

ARMOR



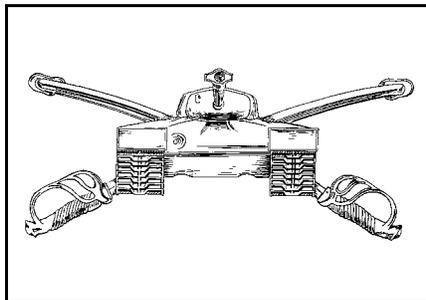
Russia's T-90: A new tank with some revolutionary features...and it's for sale



First With The Most

An early January issue of *The New York Times* featured a horrifying front page photograph of the charred torso of a Russian armored vehicle crewman, rendered *hors de combat* in the Chechnya conflict. His blackened upper body rested halfway out of the hatch, the agonized face mercifully undefinable, his hands reaching upward — perhaps in a desperate last grasp at some unseen rescuer who never came — perhaps to his Creator. It is a stark reminder to all armor and cavalymen of just how dangerous our business really is.

I've always believed that in a democratic republic the soldier's job is to fight where he or she is sent, and the civilian's job is to keep us out of fights where we don't belong. Since we can't pick and choose where we will fight, we depend upon the sound judgement of our elected officials to make the right decisions regarding use of military force. If you believe the news reports, many of the Russian soldiers sent into Chechnya don't want to be there; but because they are professional soldiers, they carry out the orders of their commander-in-chief. Once he is committed to combat, whether he wants to be there or not is irrelevant—the risk is the same to the soldier, for the consequences depicted in that stark photo are self-propelled and are subject to no man's desires. The only thing that can affect the outcome of battle, once committed to it, is TRAINING, LEADERSHIP, AND TECHNOLOGICAL DEPENDABILITY; and



right now, the Russians are receiving some harsh press as to their tactical performance against a foe that is determined to fight to the death. And while the politicians may argue over the right and wrong of intervening in Chechnya, the specter of death will continue to occupy the front page of newspapers around the world largely because of a decline in those critical areas of military competency.

I hope that never happens to us in our rush to save a dollar as we shrink the U.S. military. And I don't know about you, but I'd like to see that photograph posted in the office of every U.S. Congressman just to remind them of the terrible price of war.

* * *

At this year's Armor Conference here at Fort Knox, we will discuss those three critical areas of training, leadership and technology, and we'll examine where we've been, where we are, and where we're going as an Armored Force. It's a challenging time of fast-breaking technology and ever-changing force structure, and it behooves each of us as professional soldiers to either keep-up or get out of the way. Attend the Armor Conference if you can, and if you can't, find out what happened from someone who did. I hope to see you there.

— J.D. Brewer

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ARMOR

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LETTERS

Going in Circles

Dear Sir:

I am writing to applaud Brigadier General Philip L. Bolté for his article, "Full Circle: The Armored Cavalry Platoon," which appeared in the September-October 1994 issue. As one who was fortunate enough to have served in these magnificent organizations, I often reminisce about the "good old days" while counting my lucky stars that I was spared the frustrations that apparently face cavalry troopers of today. As General

Bolté points out, the cavalry platoon that was adopted following WWII was a mechanized combined arms team that reflected lessons learned the hard way in combat. Mechanized cavalry units of that era had to be constantly reinforced, augmented, supplemented, or in some fashion strengthened to enable them to either perform their mission or avoid suffering unacceptable losses when faced with superior opposition. Cavalry groups and squadrons were almost always supported by tank destroyer, artillery, engineer, or infantry units to make up organization/equipment shortfalls in hitting power, close-in security, urban combat, and the ability to hold ground.

The CONARC study referenced by General Bolté used as a starting point a report issued by the General Board which convened at Bad Nauheim in November 1945. The board addressed the performance of mechanized cavalry during the war. After identifying shortcomings, they made recommendations for organizational and equipment changes that would provide cavalry leaders the ability to perform all normal cavalry tasks without undue reliance on supporting troops. The organization created by CONARC was the end result of these findings. The new organization not only corrected most of the inadequacies experienced during WWII, it produced a cadre of

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officers and noncommissioned officers fully at home in a combined arms environment. In retrospect, one could almost say this particular organization provided one of the most effective training vehicles ever devised for future armor/cavalry senior leaders.

The call for mortars, tanks, and dismounts being voiced by today's cavalry troopers is identical to that heard nearly 50 years ago. Do we really need to *keep* going in circles?

CHARLES P. FRINKS
Burke, Va.

Blue-Skying: Better C² Systems

Dear Sir:

While TDY in the Stars Wars building for a 1989 NTC rotation, my thought at seeing their computer tracking system was that this is how we should all see battle. So it was with great interest I read Major Timothy Cherry's article (Nov-Dec 94 issue) on future C² systems. I agree with the need for most of the capabilities detailed in his article, but wish to offer four modifications/additions that may not have been contemplated.

For the Core Instrumentation System (CIS), I am adamantly opposed to a system that can display 'all friendly graphics in the file.' We plan missions two echelons below and must know commander's intent two levels up. That should be the limit of icon observation, with the exceptions of a task force's scout and mortar vehicles and friendly forces within our battlespace across an assigned boundary. Any more risks information overload and possible attempts to issue orders outside of the chain of command. It also signals a fundamental shift to centralized control from directive control (or mission tactics).

The CIS's E-mail system should include an interrogation capability that allows staffers to access personnel, CLASS III and V, and vehicle status as displayed in the next lower echelon's C² vehicle(s). At the company (team)/troop level, the XO should be able to interrogate each vehicle's sensor suite which would include transmitters in soldier's CVC or Kevlar helmets keyed to heart and breathing rates, in fuel tanks or slaved to the fuel gauge and in each round's tube in the ammunition racks (the latter to indicate how many rounds remain on board). The "Black Box" feature would report vehicle status. (The FSE/FSCORD's computer should be able to interrogate DS artillery CLASS V and tube status, and the S2/J2/G2's computer should have an enemy order of battle "counter," based on projected enemy strength minus BDA data.) With this capability, each echelon receives updates on personnel, CLASS III

and V, and vehicles, on demand and at rates exceeding SOP reporting requirements (as invariably is requested once battle is joined) without interrupting fighters. Near real-time data produces pushed logistics and more accurate staff estimates.

Two major additions should reach C² systems used for the orders process and the military decision-making process (MDMP). First, a software capability allowing wargaming of doctrinal enemy and friendly courses of action (COAs) should be available to assist COA development, wargaming, and synchronization. Software should allow us to depart from doctrine if intelligence or operations staffers believe the variation is necessary to accurately portray a desired COA or the fighting style of different commanders. This allows for wargaming as it is intended to occur.

Second, and closely tied to COA software, should be the ability to portray terrain in three dimensions, either with a hologram or through special computer graphics. In the MDMP, this gives a staffer the ability to "wargame in three dimensions," as alluded to by Major Michael Cloy. In an OPORD presentation, this is necessary for three reasons having to do with the way we learn and retain information. (In taking education courses to pursue teaching certification, I learned the average person receives about 75 percent of their information through the sense of sight, at first attempt retains about 50 percent of what is seen and heard simultaneously, and more easily translates an actual object, like a hilltop, into symbolism, like the hilltop's contour lines, than the reverse. This means that our orders process should be primarily a visual presentation, along with, instead of mainly through, the auditory medium. It also suggests that it should show the relationship of enemy and friendly forces and the terrain in a format that precludes as much translation between symbology and reality (i.e. the contour lines of our 2-D map into draws, spurs, intervisibility lines, etc.) as we can provide. With 3-D terrain, the critical relationship of OCOKA is shown as it is applied, instead of conjured up in different fashions in the minds of soldiers with varied experience levels.) Lastly, when in the fight, a task force can wargame a FRAGO (a reason COA software must be able to run at greater than real time) or find different movement routes on the computer and send E-mail instructions and waypoints to the task force.

These four suggestions, along with characteristics presented in Major Cherry's article, provide us with a comprehensive C² system for the future. Rapidity and a multiplicity of options are applied to our MDMP, clarity is inherent to our orders process, and battle tracking and flexibility in the fight are simplified and expedited. Together, these improvements act to increase our C² tempo and, by association, our operating

tempo, a necessity in "getting (a shrinking Army) there first with the most."

MICHAEL L. PRYOR
CPT, Armor
Co C/1-156 Armor
LAARNG

Are We Teaching "Coursemanship?"

Dear Sir:

As MG Paul E. Funk said in the July-August 1993 issue of *ARMOR*, "Active and Reserve must be full partners on the battlefields of the future. There can be no step-child mentality if we expect to fight and win." I submit to you that, in order to be full partners on the battlefields of tomorrow, we must be full partners on the training fields of today. The Armor Force needs to train together to the same standard.

Tank Table VIII is the gunnery table that tests a tank crew's ability to fight a tank in combat and win. When a tank crew qualifies on Tank Table VIII, it means that the crew has mastered all the skills taught in the preliminary tank tables I through VII. If a crew never trains on Tank Tables I through VII and just rehearses Tank Table VIII until it qualifies, do we have a crew that has mastered all the skills taught in Tank Tables I through VII? Is this a combat-ready crew? I don't think so. I think we have a crew that is well rehearsed on the test (Tank Table VIII) without learning the lessons and skills needed to be combat-ready.

The Tank Crew Gunnery Skills Test (TCGST) tests a crew member's basic gunnery skills that the tank commander taught his crew using the tank's -10 manual and FM 17-12. Tank Tables I through VII train the crew to fight the tank as a crew and win on the battlefield. Each tank table trains specific tasks. If you skip any part of the TCGST test or a tank table, you are taking a chance that a task is not taught.

ST 17-12 RC introduces a new tank gunnery training strategy designed to recognize the limited time Reserve Component (RC) tank crews have to train gunnery skills. This model changes the focus of FM 17-12 from a manual that trains crews on how to survive and win in combat to a "how-to" book on beating Tank Table VIII. In ST 17-12 RC, the TCGST is broken down into essential and nonessential tasks and the tasks, conditions, and standards for Tank Tables I through VII are changed or eliminated. According to FM 17-12, all TCGST tasks must be performed to standard prior to firing main gun ammunition, and Tank Table IV (TCPC) is a gate table

Continued on Page 50

*MG Larry R. Jordan
Commanding General
U.S. Army Armor Center*



Victory Then - Victory Now - Victory Tomorrow: Mounted Forces 1945-2005

The Mounted Force — Armor, Cavalry, Mechanized Infantry, Aviation, and the rest of the mounted combined arms team — is decisively engaged, along with the entire Army, in the effort to move into the 21st Century. The strategic vision and goals associated with Force XXI are broad and point to significant change. They also point to a tremendous enhancement in the lethality, survivability, and tempo of operations by Mounted Forces. Foremost among the Force XXI objectives is Dominate Maneuver. The other objectives — Project and Sustain the Force, Win the Information War, Conduct Precision Strikes, Protect the Force — contribute to the prime objective of dominating maneuver. The 1995 Armor Conference will focus on the mounted community's efforts and progress in this area.

A major portion of the conference will consist of hands-on demonstrations of training, doctrine, and Tactics, Techniques, and Procedures (TTP) evolving from our Force XXI work. Information will also be provided on current and fu-

ture systems such as M1A2 Abrams, M8 Armored Gun System (AGS), and Tank 1080. State-of-the-art displays by the nation's leading defense contractors will show many of the items being pursued to enhance the Mounted Force as it moves into the 21st Century. Two items we particularly look forward to displaying are the full-up AGS and an operational C-17 that can be used to rapidly deploy this superb combat system in support of contingencies across the spectrum of conflict.

The most important element of the Army as we move to Force XXI, however, is its people: competent and highly developed leaders, along with well-trained and motivated soldiers. Despite tremendous enhancements in materiel, doctrine, organization, and TTP, the true power comes from more capable warriors. That ultimate potential is achieved through training and leader development.

The 1995 Armor Conference will spotlight the training that is being developed to support the Information Age

soldiers and units of Force XXI. Innovative uses of constructive and virtual simulations, linked with live exercises by means of Synthetic Theater of War (STOW) technologies are allowing unprecedented training opportunities and effectiveness.

These concepts will come alive during the Armor Conference. As a point of contrast, we will compare innovations in mounted training, past, present, and future. Thus, the theme: Victory Then - Victory Now - Victory Future: Mounted Forces 1945-2005. Special emphasis will be placed on the 50th Anniversary of the ending of World War II, and the important role Mounted Forces played in that victory.

The Mounted Force is undergoing the most fundamental change and growth in terms of combat potential since its birth on the eve of World War II. The 1995 Armor Conference will spotlight the training that has and will enable that force to contribute to past, present, and future victories.

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



What You Can Expect From a PLDC Graduate

This is the second part in a continuing series of articles highlighting the institutional training provided at the Armor Center. Although the Primary Leadership Development Course (PLDC) is not MOS-specific and is taught at all major commands, it's just as important as the Armor-specific NCOES courses and deserves mention. Why? Because PLDC provides the leadership foundation later courses will build on! Nothing can be built without a solid foundation, and the Army's Noncommissioned Officers Academies are among the best at laying that leadership foundation. The following article will give you an idea of what to expect when your newest NCO shows up in your orderly room thirty days later, motivated, smiling and proud, with a PLDC diploma clutched in his hand. See you on the high ground!

PLDC familiarizes students with the latest in leadership doctrine and concepts. The leadership block of instruction includes what a soldier must BE, KNOW, and DO to become an effective and motivated leader: Leadership Principles, Factors and Styles, the Nine Leadership Competencies, Counseling, Equal Opportunity and Sexual Harassment, and how to take care of soldiers. Students are required to apply and demonstrate what they learned in the classroom while serving in leadership positions (one in garrison and one in a field environment). Successfully completing both leadership positions is a graduation requirement. While in these positions, student leaders conduct daily formations, inspect soldiers' uniforms and appearance, and conduct the day-to-day operations of the student body. In short, they perform tasks required of first-line leaders in units.

The communications block introduces students to the small group process, the method of instruction he will receive in Armor NCOES courses at Fort Knox. During the communications block of instruction, students learn the communications model, verbal and non-verbal communication, barriers to effective communication, and the essential elements of oral and written communications. The students' ability to effectively communicate is part of their leadership evaluation.

The supply and maintenance block provides training on supervising preventive maintenance, conducting Preventive Maintenance Checks and Services, using the DA Form 2404, and introduces the student to the Unit Level Logistics System (ULLS). The instruction given is not armor- or cavalry-specific; its primary purpose is to train students to use technical manuals to assess equipment. Students train on supply accountability and learn individual responsibilities for the care of government equipment.

Leaders must perform, and PLDC places a premium on the NCO's ability to perform professional skills commensurate with his leadership level. Students must lead a team in physical fitness training and drill and ceremonies without error. Students are trained in the proper wear of the military uniform and appearance. They reinforce this training by planning and conducting inspections. They must also learn the NCO's role in maintaining discipline, how to act and maintain discipline within their team.

Individual training belongs to the NCO, and PLDC teaches the fundamentals and concepts on how to con-

duct individual training. After classroom instruction, students prepare and conduct two individual training sessions. During these sessions students must demonstrate their ability to train soldiers in a field environment. They must also conduct After Action Reviews (AARs), with focus on the AAR as a training tool. Finally, students must learn the risk management process and incorporate the process into their training.

In the military studies block, students receive instruction on field sanitation, combat orders, rifle marksmanship, NBC skills, map reading, and land navigation, and they get an introduction to the Multiple Integrated Laser Engagement System (MILES). During this block, emphasis is placed on troop-leading procedures and decision-making. Students must apply what they learned in the classroom by planning and conducting missions in a field environment under all types of weather or visibility conditions. Cadre evaluate the student's ability to use troop-leading procedures and proper leadership techniques to accomplish their assigned missions.

PLDC, the first Noncommissioned Officers Education System course (NCOES), introduces new leaders to military leadership, communication skills, supply and maintenance, professional skills, training, and military studies. However, understand this: PLDC does not return a fully seasoned trained leader back to the unit. PLDC is a cornerstone of leader development; it provides a foundation on which to build. Combined with leadership assignments and self-development, this training will help soldiers develop into the effective combat leaders of tomorrow.

The Russian T-90/T-90S Tank:

An Old Dog With Some Dangerous New Tricks

by Major James M. Warford

It incorporates elements of the T-72 and the T-80, with some revolutionary new features, including a suite of countermeasures.

Scenario

The announcement made by the Middle Eastern dictatorship of The People's Islamic Republic (PIR) — that it was breaking diplomatic ties with its two pro-Western neighbors — did not cause widespread concern in U.S. military circles. Sighting ancient territorial claims to various sections of land beyond its own borders, the fundamentalist state was again raising the level of saber-rattling in the region. The announcement did, however, add a sense of urgency and increase the level of curiosity concerning the annual military exhibition hosted by the PIR. Widespread rumors of recently purchased military hardware not previously available from the old Soviet Union were confirmed on the opening day of "Brotherhood in Arms 95" in October 1995.

Unlike similar exhibitions held around the world prior to the collapse of the Soviet Union, this surprising show went far beyond the well known armored vehicles U.S. and coalition forces defeated during DESERT STORM. The vehicles lined up on static display and shown in mobility and firepower demonstrations included the very latest the new Russian government had to offer. The appearance of the T-80U Premium Tank and the BMP-3 and BTR-90 IFVs was overshadowed by a new variant of the T-72 MBT. While this particular T-72 had already been overlooked by many of the defense press present at the show, it did not escape the attention of the U.S. military observers. What the other attendees failed to realize is that the new technology incorporated into this new T-72 variant, designated T-90/T-90S, actually gave it an edge. The Russians were apparently exporting the very best their tank building industry had to offer. According to one source, "This is not a run-of-the-mill T-72. While certainly a member of the T-72 family, it is an entirely different animal than what the Iraqis threw at us in the desert. It is, in fact, an old dog with some dangerous new tricks..."

The first unclassified information concerning the new Russian "T-90" (See cover illustration. - Ed.) began to appear in the defense-related press in the Spring of 1993. In addition to some confusion concerning the tank's exact designation (T-90 vs. T-90E vs. T-90S), and according to published reports that the new tank incorporates various components of both the T-72 MBT series and the T-80U Premium Tank, this author has designated the Russian "T-90/T-90S" as a Hybrid Premium Tank (HPT).

In March 1993, an article appeared in *Jane's Defence Weekly* describing a tank designated T-90E. The article included a photograph of a new T-72 variant fitted with reactive armor similar to that carried by the T-80U Premium Tank (PT). While this new reactive armor is very significant and will be discussed in detail below, the tank pictured was actually the latest variant in the T-72 series known as the T-72BM MBT. While a very capable and modern tank in its own right, the T-72BM provides only the starting point for the T-90/T-90S. The T-90E designer may actually belong to a particular variant of the T-90/T-90S since the letters "S" and "E" usually refer to a tank slated for the export market.

Some of the details concerning the T-90/T-90S finally came into focus with the publication of an article, with two photographs, in the October 1993 issue of *PANZER* magazine from Japan. In the first photo, a T-90/T-90S is seen conducting a firepower demonstration or gunnery exercise alongside a T-80U and what appears to be a BMD-3 airborne IFV. In the second photo, a T-90/T-90S is shown as part of a static display parked alongside a T-80U. The first photo highlights the different reactive armor and hull skirting armor carried by the T-90/T-90S and the T-80U. In addition, the two commander's cupolas are different. This is an interesting point since the cupola carried by

the T-90/T-90S is very similar to that carried by the T-64B and the diesel-powered T-80UD. As a result, the tank commander in the T-90/T-90S can operate his commander's weapon station with his hatch closed. The tank commander on the T-80U must open his hatch and expose himself to fire the machine gun.

The second photo highlights a comparison between the T-80U and the T-90/T-90S from a frontal view. Like the T-80U, the T-90/T-90S is fitted with advanced integral reactive armor on the front slope or glacis plate. The T-90/T-90S armor, however, is a slightly different design. The T-90/T-90S wind sensor mast is clearly evident, as is the reactive armor on the tank's turret front. Unlike the turret front reactive armor carried by the T-80U, which is partially hidden from view by reinforced rubber skirting attached to the reactive armor "boxes," the new reactive armor on the T-90/T-90S is plainly visible. The new hull skirting fitted to the T-90/T-90S is also clearly visible and the three square armor plates attached to the front of the hull skirts can be seen in detail. These plates probably fill the dual function of providing standoff against attack from the flank as well as facilitating the mounting of reactive armor boxes between the plates and the actual hull skirting.

Finally, this photo shows perhaps the most important characteristic of the T-90/T-90S; the fully automated "Defensive Aids Suite" (DAS) known as the TSHU-1-7 SHTORA 1¹ mounted on the tank's turret. The three primary external components of the SHTORA 1, the two infrared jammer/emitters, the laser warning receivers, and the grenade launchers, are all clearly visible in the photo. This impressive system, which will be detailed below, provides the T-90/T-90S with a truly unique defensive capability. To date, it is the only fully developed countermeasure system of its kind in the world. One of the

most threatening aspects of this new system is the fact that the vast majority of the information available on the SHTORA 1 comes from an unclassified report on the Defendory '92 arms exhibition held in Athens, Greece.² During that show the Russian manufacturer was marketing the system for export.

The firepower of the T-90/T-90S is based upon the well-known 2A46A1 Rapira 3 125-mm smoothbore main gun. In addition to the standard 125-mm HVAPFSDS, HEAT-FS, and FRAG-HE ammunition, there are two new types of ammunition available. The first type includes improved capability versions of the standard rounds. The Russians have made a concentrated effort to improve the capability of their conventional tank ammunition and have introduced new versions of all three types. The new HVAPFSDS round, designated the 3BM32, incorporates a depleted uranium long-rod penetrator. To this author's knowledge, this new round has not been used in combat. The first new HEAT-FS round, the 3BK29, reportedly has a hardened nose that can push through reactive armor and still penetrate at least 300mm of armor angled at 60 degrees. The second new HEAT-FS round, the 3BK27, has been developed but not yet put into production. This tandem projectile has **three** HEAT charges; the first detonates the reactive armor, the second charge is then fired to initiate the penetration of the target's main armor, and then the third charge is fired to complete the destruction of the target.³

The second type of ammunition available to the T-90/T-90S (as well as the T-72S MBT, T-72B MBT, T-72BM, T-80U, and T-80UD) is the 9K120/9M119 laser beam-riding antitank guided missile system. Known as the AT-11 SNIPER by NATO, the system actually includes two slightly different main gun-launched missiles. The SVIR missile is the less sophisticated of the two, and cannot be fired while on the move. This missile is used by the less sophisticated T-72 MBTs. The more capable REFLECKS missile can be fired on the move and is used by the T-72BM, T-80U, T-80UD, and T-90/T-90S. The two-piece missiles are loaded by the tank's automatic loading system and have a maximum effective range of 5,000 meters with a maximum armor penetration of approximately 750mm. There are some unconfirmed reports that the missiles have the ability to de-

feat reactive armor-protected tanks.⁴ Finally, these missiles are being offered for export by the Russians at a cost of \$40,000 per REFLECKS missile.⁵

The other key component of the T-90/T-90S firepower concerns the tank's fire control system. Labeled the "Perfect" fire control system by the Russians, it consists of the computer-based system taken from the T-80U. It includes a laser rangefinder and, possibly, the AGAVA thermal sight for the gunner. (Some of the available sources say the T-90/T-90S is fitted with a thermal sight while others continue to say that a passive light amplification sight is fitted.) The fact that the T-90/T-90S is the first Russian tank since the T-54B Model 1952 MBT not to be fitted with IR searchlights may indicate that, if the tank does not have a thermal sight as yet, it could be added in the very near future. The lack of these standard IR searchlights is one of the key recognition features of the T-90/T-90S.

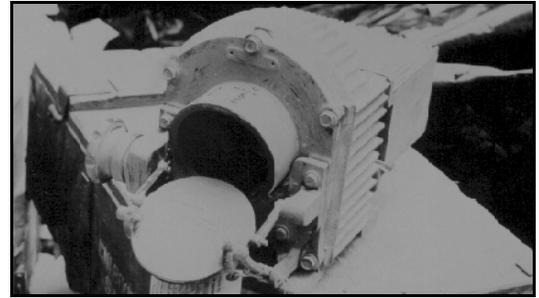
The mobility characteristics of the T-90/T-90S are impressive for a diesel-powered Russian tank, but are not revolutionary. The photographs confirm the use of the T-72BM hull and suspension system. Although some sources report that the complete turret from the T-80U is fitted, the available photos and more recent information confirm that both the hull and the turret are from the T-72BM. The tank is powered by the Model V-84 840-hp diesel engine that provides a power-to-weight ratio of 18.06 hp/ton and a maximum road speed of 60 kph. The operating range of the tank is 470 km and its combat weight is 46.5 tons.⁶

Perhaps the most significant of all the T-90/T-90S characteristics is the truly innovative defensive protection carried by the new tank. For the first time a tank has been designed and fielded incorporating a "three-tier" protection system. As has been reported previously in the pages of *ARMOR*, a modern tank fitted with composite/laminate base armor and then fitted with reactive armor would have a level of armor protection beyond the capability of most antitank weapons.⁷ The significance of this long-standing threat can be measured in the huge effort being undertaken in the West, as well as Russia itself, to field antitank weapons with the capability to defeat tanks protected by reactive armor. The Russians apparently came to the conclusion that,

in spite of the success achieved by the combination of composite/laminate and reactive armor, additional protection was required to deal with the changes in antitank weaponry. As opposed to the traditional effort of minimizing the damage done to the tank after being hit, the Russians decided to refocus their efforts on minimizing the possibility of the tank being hit. The appearance of the T-90/T-90S has ushered in the Defensive Aids Suite (DAS) era.

The unclassified information concerning the composite/laminate base armor of Russian tanks is extremely limited. It is known that the T-64 series, T-72 series, and T-80 series tanks incorporate composite/laminate turret front and front-slope or glacis armor. While the exact design and capabilities of each type of composite/laminate armor used probably vary according to the tank's intended role and export status, tanks fitted with this type of armor have long been available on the export market. Since DESERT STORM, photographs of destroyed Iraqi T-72M1 MBTs clearly show their front-slope armor to consist of a five-layer array, with two outer layers of steel, two middle layers of a non-metallic material, and a single inner layer of steel. Although the armor carried by the T-90/T-90S is certainly more advanced than this old design used by the T-72M1, the description above does provide some insight into the work the Russians have been conducting concerning "combination armor" since the 1960s. The most likely scenario is that the T-90/T-90S incorporates the same advanced frontal armor carried by the T-80U. Since the fire control system from the T-80U is already a part of the hybrid T-90/T-90S, it can certainly be assumed that the most effective armor design available would also be used.

The capabilities, advantages vs. disadvantages, and significance of reactive armor have been discussed in detail in the defense-related press for many years. Reactive armor such as Israeli Blazer armor, first identified in 1982, and Russian first generation reactive armor, seen fitted to the T-64BV and T-80BV (V=VZRYVNOI or explosive) in 1984/85 are fairly well known. With the introduction of the T-72BM, T-80U, and T-90/T-90S, however, the reactive armor equation has changed. Known as advanced integral reactive armor, second generation reactive armor, or by the market name of "KONTAKT-5,"⁸ this new reactive armor may force the



An early — and unsuccessful — attempt at a countermeasure to missiles like the TOW and Dragon, these infrared “dazzlers” (above) were discovered on Iraqi tanks in DESERT STORM.

The device is mounted on the top of the left side of the turret roof, next to the hatch, in photo at left. Newer versions appear on the T-90 (see cover illustration) above main gun mantlet.

majority of the world’s weapons designers back to the drawing board.

According to *Armed Forces Journal International*, KONTAKT-5 was shown by the Russians during an international arms exhibition held at Nizhni Novgorod in September 1994. First identified in 1989 carried by the T-80U, the September arms show was the first time the new reactive armor was shown to the public. The capabilities of KONTAKT-5 reportedly go far beyond those of the older, more well-known reactive armor. “Unlike the first generation explosive reactive armor, the new KONTAKT-5 helps defeat both shaped-charge warheads and kinetic energy tank rounds.”⁹ If fitted to a T-55 MBT, KONTAKT-5 will increase the armor protection level against kinetic energy ammunition from the equivalent of 200mm of RHA to the equivalent of 480mm of RHA.¹⁰ If KONTAKT-5 does have the ability to significantly degrade the penetrating power of APFSDS and HVAPFSDS ammunition, the T-90/T-90S (and maybe the T-80U and T-72BM as well) may constitute the single most serious threat to U.S. and Western armored forces since the appearance of the T-64 Base Model in 1967.

The third tier of the T-90/T-90S protection system is certainly the most revolutionary characteristic of the new tank. The TSHU-1-7 SHTORA 1 (meaning shutter or blind) Defensive Aids Suite was developed by the Russian Mobile Vehicle Engineering Institute in St. Petersburg. The system consists of two to four laser-warning-receivers (LWRs), one or two wide-band

infrared (IR) jammer/emitters, special grenades fired from the tank’s standard turret grenade launchers, and a central computer.¹¹ An examination of the photo that appeared in *PANZER* confirms that the T-90/T-90S is fitted with

special grenades are automatically fired from the tank’s grenade launchers. The aerosol smoke screen created by these grenades obscures the targeted tank from the source of the laser beam, thus preventing the guidance of the projec-

“...The tank’s LWRs detect the projectile’s guidance beam as soon as the targeted tank is illuminated. Once the beam is detected, the turret is automatically oriented in the direction of the laser beam and special grenades are automatically fired from the tank’s grenade launchers.”

at least two sets of LWRs on the turret roof (above the main gun and above the turret storage box on the left side of the turret) and two IR jammer/emitters (one on each side of the main gun). According to published reports, the system is designed to counter semi-automatic, command to line-of-sight (SACLOS) antitank guided missiles and laser-guided projectiles.

Against ATGMs, the two IR jammer/emitters confuse incoming missiles by causing the missile launcher to lose contact with the missile’s IR locator or beacon while the missile is in flight. Without receiving the correct guidance instructions from its launcher, the missile simply flies into the ground short of the intended target. The two IR jammer/emitters are permanently turned on while the tank is in combat.¹² Against laser-guided projectile attack, the tank’s LWRs detect the projectile’s guidance beam as soon as the targeted tank is illuminated. Once the beam is detected, the turret is automatically oriented in the direction of the laser beam and spe-

tile to the target. The smoke screen requires less than three seconds to fully develop and lasts for about 20 seconds. According to the Russian company’s brochure, the SHTORA 1 DAS can operate continuously for six hours and is most effective against antitank weapons like the U.S. TOW, DRAGON, HELLFIRE, MAVERICK, and laser-guided artillery projectiles. The brochure also states that the SHTORA 1 reduces the chance of a tank being hit by the weapons listed above by four to five times.¹³

Although the SHTORA 1 DAS has not been tested in combat, two much less sophisticated counter-ATGM devices were employed by the Iraqis during DESERT STORM. Known as “dazzlers” in the defense-related press, each consisted of a small IR beacon mounted on the turret of Iraqi T-72M1 MBTs. The first, apparently manufactured in Iraq, used a ventilated cylinder housing with a small round door at the front to protect the light. The second, reportedly imported from China, was carried in a different housing that was

The Russian T-80U is another first-line tank now available to the export market. Since the breakup of the Soviet Union, the old policy — of selling only less-capable equipment — has changed in light of the need for hard currency.



round at the front but box-shaped at the rear. While also using a small round door at the front, this device had a much more sophisticated overall appearance than the first. Both systems emitted an IR light that was intended to confuse the IR tracker of an ATGM launcher, thus preventing it from sending the correct guidance instructions to the in-flight missile. According to published reports, these two systems did not perform well during the war. Although these two Iraqi systems are similar in some ways to the T-90/T-90S SHTORA 1 DAS, they represent the infancy of this technology and are certainly generations behind the comprehensive capabilities of the SHTORA 1.

The three-tiered protection system incorporated into the T-90/T-90S (advanced composite/laminate base armor, KONTAKT-5 second generation reactive armor, and the SHTORA 1 DAS) provide this new tank with a higher level of protection than any other former Soviet or Russian tank. It appears that the Russians have managed to produce a new tank that incorporates a level of protection approaching that of much larger and heavier U.S. and Western MBTs, within the size, shape, and weight constraints of the T-72BM.

The T-90/T-90S was first shown to the public at an arms exhibition held near Moscow at Kubinka in the summer of 1993. The status of the new tank in Russia and the Russian Army, however, is not clear. One unclassified source reports that the T-90/T-90S is in full production and has been delivered to the Russian Army.¹⁴ Another source reports that a series of competitive trials were

held in June 1993 putting the T-90/T-90S up against the T-80U. While the results of this competition are not known, the goal was apparently the adoption of the competition winner as the single “unified tank” for the Russian Army.¹⁵ When the innovative technologies and advanced capabilities of this new tank are combined with the fact that it is here today (and potentially already fielded by the Russian Army), the T-90/T-90S can only be regarded as a very serious threat. What makes the T-90/T-90S even more dangerous is the very real possibility that it will appear on some battlefield in the near future with non-Russians at the controls.

Notes

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⁴Foss, Christopher F., “Missile-firing T-90 is Russia’s Latest MBT,” *Jane’s Defence Weekly*, 6 March 1993, p. 5.

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Gates,” *Armed Forces Journal International*, November 1994, p. 32.

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¹⁰Ibid.

¹¹de Briganti, Giovanni, “Russian Firms Tout Three Tank Defensive Systems for Export,” *Defense News*, 27 September 1993.

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¹³Ibid.

¹⁴Shishlevskiy, p. 111.

¹⁵Zaloga, Steven J., “Trends in Russian Tank Design,” *Jane’s Intelligence Review*, June 1994, p. 248.

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Caucasus Nightmare

Red Dawn in Chechnya: A Campaign Chronicle

by Adam Geibel

This article was assembled from unclassified sources, in most cases without comment. Some reports required interpretation or extrapolation, which are italicized. This article is not meant to be definitive, as 'hard' information coming from the conflict area through civilian sources can be distorted, ignored or misinterpreted.

"Freedom is their God, and war is their love. They repay good for good and blood for blood"

Lermontov's description of 19th Century Chechens, in 'Izmail-bey'

Prelude to Civil War

The dissent along the southern edge of the old Soviet Empire can be traced back to one of Stalin's legacies — ethnic resettlement. 'Enemies of the State' — usually minorities who allegedly supported the Nazis — were transported *en masse* thousands of miles away and not allowed to return for decades.

In reality, this policy served two purposes: populating desolate areas, and making room for reliable European Russians in the more desirable areas. Now, the ethnic minorities are back, and they don't want anything to do with Moscow, 1,000 miles to the north.

To the south is the large and independent Georgian Republic, to the southeast Azerbaijan. Even after the major republics split from the CIS, areas within the Russian Caucasus have been splintered.

Just to the west, Moscow backed Northern Ossetia's bid to separate from Georgia. The North Ossetians then moved against Inguish on 31 Oct 92, aided by a regiment of the Pskov Airborne Division. By supporting the Ossetians, the Russians created a power base at the western edge of Inguishtan around the garrison town of Vladikavkaz.

The Inguish Republic, repopulated with a returning Muslim minority similar to the Chechens and Dagestanis, split from Chechnya in 1992.

The litany continues. Moscow has been involved in the Nagorno-Karabakh debacle in Azerbaijan since 1988, po-

liced a truce in Southern Ossetia (trying to succeed from Georgia and join the North) and helped Abkhazia secede from Georgia in 1993.

Chechnya

Under the leadership of Dzhokhar [Jokhar] Dudayev, a former Soviet Air Force bomber pilot and general, Chechnya unilaterally seceded from Russia in 1991. Since the region has strategic value for Moscow — Grozny's refineries had produced 8 million barrels a year and rail lines to the south passed through the territory — Yeltsin's advisors fear that Chechnya (smaller than New Jersey, with 1.1 to 1.3 million inhabitants) would slip away for good.

Among Moscow's complaints are that the area is a haven for the revenue-draining Russian Mafia and that black market



arms, oil, stolen automobiles, and narcotics smuggling are rife. Russian sources speculate that every Chechen household has at least one fully automatic (and illegal) weapon.

Dudayev's popularity amongst Chechens slips as crime and corruption spread throughout the republic. Since its declaration of independence, the breakaway government thumbs its nose at Moscow and is the target of several covert operations aiding anti-Dudayev forces.

Will Chechnya be the first of the CIS hodgepodge of 89 separate states — including 22 'republics' and 10 auto-

mous regions — to secede? If so, the danger to the rest of the world lies further down the road, should Russia's nuclear arsenal fragment as well.

* * *

Late November, 1994

With instigation and material support from Russian Intelligence, anti-Dudayev forces move against Grozny — a city at the foot of the Caucasus mountains. Dudayev loyalists claim 20 tanks destroyed, 350 dead, and 120 Russian mercenaries captured in the fighting.

For the next week, Yeltsin, Counter-Intelligence¹ Chief Sergei Stepashin, and Defense Minister Pavel Grachev deny giving Dudayev's opponents anything but political aid. However, Moscow relatives of the POWs in Grozny publicly identify them as members of the Russian Army. The commanding general of the 'Kantemir' Division resigns, protesting the use of his men as pawns.

* * *

7 December 1994

When Chechnya threatens to execute the Russians, Yeltsin is forced to play his hand. He gives Dudayev a 48-hour deadline for Chechen forces to lay down their arms and receive limited amnesty. When the 6 a.m. (Thursday, 9 December) mark passes, Russian forces mass along Chechnya's borders. Yeltsin offers to extend the deadline to 0001 hrs, 11 December.

* * *

10 December 1994

Dudayev's opponents use sophisticated fighter-bombers (possibly Su-25 Frogfoots) against loyalist forces, which indicates more materiel aid from Moscow.

Thirty An-12 transports land airborne forces in Northern Ossetia, carrying an estimated 6,000 troops [*rough description of an airborne division*] and their equipment. Mi-6 Hooks, still in civilian Aeroflot blue and white markings, provide tactical lift capability [*Note: Equipment in the area of operations could also indicate the presence of an air assault brigade*].

Chechen claims Dudayev's forces number from 12,000 to 13,000 guerrillas, though Russian military sources estimate only 3,000 are well-armed. Their weapons range from shotguns and WWII-era bolt-action rifles to AK-74s and RPG-7/16s and 18s, without appreciable heavy assets like AA, heavy artillery, or tanks. There is speculation that the rebels have access to Stingers, [*more likely SA-7/14s*]. One source claimed that the rebels could muster 50 'tanks' [*a typical civilian press misnomer for anything with a gun and tracks*.²]

However, one must remember that a healthy percentage of Russia's population had been drafted and spent enough time in uniform to learn how to use a Kalashnikov or RPG. The Islamic locals have a long tradition of independence and sheer hate for Moscow's edicts. Their threats of guerrilla warfare carry the weight of history.

Dudayev's forces wear civilian clothes or a mixture of Soviet army cast-offs, a green bandana (symbolic of Islam) the only uniform item. Their resolve is grim; they organize in 'death brigades.' After Dudayev declares a *gazavat* (holy war), Interior Ministry propaganda asserts that 2,500 guerrillas are from neighboring Islamic republics and countries.

Apart from a Abkhazian battalion contingent, the reports will turn out false — intended to inflame public opinion against an Islamic tide. However, an estimated 98 percent of the area's residents are not practicing Muslims. Dudayev's call is a political one, not religious.

* * *

11 December 1994

Russian forces enter Chechnya in a three-prong attack, from the north, west, and south. From the beginning, the invasion commanders massively underestimate Chechen resistance. As soon as Russian forces leave their assembly areas behind the border, they come under harassing attacks. At least 20 Russian troops are captured in the first day.

In addition to Russian paratroops, the force is estimated to include another 35,000 men organized ad hoc in four divisions for the Chechen operation. Among them are Spetsnaz commandos, professional officers, Interior Ministry troops, intelligence service officers, contract soldiers hired from Russia's unemployed, and teenaged conscripts.³

The University of Edinburgh's John Erikson, a Russian military specialist, points out that coordination between these different elements is chaotic, with no clear command structure. Moving troops at the beginning of winter is another blunder.

This task force, while equipped with T-80s, T-72s, BMP-2s and BMDs, *has no time to work out their tactical and administrative problems. In the weeks to come, the supply situation will become grossly inadequate.*

Reuters reports that the northern column consists of 400 vehicles: APCs, tanks, SPAA weapons, mine-clearing vehicles and bridge-layers, as well as light river boats carried on transporters.

In Grozny, local television broadcasts instruct viewers on how to fight tanks in the city, how to make Molotov cocktails, and how to use RPGs.

Facing Russian threats, some of the anti-Dudayev forces put aside their differences to defend their homeland. *As in the Balkans, invariably some of these militias were pre-war criminal gangs now infected with patriotic fervor.* Moscow fears that ethnic Chechen criminal gangs could become terrorist cells — at least one BTR-70 checkpoint is deployed at the city's outskirts.

As Russian troops roll, Yeltsin will disappear from public view for the next 16 days — in the hospital for a sinus operation. There will be speculation that Yeltsin's advisors — including General Grachev — will deliberately keep the President isolated.

* * *

12 December 1994

Fresh snow covers the Caucasus. Rebel night raids, 'just enough to cause panic,' force the Russians to deploy troops to protect rear-echelon units.

The Inguish (western) column is ambushed and 30 vehicles set afire, while 48 prisoners were taken from the southern column by Dagestani irregulars — apparently without much Russian resistance. The southern column was under orders not to fire on civilians *and was apparently not expecting resistance.*

The first rumors of trigger-happy Russian troops firing on reporters and refugees filter out of the area.

13 December 1994

The chinks in the Russian suit of armor become apparent. AFV crewmen are seen constantly adjusting carburetors and using buckets of puddle water to refill radiators at each stop. Rations and drinking water are in short supply.

There are more allegations of atrocities. Just outside of Assinovskaya, at around 1800 hrs — Russian troops fired on a group of refugee automobiles, killing up to nine civilians. Eyewitnesses reported that the Russians knew the civilians were unarmed and removed all of the bodies. Subsequent searches revealed empty cartridge cases, riddled and bloodstained vehicles, AFV tracks, but no bodies. Russian intelligence sources admitted the firing, but claimed it was in response to a guerrilla attack.

Along the Western route, Ingush locals sabotage rail lines and throw up roadblocks. The Western press counts seven burnt-out trucks on the road from Ingushetia, while others, with their tires cut, have been towed away. There are reports that Russian troops retaliated, burning a mosque and six homes.

A Russian pattern will emerge during the campaign — of assault, then resupply and reorganization under a flag of truce, then another assault.

* * *

14 December 1994

The western column is stopped by sniper fire 18 miles from Grozny at Sleptsovskaya. Alongside the highway, a Grad missile launcher sets up to fire on Achkoi-Martan four miles ahead. Reports indicate 100 Russian POWs taken to date.

The Russian public begins to experience its first 'TV war.' Not only are the usual Western press agencies covering the fighting, but ITAR-Tass (the semi-official Russian news source), NTV (Russia's biggest independent television station) and a gaggle of other Russia media types are in the area. *Unlike Desert Storm, the Russian military appears to have no cohesive press policy.* Reports often appear unedited. Images of refugees, of rebels filled with religious fervor, of bombed-out buildings, of dead Russian soldiers are brought right into the citizens' apartments.

Afghanistan was a war fought in public denial by the government. Even a little over a year ago, *Swan Lake* played on Russian TV as tanks shelled the Parliament Building.

The Chechen coverage is not without a political agenda. Vladimir Gusinsky, MOST Bank president and the media magnate (owner of NTV, the newspaper *Sevodnya*, and radio station Echo Moskv) is a political enemy of Yeltsin's. His offices were recently raided by masked government law enforcement officers.

* * *

15 December 1994

The deadline comes and goes while TASS notes that 'not a single gun has been turned in...' Another deadline for 18 December is set.

Chechen rebels freely admit that they will take regular Russian troops prisoner, but not special forces... Dudayev threatens to execute one Russian PW for every air raid, but never carries it out.

* * *

16 December 1994

Facing a human chain of several hundred civilians, the western column's leader, General Ivan Babichev, halts his

troops. At 1400 hours, Babichev and Col. Gennady Kandalin (both of the 19th MRD) met with Chechen leaders and journalists in Novo-Shurvoi, 20 miles from Grozny. Babichev hugs some weeping mothers and declares that his troops will not fight Chechen civilians, a statement bordering on mutiny.

The troops echoed their General's statement, and morale plummets. The column will not move for more than a week.

There are threats to use 'rockets' on Grozny if the rebels do not respond to the latest ultimatum.

According to the International Red Cross, since 11 December Grozny's estimated prewar population of 400,000 has shrunk to around 100,000 as women and children headed for fortified farms in the countryside and guerrilla fighters arrive. Many of the civilians that remain are too old to run or have no place to go.

* * *

17 December 1994

Russian bombers knocked out five bridges along the Terek River, *presumably to cut the flow of refugees and Chechen reinforcements.* A Russian MASH unit sets up in Vladikavkaz. Western media estimates Russian casualties range from 16 to 70 KIA.

Three hours before midnight, Dudayev agrees to talks but Yeltsin rejects this as 'inadequate.'

The northern column halts 6-10 miles outside of Grozny, and at 2100 hours, Russian tanks fire on Chechen-held villages around Grozny and Russian aircraft bomb Grozny proper.

* * *

18 December 1994

Under a new coat of snow, Russian air force jets bombed military and civilian targets in the Grozny area. Moscow claimed that shelling knocked out 16 rebel tanks and APCs, five aircraft (*apparently Su-17s*), two artillery pieces, a missile launcher, and an ammunition dump.

An Mi-8 helicopter is downed intact *by rebel ground fire*, the injured pilot executed. Apparently, the copilot and *crew chief* were already dead. ITAR-Tass reported that, in addition to the two crewmen, two military doctors were on board.

* * *

19 December 1994

The northern column was within five miles of Grozny after capturing the fortified village of Petropavlovskaya. Another column, engaged in small arms and tank duels, halted in Dolinskoye, a western suburb. Twenty-four hours after spurning Yeltsin's last cease-fire offer, Dudayev presses his own appeal.

* * *

21 December 1994

Western media show a unit of very young Russian infantrymen who surrender to the rebels *en masse.* *Their faces look like the German children sent to face the Soviet horde in April, 1945.*

Russian jets with gravity bombs begin hitting indiscriminate targets. They will continue this for the next ten days, in concert with long-range artillery bombardments, allegedly targeting industrial and utility sites within the city. They

will hit some viable targets, as well as an orphanage, a hospital, and countless buildings of no military value.

One reason for the poor accuracy was the token use of *expensive* laser-guided weaponry. The other was pilot proficiency — most had logged only 30 hours flight time in the previous year.

* * *

22 December 1994

Russian forces step up pressure on Chechen strongpoints, often using Mi-24 Hinds for rocket attacks when the weather permits. Dolinskoye, 15 miles northwest of Grozny, continues to hold out in defiance of Russian tank fire.

* * *

24 December 1994

GEN Eduard Vorobyov, ground forces commander in Chechnya and commander of last summer's joint Russian-American military exercise, is relieved of duty. Allegations fly that Moscow has been issuing all orders over the phone, without written backup, in order to maintain 'plausible deniability.'

Deputy Minister LTG Valery Vostrokin told the AP that all he had seen "are drunken soldiers and drunken officers manning the posts." One sergeant tells a Russian reporter that his battalion has 25 AWOLs.

* * *

26 December 1994

Avlur Dudayev, Dzhokhar Dudayev's son, was seriously wounded in fighting outside of Grozny. His location is unknown.

Only now do Chechen rebels prepare bunkers and fighting positions within an 800-meter radius of the Presidential palace, formerly the offices of the Communist Party. They vow to hold the building at all costs, which promises to be a tough nut to crack. The structure was built to shelter citizens from the effects of a nuclear attack.

* * *

28 December 1994

INTERFAX News agency reports at least 17 known Russian deserters.

The inexperience of young Russian tank crews becomes apparent as T-72s slide on mud-covered roads. An anonymous Russian colonel thought the drivers might have been exhausted and falling asleep, but they were simply incapable of dealing with the difficult conditions.

Yeltsin announces a "government of national revival" for Chechnya, to be headed by Salambek N. Khajiyev and other members of Chechen opposition groups. *Nothing more is heard of this puppet-government-in-waiting for two weeks.*

* * *

30 December 1994

The tempo of aerial bombardments increases. An ammonia plant is bracketed and damaged. Admitted Russian casualties to this point are 61 KIA, 187 WIA.

The war in Chechnya is expensive, estimated by the newspaper *Izvestia* to cost 1 percent of the Russian GNP. The Russian army budgets \$56 to \$60 million, the Interior Ministry another \$18 million. Both Western and Russian economists' speculation fluctuates on how much more the fighting \$ and rebuilding — will cost, and whether it will endanger a \$6.4 billion IMF loan.

New Year's Eve Strike

The desultory air and artillery strikes of the past week built to a crescendo during the day, a prelude to the mechanized Russian assault of 2,000 troops [*a rough description of an MRR*] with the railway station their objective. The Chechens anticipate the assault and bus in more fighters throughout the day, though Dudayev can rely on only 5,000 men.

On top of bad morale and an exhausting advance on the city, none of the Russian troops have maps of the objective,⁴ nor have they received any MOUT training prior to the assault. Reported incidents of 'friendly fire' are rampant. Somehow, the lessons of Stalingrad, of Budapest, Prague, and Afghanistan are forgotten: the covering infantry become separated from the tanks, *or more likely wait too long to dismount, according to one PW's commentary.*

A motorized rifle battalion's BMP-2s took the brunt of the slaughter at the railway station; 30 survivors spend the next ten days barricaded in two nearby apartment buildings. A few blocks away, a group of cut-off paratroopers dig in and wait for help.

At the end of the day, Chechen fighters boast of 50 tanks destroyed. Film footage shows a massacre: a square full of smoking BMP-2s, an isolated and shattered BTR, rebels firing from the cover of a pair of disabled ERA-fitted T-80s, a street full of burnt-out T-72 and BMP-2 hulks. Russian and Western press counted nine AFVs knocked out in the Central Square.

The Chechens use ancient tactics — disabling the vehicle with an RPG or Molotov, then shooting the panicked occupants as they bail out. One driver fires back with his Kalashnikov as Chechen guerrillas close in. Fueled by religious fever, Chechen RPG gunners roam about, eagerly searching for targets.

Izvestia will report that Grachev orders the attack while drunk, offering to award a medal if Grozny is taken by his birthday, 1 January.

Regrouping

1 January 1995

Russian troops lick their wounds. Vladimir Chudinov, a 19-year-old infantryman and PW, claims to be the only train station assault survivor of his 120-man company. His unit had arrived in the AO 27 December 94.

Spetsnaz forces thoroughly search all traffic coming from Dagestan while a BBC producer and her crew are arrested while trying to film impact areas from Tolstoy-Yurt.

Today will be the last specific report of the immobilized western column.

In the weeks to follow, General Babichev will not be mentioned, yet there will be implications that his men are moving again.

* * *

2 January 1995

For three hours, SU-27s rocket and bomb Shali, claiming a few empty autos and two buses reportedly full of civilians.

3 January 1995

Defense Minister Grachev declares that his troops control central Grozny. However, most Russians in that area are dead or wounded.

ITAR-Tass reports that an 'elite ground unit' and a naval infantry unit are enroute from Murmansk, and that other units are on the way from the Urals (The MRD at Yekaterinburg [?]) and the 'Tula' Airborne Division) and the Far East.

Troops of the Russian-backed, anti-Dudayev 'Chechen Provisional Council,' led by Russian Labazanov, attack Russian units.

* * *

4 January 1995

Fighting in the city is sporadic, with middle-aged, white-haired Chechens holding the teenaged Russians off with rifle fire. Yeltsin orders the "end of the bombardment of the capital of Chechnya," but the fighting continues.

* * *

5 January 1995

Chechen sources claim that only a handful of the 200 AFVs used in the New Year's Eve attack were T-80s, and that 100 AFVs were knocked out. Infantry support was allegedly minimal. Estimates rise to 300 Russians KIA during the attack.

Pavel Feltgengauer, a Moscow military analyst for *Sevodnya*, theorizes that the Russian forces used outdated tanks that were to be disposed of under the CFE Treaty. *However, no T-54/55s are seen on film — only standard issue AFVs.*

* * *

7 January 1995

Russian forces start using MOUT tactics reminiscent of Stalingrad, with infantry moving up building-by-building and tanks in direct support. Some units are reported to be within 1500 meters of the Presidential Palace. Cracked gas mains and buildings throughout the city burn unchecked, but Chechen forces still hold the palace. Artillery fire support was estimated at 15-20 rounds per minute while the city the Russians have come to save crumbles.

The Chechens are capable of return fire. The commander of the Russian Interior Ministry forces, MG Viktor Vorobyov, is reported killed by a rebel mortar burst. Two senior officers are wounded in the same attack.

Russian authorities admit to 256 KIAs and claim 2,500 rebel casualties. Unofficial sources put the figure at 2,000 for each side. Civilian casualty figures are unavailable, but estimated to have been heavy due to indiscriminate Russian bombing.

Over the next several days, ground fog will cloak the fields around Grozny. MAJ Andrei Ivanov and 12 paratroopers are captured by rebels in the hills outside Alkhazurovo, while on a search-and-destroy sweep.

* * *

8 January 1995

Dudayev has abandoned his bunker underneath the Presidential Palace, Russian press reporting that he had fled to a mountain hideout 25 miles southwest of Grozny.

Russian artillery intensifies to 12 rounds per minute in support of an attack on the railroad station. The attack is beaten back, but 29 Russian AFVs reach the central market,

where they are able to fire on the Presidential Palace. Film of Palace defenders shows good tactics: standing well inside to hide muzzle flashes while firing through windows, moving quickly to alternate positions after firing RPGs, and using spotters. The same film also shows the rebels resupplying with abundant small arms ammunition.

* * *

9 January 1995

Russian infantry move up to within 900 feet of the Palace and are building up their strength. More T-72s and BREM 1/2 ARVs move into town past heavily armed but exhausted-looking troops. *TIME* identifies the 131st Brigade and the Volgograd Division as part of the Russian reinforcements, versus 7,000 rebels.

Outside of Grozny, Spetsnaz troops engaged in an unimpressive bout of rifle practice criticize their higher officers, admit their morale is low and their purpose unknown. Their commander candidly reveals that his men are undisciplined and his unit is subject to constant sniper attacks and nighttime minings. At another location, an Interior Ministry major echoes the same warnings, telling the camera crew that he and his troops just want to go home.

While leaving the area, a film crew covers 30 T-72s and assorted softskins moving up to Grozny. Other sources report 40 tanks due west of Grozny, presumably the same unit, *indicating elements of another MRR.*

Russian military sources claim to have inflicted 500 rebel casualties today alone. Meanwhile, the 300 or so Russian dead lying in Grozny's streets are being eaten by dogs. Fearing disease, the rebels shoot the dogs.

The Russians officially offer a 48-hour cease-fire, primarily to recover the dead and wounded. Locally, the offer is challenged by both sides. One cynical rebel thinks that the Russians are deliberately avoiding one, so that the Russian leadership cannot issue exact casualty figures.

Prior to Moscow's cease-fire offer, the local commanders threaten to level Alkhazurovo, a town of 6,000, unless 45 Russian PWs held in the Presidential Palace are freed by the rebels. Civilian residents and Groznian refugees evacuate Alkhazurovo immediately. All but three PWs had been moved by the rebels to the town of Shali, where a dozen are put on display for the media.

* * *

10 January 1995

The 0800 48-hour cease-fire in Grozny lasts all of two hours, with the heaviest fighting on Victory Street and just across the Sunzha River bridge. Russian bombardment recedes to one round every two minutes.

Both sides claim the other has advanced under cover of the cease-fire. Russian forces are within a few hundred feet of the palace, while civilian food and water supplies are critically short.

Moscovite civilian protesters question the number of lives and rubles this war is costing Russia. Yeltsin asks liberal Foreign Prime Minister Victor Chernomyrdin to arrange a truce, despite friction from Yeltsin's hawkish advisors (including his aide, Oleg Lobov, Vice Prime Minister Oleg Soskovets, and Interior Minister Nikolai Yegorov, in addition to Grachev and Stepashin).

11 January 1995

One month since the invasion began, Russian forces are still bogged down in city fighting. Yeltsin takes command of the Russian military, amid speculation that this disaster is a 'set-up' by General Grachev to discredit the President. Russian press insists that between Moscow and the front lines are multiple layers of incompetents and political hacks masquerading as officers.

Writer Alexander Solzhenitsyn tells ITAR-Tass that the northern territories of Chechnya, with ethnic Russians, should revert to Russia, and that the traditionally-Muslim southern territories be allowed independence.

* * *

12 January 1995

As the 48-hour cease-fire officially ends, Russian troops renew the assault. A heavy artillery barrage promptly begins at 0800 hrs and a column of 100 Russian vehicles approaching from the west turns to reinforce positions north of the city. By the end of the day, Russian positions surround the city center on three sides. Only the southern approach remains open.

Chechens report chasing off Russian looters near Alkhai-Yurt.

The operations are estimated to cost Russia \$25 million a day, and recovery will be around three trillion rubles (\$850 million).

* * *

13 January 1995

Between 0700 and 0900 hrs, 20 rounds per minute fall on the city and the rebels are pushed into a pocket around the Presidential Palace. INTERFAX reports another column of 77 AFVs and 55 'troop carriers' (trucks?) left Inguishtan for Grozny. Moscow announces that its hand-picked Committee of National Rebirth is working with local governments in 5 of 11 Chechen regions.

* * *

14 January 1995

Unopposed pairs of Mi-24s circle city targets at NOE heights amidst continued heavy bombardment. Bombers strafe the southern access road, then troops close it after seizing buildings on the Sunzha's north bank. The BBC reports that Russian troops momentarily entered the Parliament building but were repulsed.

The Prosecutor General's office announced that it was considering filing charges against some high-ranking officers who refused to take part in the Chechen fighting.

With their ammunition supplies critically low and the Parliament defenders cut off, rebel mechanics struggle to bring one captured T-80 back on line. The bombardment has eroded the upper floors of the Presidential Palace, which still houses an estimated 100 rebel defenders.

* * *

15 January

One news program announces that Dudayev's son is KIA. The rebels also report Russian troops are fighting room-to-room in the Parliament building, that naval infantry have

joined the fighting, and one Russian drive on the locomotive depot is surrounded on three sides.

* * *

16 January 1995

Prime Minister Chernomyrdin, in his capacity of negotiator, calls for another cease-fire and peace talks. Under another Russian barrage, two rebel T-72s drive in from the outskirts — rebels claim to have retaken sections of the city.

Russian sources estimate that their losses are around 500 KIA, 200 MIA, and 6,000-7,000 WIA.

* * *

17 January 1995

The fighting in Grozny continues...

Notes

¹Federal Counterintelligence Service [FSK], spawn of the old KGB.

²[Hereafter, media references to 'tanks' will be replaced with 'AFVs' unless verified from film footage.]

³One tank battalion will hail all the way from St. Petersburg. Is this the T-80 unit?

⁴Under Soviet practice, maps of the Motherland were 'classified material.'

Times given are local, while dates of events are as they occurred — not as they were reported.

NOTE: The author would appreciate authoritative articles and photo clippings on the subject, in any western European language, forwarded via the editor.

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Adam C. Geibel is currently associate editor of *Museum Ordnance Magazine*. He is also a freelance journalist specializing in military topics.

Ammunition Loading Systems for Future Tanks

by Dr. Asher H. Sharoni and Lawrence D. Bacon

Introduction

The past three decades have witnessed a profound and ever broadening interest in the development of automation for armored combat vehicles. This has evolved through "human factors engineering" to "man-machine interface" to "Manprint," with the ultimate goal being to achieve autonomous operation of many complex subsystem functions with minimal labor or human intervention. The major drivers in this trend toward autonomous operation have been lethality, survivability and strategic transportability, as well as the ever-increasing complexity of combat vehicle systems introduced by rapid technological change. One of the last frontiers in the U.S. main battle tank is the inevitable automation of the Ammunition Loading System (ALS).

Advanced electro-optics, fire controls, kinetic penetrators, and turret stabilization systems enable the crew to acquire, engage, and destroy targets at greater ranges while aggressively moving cross-country. This accurate, fire-on-the-move capability is now limited only by the loader's ability to ram another round into the breech while undergoing the disorienting effects of roll, pitch, and yaw in a 40 m.p.h.-capable M1A1/A2 Abrams Tank! Automation can provide consistent and high reload rates under fairly extreme cross-country conditions.

One of the advanced survivability features of the current Abrams Tank is the compartmentalization of the 120-mm ammunition, which affords the crew a high level of protection from the effects of secondary explosions if the magazine is penetrated. This protection is diminished during round transfer for loading, at which time the large magazine door is briefly opened. Automation of the loading process can reduce the time period of exposure, as well as reduce the area which must be opened to handle the round.

Future tanks will be required to provide the same (or higher) level of crew

protection as the M1A2 Abrams, but at a substantially reduced gross vehicle weight (40-50 tons). Some weight reduction will be realized through advanced composite armor and active vehicle defense systems, but most weight savings will be realized through the reduction of the overall armor envelope. This means lowering the crew size, which in turn requires reducing the crew's workload and enhancing crew efficiency and combat effectiveness through automation. The reduction in tank size will positively affect survivability and significantly enhance the ability to deploy U.S.-based combat power abroad.

The Future Main Battle Tank (FMBT) must capitalize on a revolutionary design and development philosophy as a completely integrated, multipurpose weapon system. Since one of the principal contributors to lethality is the main gun rate of fire (ROF), it must be considered as a major design driver for any future tank configuration. Consequently, future tanks (and major upgrades to existing tanks) will most likely be equipped with an Automatic Loading System (ALS) that reduces crew workload and allows an unprecedented, continuous rate of fire while on the move. The main gun and the ALS must be considered as a fully integrated weapon system to reflect the close interrelationship and dependency between the gun, ammunition, and lethality.

FMBTs and major tank upgrades will be equipped with state-of-the-art Battlefield Management Systems (BMS) and fire control systems. These systems will be comprised of multi-sensor targeting and fire control with automatic air/ground target acquisition through thermal imagery and/or millimeter-wave radar processing and tracking. The BMS will provide a day/night integrated armament system capable of automatically engaging multiple targets, with the option of no human intervention. A high rate automatic loader must be incorporated to fully exploit the capability of modern battlefield

management systems and "fire-on-the-move" lethality. Automation lessens the crew workload and makes it feasible to contemplate novel tank configurations and smaller tank crews.

An automatic loading system permits development of an unmanned turret and lends itself favorably to the reduction of the four-man crew. It substantially increases the rate of fire under all conditions, provides the capability to rapidly engage multiple targets and ultimately contributes to the tank's overall survivability. An unmanned turret dramatically reduces volume and weight, yielding a much lighter tank with a smaller silhouette. If the conventional manned turret arrangement is maintained in the future, or if an automatic loading system is introduced into an existing tank turret, the fourth crew member's role could be expanded to data management and target acquisition, or else eliminated. For example, the introduction of battlefield management into the M1A2 may be best exploited by a full-time data manager. Tank maintenance, perimeter security and the 24-hour battlefield are other considerations in establishing crew size (The three-versus-four-man-crew is a doctrinal issue and should not be driven by engineering considerations.)

Since lethality is a principal design driver, any rational design approach for a future main battle tank will commence with the selection of the armament system, to include the main gun and the ALS, continue with the selection of a conventional or unmanned turret, and conclude with the remainder of the tank literally "built" around the integrated weapon system.

The purpose of this article is to discuss various design approaches to Automatic Loading Systems (ALS) and to outline the effect they may have on the overall tank configuration and its combat effectiveness. Our commentary will be based upon the design experience accumulated through 16 years of involvement in various U.S. ammunition autoloading development pro-

grams, and through expertise the authors have developed over a career of involvement with main battle tanks of European, U.S., and Soviet design. In the discussion of different design approaches, we will provide a brief overview of previous experience in various ALS design and development programs undertaken for the U.S. military.

General Dynamics Tank Test Bed Demonstration Vehicle

In 1983, the U.S. Army Tank Automotive Command (TACOM) awarded a contract for design, fabrication, and demonstration of a 120-mm "brass-board" autoloader transfer mechanism. This device was required to cycle ammunition from a designated storage position to a simulated gun breech and back, at 12 rounds/minute, while leaving no witness marks on the fragile combustible case after the completion of 20 loading repetitions per round. Following successful demonstration of this "proof-of-principle" device, a follow-on contract was awarded to design, build, and test the full-up autoloader in the Tank Test Bed turret.

The TTB Autoloader, as depicted in Figures 1 through 3 (showing the autoloader major components and the Transfer Unit in particular), was a conspicuous success. The system consisted of a 44-round capacity "carousel" type mechanized magazine, located in an unmanned turret basket; a fully articulated Transfer Unit (including a rammer) positioned at the rear of the M256 120-mm cannon in the turret bustle; and a microprocessor-based, Electronic Control Unit (ECU).

The system was electrohydraulically powered to utilize the existing turret power supply, and established a new performance baseline in the heretofore unpretentious field of ALS.

The TTB Autoloader successfully performed an entire array of designated functions which are typical requirements for a "generic" main battle tank autoloader:

- Rapid fire reloading of the M256 cannon at a maximum rate of 12 rounds/minute.
- Automatic ejection of spent stub-cases through a small door at the rear of the turret.
- Ejection of misfired rounds.
- Restoring and optimally rearranging (inventorying) unfired rounds in the

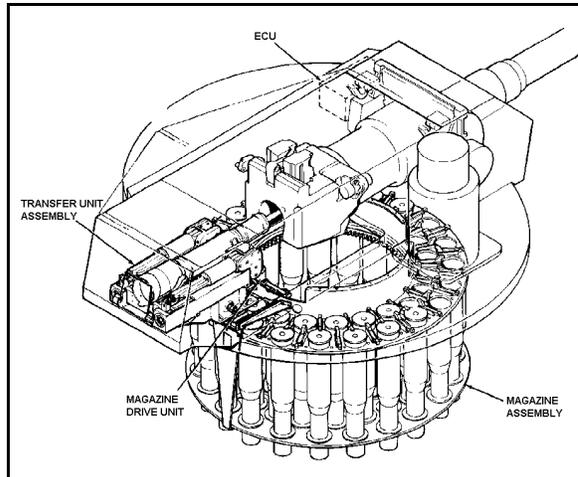


Figure 1
TTB autoloader system general overview and major components.

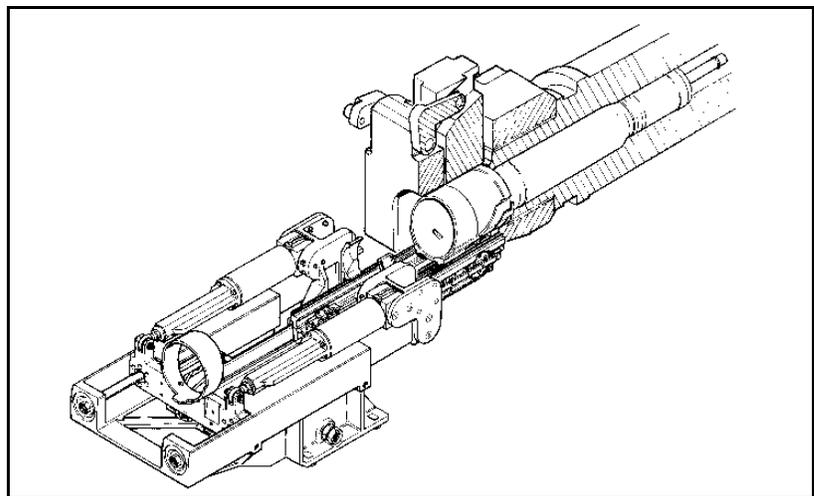


Figure 2
TTB 120mm autoloader transfer unit in loading position.

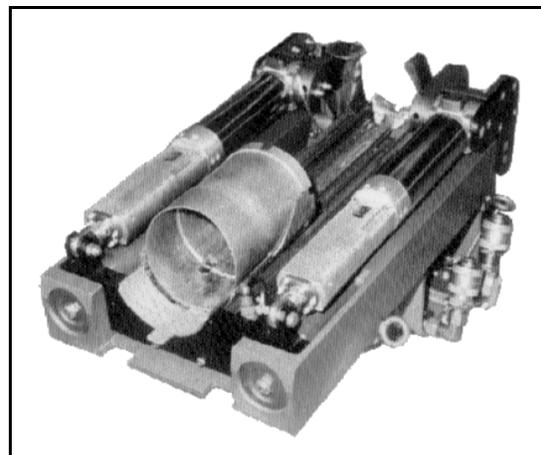


Figure 3
Autoloader transfer unit.

- An upload mode, also performed at the rear of the turret at a rate of 6 to 8 rounds/minute.
- A "soft-present" mode of operation which allows the crew to easily and safely download ammunition from the weapon station through the ejection door at the rear of the turret.

The control system performed an inventory management function allowing it to quickly cycle to the nearest available selected round while minimizing center of gravity offsets and power re-

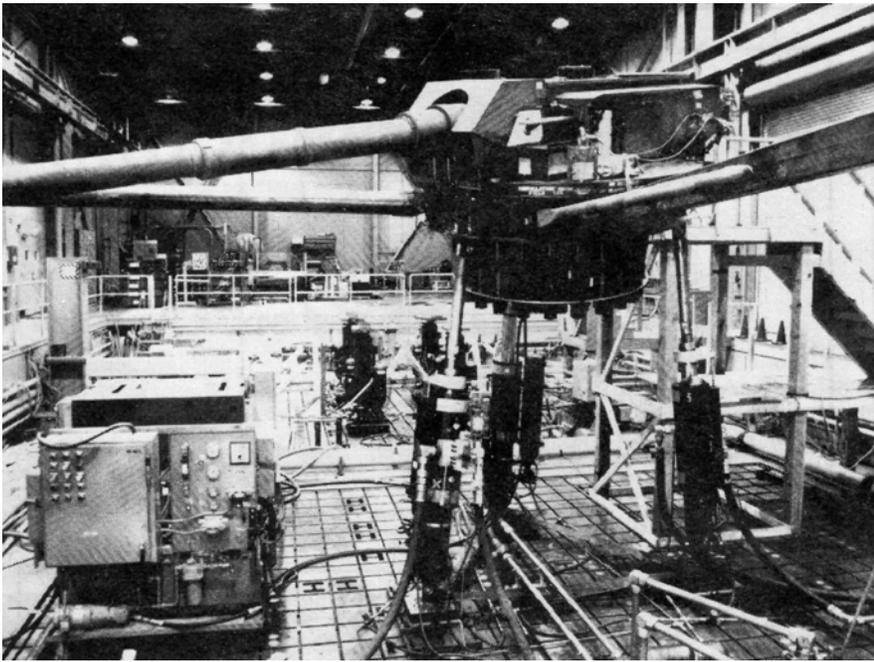


Figure 4. Tank Test Bed turret on TACOM's vehicle motion simulator.

quirement fluctuations. The system incorporated complete actuator redundancy, which allowed continued operation, albeit at a lower rate, when a single point actuator failure occurred. This added reliability feature proved the feasibility of a remotely operated weapon system, and allowed consideration of a three-man vehicle crew as well.

System cycling tests exceeded 66,000 total rounds loaded and were highly successful in their results. Testing included an extensive demonstration period completed on the TACOM Vehicle Motion Simulator, during which ammunition was cycled while the weapon station was concurrently being "shaken" in a true fire-on-the-move simulation as depicted in Figure 4.

The Tank Test Bed system consisted of two major mechanical subsystems:

- 1) A rotating magazine below the turret ring that stored 44 rounds of ammunition; and
- 2) A Transfer Unit assembly which provided all functions required to load, unload, present, on-load, off-load, and immediately dispose of spent stub cases and misfires.

The autoloader was designed to accommodate a sustained rate of fire of 10 rounds/minute (with a maximum of 12 rds/min.) and had an empty weight of less than 1,400 lbs. The 44 rounds stored in the magazine were individually protected, supported, and isolated by full-length canisters, which enveloped and supported the rounds. The

magazine design allowed ready capacity expansion to 48 rounds, if required, and up to a 60-round complement was feasible.

Electric power consumption was negligible, limited to that required to command pilot operated servo valves and low power sensors. The system was unique in that it was a "no-spring" design and did not rely on spring-loaded

components of any kind for autoloader operation.

The transfer unit featured a hydraulically actuated rammer system designed to limit tensile loads applied to the stub-case to 110 pounds maximum (approximately 2 g's, including gravity) and to limit compression loads applied to 220 lbs max (approximately 4 g's). Stub-cases and misfires were ejected overboard at a velocity of approximately 11 ft/sec. Ejection was due aft and level through a single ejection port/loading access door.

FASTDRAW Mechanized Magazine

In the mid-1980s, an alternative ammunition handling system was considered for the M1A1 that incorporated a mechanized rotary magazine, as depicted in Figures 6 and 7. Developed in cooperation with General Dynamics, FASTDRAW was an extremely lightweight, robust, and reliable system with numerous important advantages over "traditional" stationary rack-type storage systems. The 36-round system (identical twin magazines) was designed for the 120-mm equipped M1 tank series, but can feasibly be reconfigured for a reduced ammunition complement in lighter vehicles and in smaller (105-mm) caliber ammunition. The most consequential features of the FASTDRAW approach to tank ammunition storage were:

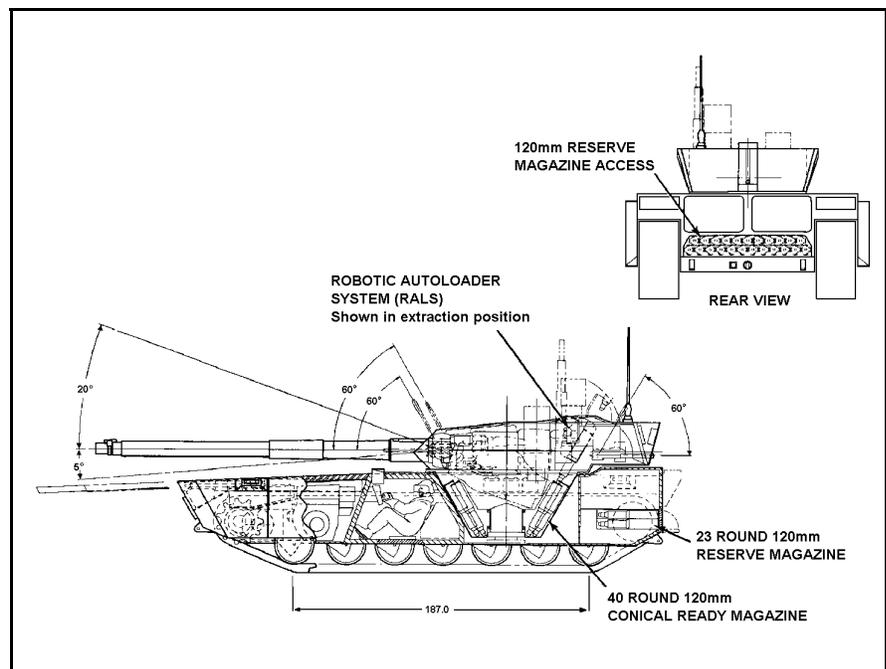


Figure 5. Future MBT showing RALS and reserve magazine.

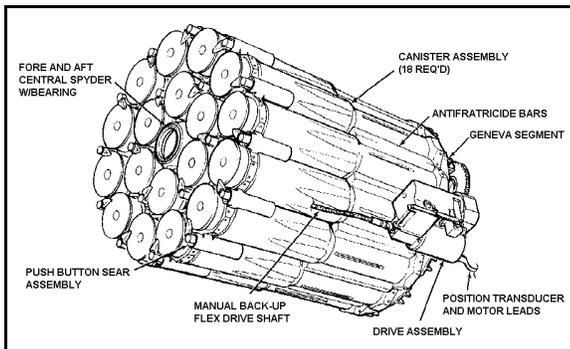


Figure 6. FASTDRAW magazine assembly.

- Significantly reduced blast door complexity and sealing requirements, which yielded enhanced crew safety and survivability.
- Complete separation of the two ammunition compartments by a solid armored wall, which would provide enhanced vehicle survivability and fightability in the event of an ammunition compartment penetration.
- Automatic presentation of the selected type of ammunition to the loader, as opposed to the loader searching the rack for the required type of round.
- Reduced bustle structural weight and complexity — in the case of the M1A1 tank, 350 lbs.
- Instant accessibility of all of the stored rounds, no “disassembly” of the rack required to reach rounds in the corners of the bustle.
- Complete inter-round fratricide protection.

FASTDRAW could have been powered either electrically or hydraulically through a simple, precise Geneva drive mechanism. FASTDRAW’s weight advantage resulted from the honeycomb-like structural assembly, wherein the canisters themselves provide mutual support and rigidity, eliminating the need for heavy fore and aft structural support plates.

The FASTDRAW approach also provided the intrinsic benefit of built-in growth options, or pre-planned product improvements. The function of the carousel(s) bringing the ammunition to a single extraction point, lends itself favorably to the replacement of the fourth crewman with a robotic ammunition transfer unit. This transfer unit would work the same way as the TTB device, with the exception of an additional lateral pair of actuators required to shift the transfer unit from the magazine pick-off plane to full alignment with the gun tube and breech at the loading position.

Block III Tank Auto-loader

The joint venture company AVTA (FMC/General Dynamics Land Systems), was awarded a contract for design, development, prototype fabrication, and test of a next-generation main battle tank, which incorporated a 140-mm autoloader system. This highly complex requirement involved storage, transfer and loading of an extremely fragile, “two-piece” 140-mm round that measured 1.5 meters in overall length. The round’s fragility required particular attention to shock and vibration during storage, handling, and transfer, with emphasis on controlled deceleration to ensure “soft” stops.

Figures 8 and 9 are illustrations depicting several conceptual Block III designs which took into consideration an overall vehicle integration approach. Figure 8 depicts the ALS with a 40-round capacity transverse magazine arrangement, a “round swapper,” a 4-round carousel, and a transfer unit. The principal round path is from the storage magazine through the swapper, to the carousel, to the transfer unit, and finally to the gun. Figure 9 depicts a different configuration of the ALS, with a longitudinal magazine arrangement, turntable, dual round swappers, an elevation rack mechanism, and a transfer unit. Both approaches utilized a canis-

ter (which may or may not be an integral part of the ammunition packaging) that provides the necessary protection and ensures round integrity at all times. The introduction of the canister concept requires the utilization of a swapper to swap full with empty canisters. The concept depicts a well integrated ALS in the tank and shows the feasibility of such a system when incorporated into a new tank design configuration.

The Block III Tank Program was terminated due to reprioritization of the threat, although the 140-mm cannon development will most likely continue. Due to the still-current sensitivity of the technology involved with this program, much detail of our ALS design cannot yet be released.

Future Main Battle Tank (FMBT)

Figure 5 shows a conceptual design of an ALS for a FMBT based on the TTB autoloader prototype. This concept was a winning entry in a contest held by *ARMOR* magazine for the design of a FMBT. This innovative derivative provides continuous theoretical 15-16 rounds/minute loading rate capability. The system is automatic, compact, computer controlled, electrically operated, lightweight, highly reliable, and remotely operated. It stores forty rounds of all types, which are readily available in a rotary, conical-shaped magazine with anti-fratricide provisions. The autoloader is integrally installed in an unmanned, turreted

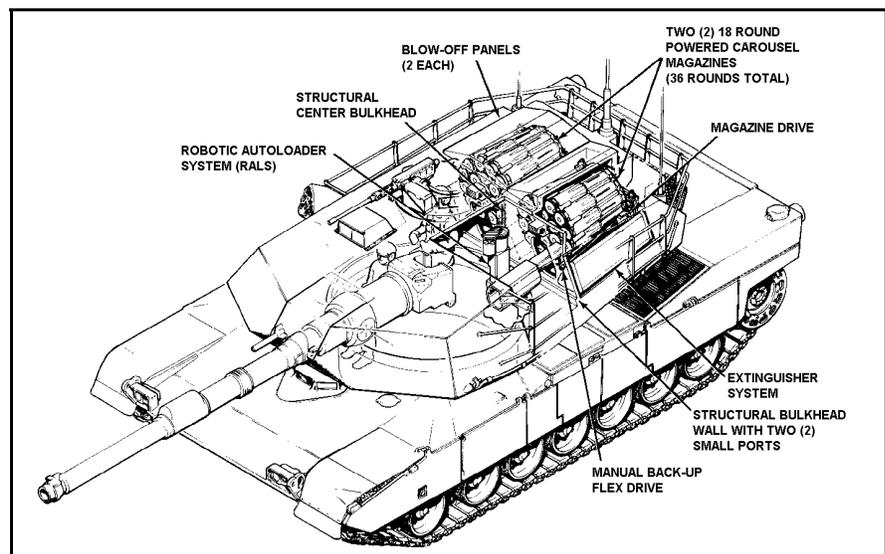


Figure 7. FASTDRAW application to M1A1 concept.

“weapon station” with maximum protection for the crew and ammunition by way of compartmentalization and positioning of warheads as low as possible in the hull, adjacent to “blow-off” panels.

This conceptual system offers full inventory control, optional round replacement and a misfire ejection port that will interface with an automated reload system such as the Future Armor Resupply Vehicle (FARV). An additional 23 rounds are stored low in the rear of the hull in a reserve magazine. An additional transfer mechanism can be de-

vised to automatically transfer rounds from the reserve magazine to the ready magazine. This arrangement would make the entire complement of 63 rounds available to the ALS without the crew leaving its compartment. This feature is particularly important when the tank is operating in a contaminated NBC environment, where leaving the crew compartment is undesirable. The ALS and the Battlefield Management System combined provide a superior kill capability and substantially increase shock effect and weapon system lethality.

Conclusion

The main battle tank will remain a viable, necessary weapon system for the foreseeable future. Continued technological improvements will result in reduced volume and lighter vehicles, but the tank’s historical mission will remain the same: shock, mobility, and firepower. Automatic loading systems will become standard, providing reliable, rapid reloading, thereby increasing lethality. Crew member duties will be readjusted to address other battlefield management technological needs. Efforts at TACOM and Picatinny Arsenal to develop a 120-mm compact tank autoloader and a 155-mm howitzer autoloader are indications of this trend. Just as we would never consider sending an infantryman into battle with a bolt-action rifle, future tank designs will fully automate the loading function.

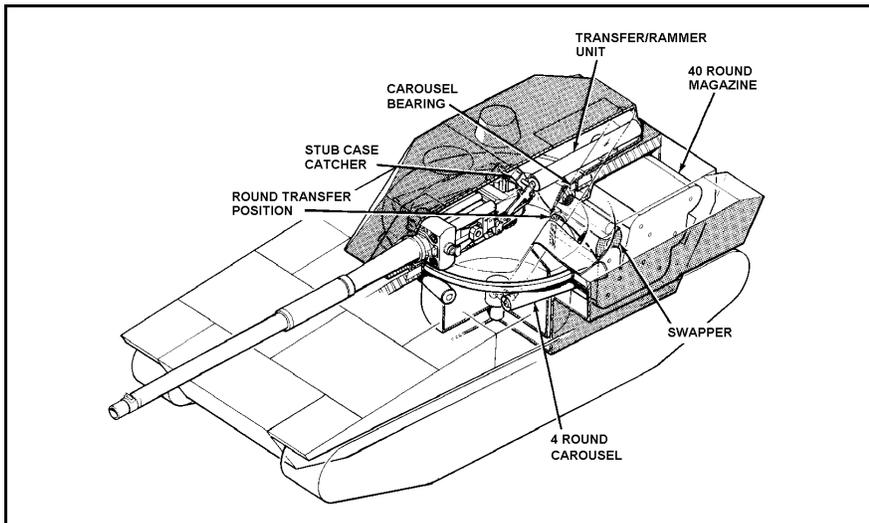
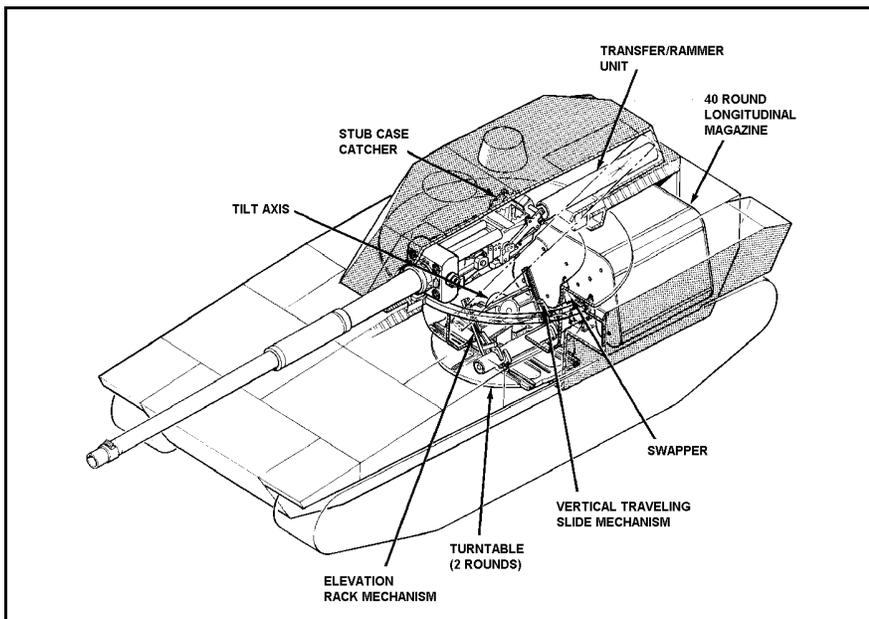


Figure 8. (Above) In this tank, the RALS feeds rounds from a transverse magazine.

Figure 9. (Below) a general overview of the RALS adapted to a tank with a longitudinal magazine arrangement.



Western Design Corporation (WDC), a small defense company in Irvine, California, specializes in the design, development, and production of ammunition and material handling systems for the U.S. and international military markets. WDC’s track record includes a variety of air, land and seaborne weapon systems that require automated feed, resupply, and optimized ammunition packaging.

Mr. Lawrence D. Bacon is the Director of Graphic Arts at WDC, where for the past 16 years he has been responsible for creating numerous concepts for automatic ammunition handling, loading, and storage systems.

Dr. Asher H. Sharoni is the Director of Engineering at WDC. He holds an Sc.D. in Mechanical Engineering from MIT and a M.Sc. from the Technion, Israel Institute of Technology. Dr. Sharoni is a former colonel in the Israeli Defense Forces, where he was involved in various armored weapon developments.



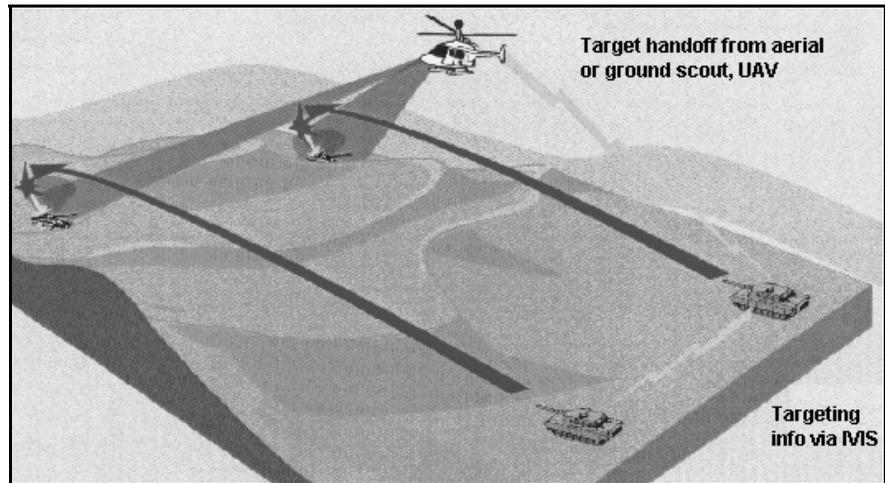
GDLS Photo

Tomorrow's Smart Tank Munitions

by Major Bruce J. Held

Tankers behold! The era of 'smart' tank munitions is approaching and your days of being referred to as DATs or dumb a— tankers are rapidly closing. Over the next several years, new types of 'smart' tank ammunition will be fielded that not only have a terrific knockout punch, but also have an electronic brain to seek out targets and deliver the punch. With the fielding of these 'smart' rounds, tankers will be able to shoot bullets that do more than fly in ignorant, supersonic bliss to their appointment with destiny. Instead, 'smart' tank ammunition of tomorrow will search for and acquire targets, maneuver toward their targets, and then strike with devastating accuracy and lethality.

The tactical implications of 'smart' tank munitions are complex and extensive, therefore we must start to energetically explore and experiment with our new opportunities. The tactics, techniques, and procedures needed to employ these new weapons effectively must be developed and in place **before** units begin placing 'smart' tank rounds in their basic loads. Thus, the purpose of this article is to energize the Armor community to begin a critical analysis of the tactical use of 'smart' tank munitions. To accomplish this, we will begin by discussing the key elements of 'smart' tank munitions and how these new weapons bring tactical value to the



Concept drawing shows aerial scout handoff to STAFF-equipped tanks on a digital battlefield.

battlefield. To activate the Armor community's creative mind, we will end by describing several potential scenarios in which 'smart' tank munitions could have a significant impact.

What Makes a Round 'Smart'?

'Smart' tank munitions must possess four key capabilities including: target acquisition, target identification and selection, maneuver control, and a lethal mechanism. These capabilities can be enhanced by a nearly unlimited number of options. The goal, however, is to

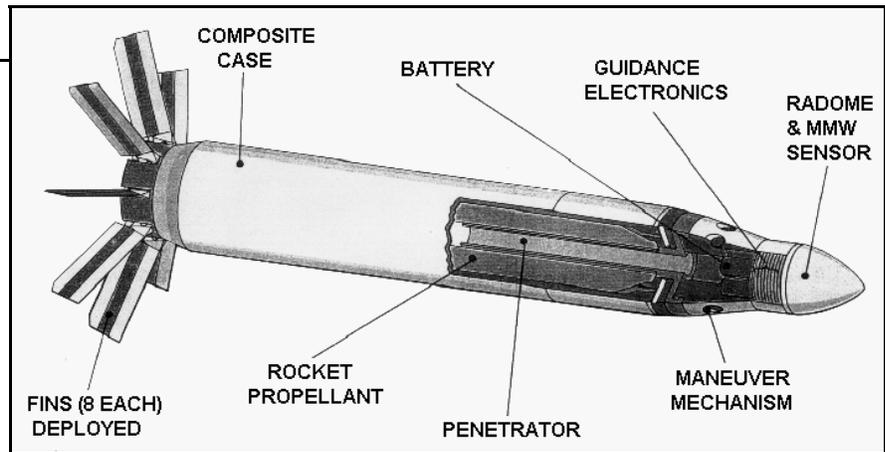
limit the components so that everything needed will fit within the cartridge and within a reasonable budget. With this in mind, we feel that the four capabilities identified above are the minimum requirements for future 'smart' munitions.

First of all, 'smart' munitions require a target acquisition capability, which is either passive or active. Passive target acquisition relies on emissions of some sort emanating from the target and being detected by the round. These types of emissions include optical, thermal, and magnetic energy. Active target acquisition relies on painting the target

with some form of energy and detecting the reflection of that energy. Ammunition developers consider radar and ladar (reflected laser energy) as the most likely forms of active detection that will find their way into ammunition or fire control systems. The type of acquisition system selected depends on target characteristics, desired capabilities for the munitions and the environment in which it is to be used. In some cases, more than one type of target acquisition sensor may be required.

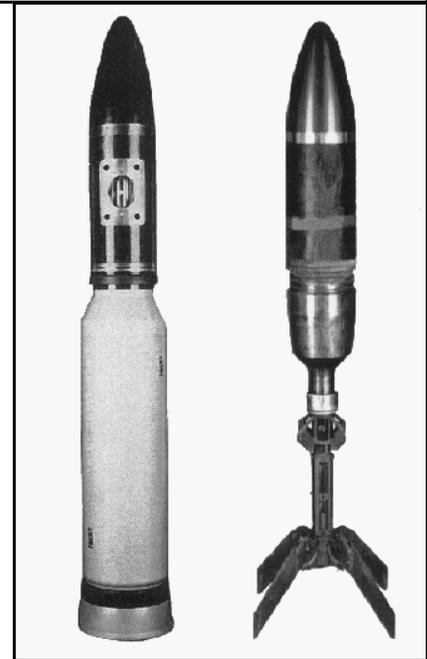
Secondly, 'smart' tank munitions require the ability to conduct target identification and selection. They must be able to distinguish real targets from battlefield clutter. For example, if a 'smart' munition uses a thermal sensor for target identification, the electronics that read the sensor inputs must be able to distinguish, with high reliability, between all the various heat sources on the battlefield. This means that great care must be taken to ensure that the round's sensor does not just identify the hottest spots on the battlefield as targets. The acquisition method used must also be robust; i.e., resistant to countermeasures. A 'smart' munition is useless if it can be easily fooled by the enemy. Creating this capability is not an easy proposition. To the human viewer, with his very complex pattern recognition ability, the thermal signature from a burning tank or a countermeasure flare is relatively easy to distinguish from a tank that is still a dangerous target. Size and cost limitations, however, force the electronic brains of a 'smart' round to be relatively simple; normally only a few microchips. Electronics engineers and programmers must figure out how to make the round 'smart enough' within the limited electronics package that can be carried.

Third, 'smart' tank munitions must maneuver their lethal mechanism to its intended target. As with target acquisition, this is not an easy task. In order to maneuver to a target, the round needs to 'know' its own position, what its dynamic state is, where the target is, and what the dynamic state of the target is. The round also needs some form of maneuver mechanism, the physics of which must be encoded into its electronic brain. Maneuver mechanisms generally fall into one of two types. One type uses aerodynamic control surfaces, such as tail fins and canards, to guide the round onto a new line of flight. The other type uses rocket thrusters to change the direction of flight. It



Above, the X-Rod round, fins deployed as in flight. It is a rocket-propelled, long rod penetrator that kills targets with kinetic energy, like the current sabot round.

At right, the XM943 top-attack smart round, which kills with a downward-firing explosively formed penetrator (EFP) that attacks the thinner roof and top deck of tanks.



is also possible to employ hybrid types that use both control surfaces and rockets to turn the round. Whatever type of maneuver mechanism is employed, it must be strong, yet very precise. Tanks shoot in a direct fire mode. This means that the rounds fly at speeds of thousands of feet per second. As a result, the round has a great deal of momentum. Trying to change the direction of a heavy projectile that is traveling so fast requires a very strong mechanism. The speed of the projectile also implies that the time available to make a course correction is very short. A responsive, precise maneuver mechanism is required to make such a quick course correction towards a point target.

Most importantly, the 'smart' tank munition's lethal mechanism must defeat the intended target. For the foreseeable future, the primary target of the U.S. Armor Force will continue to be other tanks. This means that the lethal mechanism must be able to penetrate a variety of armor types: homogeneous steel, composites, and explosive reactive armors. The real trick is to come up with a means of defeating targets that employ these armor types in combination. Pending some new development, the ability to penetrate these armors will depend on the current penetration technology triad that includes long rods, explosively formed penetrators (EFP), and shaped charges.

Finally, we must also discuss the most difficult task of all, systems integration. All the various parts of the 'smart' munition must be packaged into a space small enough to fit into a 105- or 120-mm cartridge. To make things even more difficult, all the parts and assemblies must be hardened to survive the violent, high g launch from a tank cannon. Finally, all the miniaturized, hardened, disparate parts of the round must be able to function perfectly, as an integrated whole, in a tactical environment, after sitting for years in storage.

Two examples of 'smart' tank munitions are the 120-mm Smart, Target Activated, Fire and Forget (STAFF) and the X-Rod. STAFF, currently in Engineering and Manufacturing Development, combines the four attributes described above. It has a radar seeker that scans the line of flight for targets and software that helps it discriminate potential targets from battlefield clutter

and countermeasures. Once a target is found, the electronic brain of the STAFF rolls its warhead so that the EFP aligns with the target. It then times the firing of the EFP to achieve center-of-target impacts. A big advantage of STAFF is that once fired, the tank crew can move on to other targets; the round's electronic brain and target seeker work autonomously. Additionally, since the EFP has a top-attack capability, the STAFF is able to defeat both partially and fully defiladed targets.

X-Rod, which is now going through proof-of-principle testing, will also carry its own target seeker and electronics, so in the basic sense, it will be a fire-and-forget weapon like STAFF. Unlike STAFF, X-Rod will rely on rocket thrusters for maneuver. A large rocket motor will also boost a long rod penetrator to high speed. Additionally, whereas STAFF is a top-attack munition, X-Rod penetrates the front and sides of targets, much like traditional KE ammunition. X-Rod's advantage will lie in its ability to steer a long rod penetrator, thus making it ideal for attacking maneuvering armored targets.

Is There Value in Developing 'Smart' Tank Munitions?

There are many unknowns in the development of 'smart' tank munitions. One thing is certain, however. The price tag for a 'smart' tank round will be greater than for a traditional KE or HEAT round. Several key questions thus arise, to include: what is the tactical value of this expensive round of ammunition, is it cost effective, and isn't what we have now good enough? We must consider several factors to answer these questions. First we must consider the development of threats against the U.S. Armor Force. Next, we need to determine how we want to meet those threats. And finally, we must consider cost, not just for each individual round, but the total cost effectiveness of defeating an enemy with 'smart' ammunition in the basic load.

Despite the end of the Cold War, defense technologies are still being developed around the world. Most significantly for U.S. tankers, work continues in many countries on tanks and attack helicopters. For the most part, this work is aimed at improving existing systems, but completely new systems are also being developed and deployed. Examples such as the Russian Havoc or the Western European Eurocopter in-

dicating that there is still interest in fielding new antitank helicopter capability, while the French LeClerc and the T90 bring dangerous new capabilities to tank fleets around the world. In this era of reduced defense spending, much of the world's defense industry is shopping for new markets. No longer can we be confident that the weapons we will face on future battlefields will be of Soviet design; nor can we be certain that threat weapons of Western design will be obsolete. Instead, the U.S. Armor Force must be prepared to face the best Western designs, possibly including new U.S. designs. The conclusion here is that we cannot rest on our laurels. Continuous improvements in the lethality of the U.S. Armor Force are an absolute necessity if we are to defeat the new threats being developed and deployed.

Tank lethality development is concentrated into several areas, including target acquisition (finding targets), accuracy (hitting targets), and lethal mechanism (defeating targets). Improving the lethality of a tank involves improving one or more of these variables. Accuracy can be greatly improved by 'smart' tank munitions and the combat effectiveness of the U.S. tank fleet can be dramatically increased by exploiting this. For the foreseeable future, primary target acquisition will continue to be accomplished with sensors on board the tank. In special situations, however, 'smart' tank munitions may be able to enhance the overall acquisition capability of the total tank system. Finally, though current and contemplated lethal mechanisms can be flown with either 'smart' or traditional rounds, their effectiveness is increased with the improved accuracy of 'smart' tank munitions.

What do accuracy improvements mean in terms of the class of targets that can be attacked with 'smart' tank munitions? All targets currently engaged with traditional rounds should be vulnerable. In addition, 'smart' tank munitions can be expected to greatly improve the effective range of tank cannons. The range of current tanks is limited by the inherent dispersion of their shot pattern. The linear size of the dispersion pattern grows with range, so that at long range the chance of hitting a target is diminished. With some 'smart' rounds, the in-flight correction reduces the size of the dispersion pattern, making it nearly constant over a very long range. Other types of 'smart' tank munitions merely need to get

close enough to the target to launch a lethal submunition, thus making the dispersion of the shot pattern less meaningful. In either case, 'smart' tank munitions should be expected to add 1 to 2 kilometers to the effective range of current tanks. In fact, a 'smart' tank munition's range is primarily limited to the distance the round can be fired or the maximum range at which targets can be acquired and identified.

An area that has always been a problem for traditional ammunition has been firing against defiladed targets. The presented area of the target is either small, making hit probability low, or completely masked, making it impossible. 'Smart' tank munitions will change this situation. Their greater accuracy will improve the probability of hitting the small presented area of hull-defiladed targets. Use of top-attack lethal mechanisms, such as EFPs, combined with the brain of a 'smart' tank munition make the top of the target vulnerable and allow engagements against even turret-defiladed targets.

The improved accuracy of 'smart' tank munitions provides obvious value. Having them in the basic load of a tank opens up the battlefield in terms of both space and time. Providing the tanker the ability to hit long range and defiladed targets expands the amount of territory that can be controlled by fire. This, in turn, improves the commander's decision cycle, providing him more time to react. It also hurts the enemy by reducing his decision cycle time, forcing hasty reactions on his part.

Traditional tank munitions also have problems against maneuvering targets, especially from medium to long range. KE ammunition takes more than a second to fly to 2000 meters. At 3000 meters and beyond, the time of flight can go to two or more seconds. A target traveling at only 20 miles per hour moves 30 feet in only one second. If this motion is at a constant speed and in a constant direction, a modern fire control system can correct for it. Unfortunately, most targets do not move in this manner. They tend to speed up, slow down and turn. When these maneuvers occur after the round is fired, the target may move off of the round's line of flight and avoid being hit. A 'smart' munition accounts for target maneuvers by correcting its line of flight near the target, or by launching a submunition while flying near the target. As a result, the 'smart' tank muni-

tion will be much more accurate against maneuvering targets.

In addition to improving accuracy against maneuvering targets, 'smart' tank munitions hold the promise of greatly improving our capability to fire on the move. With traditional tank ammunition, fire-on-the-move capability is significantly less than firing from a stationary tank, even with modern stabilization systems. There are a host of dynamic errors, such as gun tube vibration, that even sophisticated stabilization systems cannot correct. 'Smart' tank munitions make most of those errors irrelevant because they correct their own line of flight after leaving all the moving tank errors behind.

The ability to fire against evasive, maneuvering targets helps to destroy the operational tempo of enemy maneuver. Conversely, the ability to accurately fire from a maneuvering tank helps us increase the tempo of our own maneuver. Either way, the improved accuracy of 'smart' tank munitions improves our ability to fight highly dynamic battles, which can be instrumental in achieving tactical victory with minimal loss.

'Smart' tank munitions could also be an important part of the digital battlefield. We have already noted the ability of 'smart' tank munitions to maneuver or be top-attack weapons. This means that a direct line of sight between the firing tank and the target is not essential. An information system, such as the Intervehicular Information System (IVIS), could possibly be used to pass target locations from a remote platform, such as a helicopter, another tank, or a remotely piloted vehicle, to a firing tank. A 'smart' tank munition could then be launched toward the grid that was passed, even though the firing tank never identified the target itself. If used in this manner, 'smart' tank munitions give the Armor Force a very powerful tool on the digital battlefield.

Another type of engagement should be explored. Since a 'smart' tank munition will carry its own target acquisition, there is a possibility for reconnaissance by main gun fire. A 'smart' munition could be fired toward suspected, but unconfirmed enemy locations; a suspicious berm, a hot spot in a woodline, a muzzle flash, or a diesel plume behind masking terrain. If the round finds a target, it will be destroyed and an enemy location revealed. Such a capability for direct fire reconnaissance is

currently lacking, but the potential benefit is clear.

The benefits of 'smart' tank munitions that we have described so far are those that increase a commander's options for target engagement. Since some of the potential uses are new, members of the U.S. Armor Force need to begin reorganizing the way they look at the battlefield. They need to consider how to best use the whole range of new capabilities. Tactics to successfully exploit these new weapons need to be developed and tested. Used correctly, 'smart' munitions can enhance opportunities for destroying the enemy and reduce the number of vulnerable situations for the firing tank.

Importantly, the addition of 'smart' tank munitions in the basic load may also reduce the ammunition resupply burden for tank units and should not increase the maintenance burden. There are several reasons for this. The obvious reason is, if accuracy is improved, fewer rounds are needed to defeat the same number of enemy targets. Fewer rounds required means fewer rounds resupplied. Additionally, if the direct-fire battle occurs at longer ranges and a unit's reaction time is increased, the possibility of pre-stocking ammunition is improved. This allows greater flexibility in planning ammunition resupply. Finally, since the use of 'smart' munitions provides overall tactical benefits, victory may be achieved more quickly. For example, if initial enemy echelons are decisively defeated, follow-on echelons may never be committed to battle. A drawn-out slugging match is avoided and fewer rounds are expended.

There definitely seems to be value for the Armor Force in adopting 'smart' tank munitions. They are not about to replace more traditional kinetic energy or HEAT rounds, however. One obvious factor is cost. As mentioned earlier, 'smart' tank munitions will be expensive. Traditional rounds are very effective for the close-in battle (2000 meters or less) and it does not make much sense to substitute an expensive 'smart' munition when a traditional round will do just as well. Also, traditional rounds have the advantage of being 'too dumb to fool.' A disadvantage to any 'smart' munition is that countermeasures are possible and likely. In a highly countermeasured environment, traditional ammunition will still be required. Therefore, some mix of 'smart' and traditional ammunition should make up the basic load. To design that basic load,

however, requires that we understand the environments in which we expect to fight and the tactics that best use the mix of ammunition types. Only then will the full value of these new rounds be realized.

Tactical Scenarios for 'Smart' Tank Munitions

One gains an appreciation of the benefit that 'smart' tank munitions provide by looking at their use in typical battlefield situations. The final part of this article will compare defensive and offensive scenarios, with and without 'smart' tank munitions. As you read these simple scenarios, start wargaming them yourselves. Be critical of our analysis. Fight the battles out in your own head. Start considering the problems and opportunities that 'smart' munitions will present for you, both in your current position and in the positions you expect to hold throughout your career as a tankerman. Most importantly, discuss 'smart' tank munition tactics with your fellow tankers. That is really the best way to get the ideas going.

Typically, the goal for a unit in the defense is to deny the enemy his objective or to delay him and upset his plans. If properly employed, use of 'smart' tank munitions can radically improve the chance of achieving these goals. Consider a typical situation; an armor company is conducting a defense in depth against an attacking motorized rifle or tank battalion. Currently, the defending tank company must wait until the enemy has closed to 2000 meters or so, before really effective direct fire can be brought to bear. The enemy vehicles are moving and maneuvering, making them difficult targets to hit. Additionally, they are moving in and out of masking terrain, thus making clear shots very difficult. By the time the enemy has closed enough for defensive, direct fires to be effective, the enemy is moving in assault formations and is beginning his artillery preparation of the defensive positions. Timing of the defensive battle now becomes very difficult. In less than a minute, the enemy will be 1500 meters away. If the defenders wait too long, they risk decisive engagement and will be unable to move to subsequent battle positions. Moving too soon risks effective engagement of the enemy and loss of the opportunity presented. Innumerable battles on the sands of the National Train-

ing Center have proven just how difficult it is to coordinate this kind of defensive battle.

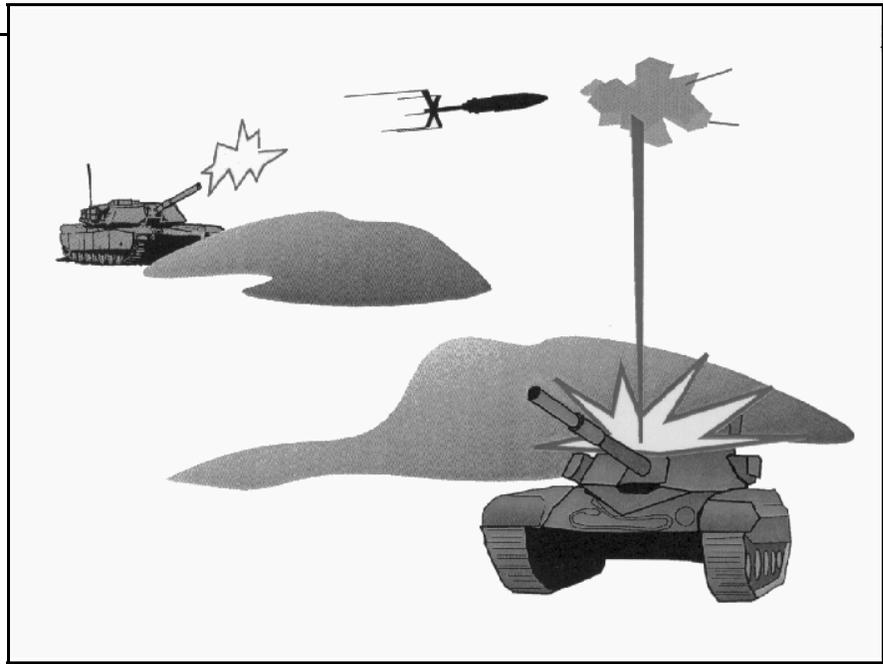
'Smart' tank munitions promise to alter this scenario significantly. By improving the effective range of the defending tanks, 'smart' rounds will open up the area of the battlefield that can be controlled by fire, thus increasing the decision time that the commander has to influence the battle. Additionally, 'smart' rounds greatly reduce the attacker's effectiveness in the use of masking terrain and evasive maneuver.

Consider the same defensive scenario when the defenders have 'smart' tank munitions in their basic load. With careful placement of the tanks, the defenders begin effective, direct fire on the enemy from as far as 4000 meters away. Evasive maneuvering by the enemy tanks proves ineffective against X-Rod. Masking terrain fails to ensure safety against the high flying STAFFs. As the enemy formation is engaged, its commander sees no alternative but to move into assault formation and call in artillery, even though he is still more than 3000 meters away. His attack slows and becomes confused.

The artillery preparation of his objective is no longer as effective, as it is not coordinated with the final assault. The defenders, out of effective range of the enemy tanks, can move to alternate positions with relative impunity. Because he has more time, the defending commander can more easily synchronize his fire and maneuver, ensuring that the attacking enemy is under constant fire, from a variety of positions. If needed, the commander can disengage before the enemy can effectively engage. Alternatively, the commander could continue to destroy the enemy at long range with 'smart' munitions, breaking up the attack, and finishing off those vehicles that manage to get closer, with traditional tank ammunition.

In either case, more enemy were engaged and destroyed because the number of engagement opportunities increased. Additionally, the vulnerability of the defenders was reduced as they engaged at longer range, with more effectively coordinated fires, and they had more time and better opportunities to move between alternate positions and shape the battle.

This is just one defensive scenario demonstrating the potential value of 'smart' tank munitions. The key point is that the defending commander's de-



The top-attack smart round is particularly effective against tanks masked by terrain.

cision cycle is much longer because he can control so much more territory through fire. Additional value is obtained during a defensive combined arms effort. 'Smart' tank munitions will provide a defending commander a long-range, direct-fire weapon that can be combined with other long-range arms. Consider the effectiveness of a kill zone that is shaped by obstacles and contains fires from attack helicopters, cannon and missile artillery, guided missiles and direct fire tank munitions, yet is 4 kilometers from the nearest friendly position. Enemy formations could be shattered long before they could bring effective, direct fire to bear on the defenders.

As with the defensive scenarios, inclusion of 'smart' tank munitions in the basic load can provide new capabilities in offensive situations. It may be that the advantages brought to the offensive scenario are even more dramatic, since the traditional advantages of the defender are partially neutralized by 'smart' tank munitions. Some of the advantages that defending tanks enjoy include firing from dug-in or defiladed positions, firing from stationary positions, moving along reconned and masked routes and finally, choosing the ground from which to fight. While 'smart' tank munitions will not address the problem of who chooses the ground, they can even the balance in the other areas. Consider the following scenario.

A friendly armor company is conducting a deliberate attack against a dug-in

tank platoon. A traditional scheme of maneuver requires moving the company to within 2000 meters of the objective. One platoon then overwatches the attack of the other two platoons. The defending enemy, firing from dug-in positions has the advantage of firing at tanks in the open, from stationary positions. The overwatching friendly platoon will have problems placing effective fires against long-range, defiladed targets, while the maneuvering tanks have problems firing on the move against defiladed targets. The attack may achieve its objective, but the cost is likely to be high.

Now, give the attacking company 'smart' tank munitions. From 4000 meters away, an overwatching platoon begins its search for targets on the objective. Peering through the tank's thermal viewers, one of the overwatching gunners spots a tell-tale plume of hot exhaust behind a berm. Before the attacking platoons even begin their movement forward, a STAFF round is launched toward the exhaust plume. The round's seeker finds a target and an explosively formed penetrator reduces the defending force by 25 percent before the attack has begun. The enemy platoon leader senses that there will be trouble and orders his remaining tanks to begin engagements at long range (2000 meters) and move often between alternate positions.

As the attacking platoons move out, a pair of enemy attack helicopters appear

Continued on Page 32

Patton Revisited

Two Personal Glimpses, Very Different Ones, Of the Irrepressible Patton

by Brigadier General Albin F. Irzyk (Ret.)

Patton! General George S. Patton, Jr. Who has not heard of him? His name still conjures up all sorts of images. Fascinating, controversial, irrepressible. The personification of tank warfare during WWII. One of a kind. The man of many faces. The subject of endless stories, Patton became a legend that, after all these years, still grows. What more can we say about him?

The Patton saga continues. Here are two personal glimpses — this time of two Pattons — two widely differing faces.

After battling a tenacious, sometimes fanatic enemy; heavy, incessant rains; sleet, snow, cold, and deep and unforgiving mud during November 1944 in Lorraine, the 4th Armored Division in early December had reached Singling in the Maginot Line, only a stone's throw from the German border.

Here, exhausted men and machines were relieved by a fresh 12th Armored Division — a most fortuitous decision by someone in light of following events.

For its rehabilitation in the rear, my 8th Tank Battalion was assigned the town of Domnom les Dieuze, about 15 km west of Fenetrangle, and barely 2 km north of the Fenetrangle/Dieuze road.

Domnom was a small, dismal, bleak, depressing town. The 8th arrived on yet another gray, rainy, cold, damp, miserable, penetrating day.

The manure piles in front of the half-home, half-barn structures were being soaked by the falling rain, which drained off into the gutters. The town was an altogether disheartening sight and prospect.

How this tiny town could absorb the men and vehicles of a tank battalion

was the vexing question. But it has long been accepted that one sign of a good outfit is the rapidity with which it gets dug in. And very soon the units of this outfit had found billets for their men and “spaces” for their vehicles.

It was not long before, all over town, broken tracks were lying on the ground, engine compartments were open, spare parts, tools, cleaning equipment — all the tell-tale signs of an armored outfit — were strewn around, as men worked furiously to get back into shape.

Late on the afternoon of the third day, I had an urgent message from my Combat Command, CCB, informing me that I would have yet another visitor, and it would be early the next morning. This was not just any visitor, but the MAN himself, the army commander, Lt. Gen. George S. Patton, Jr.

I was told not to make any special preparations for the visit, to keep the men doing what they had been doing, and to be on hand in the town square at 0900 to greet the general upon his arrival.

I immediately sent word out to the companies about the next day's visitor, and told them to continue their activities, as scheduled.

Of course, the word spread like wildfire, faster even than a hot rumor. The visit of old “Blood and Guts” to THEIR battalion became the exclusive topic of conversation at each of the mess trucks that evening. The comments and banter about the upcoming visit of the “Old Man” were amusing and G.I. “classic.”

The next morning, December 11th, was definitely not Domnom weather — it was sunny, bright, pleasant, undeniably Patton weather.

I immediately faced a wee bit of a problem. There was really no town

square in tiny Domnom les Dieuze. As I glanced about, I noted the small paved, open area outside the entrance to the village church, where the town folks gathered before Mass. Since the church was about in the middle of the main street, this spot would just have to serve as the town square. It is here that I positioned myself well before 0900.

As I waited, I glanced all about me. Everywhere I looked, the men were hard at work — every bit as busy as they had been the day before. There was one big difference: periodically, a man here, one there would lift his head expectantly with a quick, furtive glance in my direction — then back to work. Things seemed perfectly normal — but they weren't. There was an air of great expectancy — an undercurrent of excitement — totally invisible, but very much there.

Still one more time, I glanced at my watch. The hand had reached the five minute mark after nine. Suddenly, I was startled to hear a loud scree-e-e-e-e-ch way down the street, where the road from the main highway makes a sharp 90-degree turn into Domnom.

A jeep was trying to negotiate that sharp turn at high speed. It careened on two wheels, then righted itself, and without slackening speed, continued to streak toward me. A figure was standing in the jeep beside the driver, clutching the top of the windshield. Since he approached from the west, the early morning sun hit him squarely — like a huge spotlight zeroing in. But he was not dazzled; he did the dazzling. As he approached me, he reflected the sun — he actually sparkled. As he got closer — I knew the reason. I saw stars: three on the front of the shiny, highly lacquered helmet liner, three stars on each wing of his collar, three stars on each shoulder of his “Ike Jacket,” three stars on his riding crop, three stars on the



red, metal bumper plate, three stars on the small, gold-fringed pennant, which had been waving furiously from its holder on the bumper — there must have been 24 stars, at least. This was vintage Patton — the showman, the headline-grabber, the press favorite, the

flamboyant army general — but, also, the army commander esteemed and held in awe by his men.

As it reached me, the jeep screeched loudly again — this time as it came to a sharp, abrupt stop. I saluted smartly.

Behind me three huge farm animals the size of Clydesdales, previously unnoticed by me because of the excitement, who had been drinking at a trough, backed away, apparently startled by the noisy arrival. They turned and began lumbering up the street.

With a wide, crooked grin, exposing some bad-looking teeth, Gen. Patton returned my salute and announced loudly, "Ha, ha — I see that I've started a cavalry charge." With that he hopped out of his jeep and moved briskly up the street with me in tow and about a half-step behind. He stopped at every vehicle, at every cluster of soldiers, and had something to say to each — a question, a word of encouragement, of appreciation, a compliment, a wise crack, a good-natured dig. In an instant he had established total and complete rapport with these men. They were literally eating it up. He was a master at it. His stops were brief, and he kept moving. But in 30 minutes or so, he had "touched" virtually every man in that battalion. Those who were located in the back buildings or side streets had darted up for at least a "peek." His jeep had slowly followed him up to the far end of the street. Now he had it turned around. He slapped me on the shoulder, and exclaimed loudly, "Keep up the great work!"

Then he hopped up onto his jeep, grabbed the windshield again, and as the jeep started moving, returned my salute. The vehicle quickly accelerated and headed back in the direction from which it came and at the same speed. He stood ramrod straight, clutching the windshield with one hand, waving to the troops on both sides with the other — perhaps unconsciously emulating and reenacting the triumphant roll-bys of the Roman conquerors, about whom he had read so much, and with whom he empathized. The troops, of course, stood rooted to the ground, transfixed, bug-eyed. Then, with another screeching 90-degree turn, he was gone.

I was amazed at the tremendous impact that one man can have on a body of men. After his visit, troopers of the 8th worked furiously all day, as if with renewed energy, almost like the elves in the workshop after being visited by Santa, who had vigorously nodded his approbation. The men, as they worked, talked about nothing else all day, and as time passed the tales began to grow — some would eventually expand to legendary size, somewhat like the proverbial fish story.

The visit made the men almost ecstatic. There was no question now but that the army commander knew who they were, what they were doing, and what they had achieved, and had indicated his appreciation and approval of

their efforts. There is almost nothing in the world like pride, and they were handed a big dose this day.

The visit became even sweeter when they learned that the only units of the 4th Armored visited by Gen. Patton were CCB headquarters and the 8th.

The man who had visited them, although he had an abundance of color, was not merely a showboat. He had tremendous substance. He would soon

For Patton, a truly remarkable achievement! He had his Army poised and prepared to move east to cross the border and attack into Germany. In a matter of hours, he turned many thousands of men and thousands of vehicles ninety degrees from east to north — to move NOT into Germany, but into Belgium, instead.

prove that convincingly, for little did he know on this day that he and the battalion he had visited would in just one week have a great rendezvous with destiny.

A week later, on December 18th, units of the Third Army had orders to attack east. I had sent billeting parties forward to set up billets for use after the 8th Tank Battalion's approach march the next day, to be followed by the attack into Germany.

At 1700, the move to the east was cancelled. At 2300, the 8th was ordered to be prepared to move at once — to the NORTH! At 0050 on the 19th, the I.P. was crossed, and the tanks and men and the commander he had visited on the 11th were leading his Army on the long, treacherous, momentous, historic move to Bastogne (elements of that battalion, after traveling over 160 miles, would be IN and OUT of Bastogne the next day, the 20th).

For Patton, a truly remarkable achievement! He had his Army poised and prepared to move east to cross the border and attack into Germany. In a matter of hours, he turned many thousands of men and thousands of vehicles ninety degrees from east to north — to move NOT into Germany, but into Belgium, instead.

Years later, President Nixon, a great Patton admirer, would claim that that was the greatest mass movement of men in the shortest period of time in the history of warfare.

Now, let's "fast forward." The war is over — it has been over for three

months. The fighting Third Army is now an occupation army. Its combat commander is now military governor of Bavaria.

The 8th Tank Battalion is still in Third Army. I am the Kreis (County) Commander of Kreis Vilsbiburg, east of Munich.

Late on the afternoon of August 9th, I am called by division headquarters with unusual instructions. I am to take

with me a lieutenant who has served as a combat tank platoon leader, a captain who has served as a combat tank company commander, and to report to Gen. Patton the next day to discuss tank operations.

Of course, not knowing what to expect or what questions might be asked, I worked feverishly all evening trying to prepare myself for the visit.

The next day, we drove to Third Army Headquarters at Bad Tolz, south of Munich in a beautiful sector of Bavaria.

At 1300, I reported to Gen. Hobart (Hap) Gay, Gen. Patton's chief of staff. Gen. Gay greeted me most warmly, and had a staff officer usher us to the meeting place.

We entered through the back door of what appeared to be a small briefing room. There were folding chairs in rows. Scattered in the rear of the room were staff officers, apparently gathered to witness what was to take place.

We were directed to seats in the front row. Stretching in front of us, almost the width of the room, was a wooden table.

Just moments after we had been seated, a door opened behind the table, and in strode Gen. Patton, leading his dog, Willie, on a leash, accompanied by Gen. Gay and the aide. As Gen. Patton moved into the room, I inwardly gasped in surprise. The figure entering the room was far different from the sparkling, flamboyant, star-bedecked individual who had visited my battalion

at Domnom les Dieuze — just before our trek to the Bulge.

This was a subdued, aging gentleman — older-appearing than his 60 years.

He had aged perceptibly in the intervening months. I was struck by two



bones on his chest which appeared to be heaving slightly as he breathed. He paused momentarily, smiled his crooked smile, warmly greeted us, and told us to be seated. He was carrying a blue-lined tablet and a couple of pencils.

He sat down behind the table and immediately began asking questions and making notes on his tablet as he received answers. The thrust of his questions and the discussion were about how his tankers had gone about knocking out German tanks — how the lieutenant, the tank platoon leader, had employed and utilized his five tanks, the tank company commander his 17 tanks, and I my 70-plus tanks. This, of course, required a broad discussion of tank operations and tank tactics.

Time passed quickly. The discussion — questions and answers — flowed smoothly. In no time, it seemed, the shadows outside the windows began to lengthen. The afternoon was over. With that, Gen. Patton rose, warmly thanked us for coming, and strode out of the room.

The instant the door had closed behind him, I realized that I had just been treated to a rare, incomparable, unforgettable experience.

This Gen. Patton had been quiet, patient, kindly, gentle, warm, thoughtful, serious, deeply-interested, and low-key.

The session just completed reminded me of an aging college professor conducting a seminar for a small group of selected students. There was not a trace or whisper of flamboyance or bravado or a dominant personality.

I was now aware that I had been with and witnessed at close hand two Pattons — the Actor and the Man — the Actor at Domnom les Dieuze and the Man at Bad Tolz. And today I had spent the afternoon in the company of a Gen. Patton that most of the world had never seen — would never see — and did not know. This man on this day did not fit the pattern, could not step into the mold that he, himself, and the world had fashioned for him. For me, it was a most extraordinary, never-to-be-forgotten experience.

I would often wonder, but would never know, the fundamental reason for this meeting — why this great armor officer, this already famous army commander, would spend an afternoon discussing small unit tank tactics.

I wondered if it were, perhaps, to satisfy some curiosity. He was a fabulously successful army commander — widely credited with being an armor genius — whose skillful use of tanks had resulted in wide sweeps and rapid advances — whose tanks had brought mobility, maneuver, and movement to the battlefield, thus appreciably shortening the war. In many circles, he was already conceded to be the greatest FIELD commander this country had ever had.

Yet, he knew full well that his successes would not have been achieved had it not been for those individual tanks out front. When references were made to Patton's tanks, they were really talking about my tanks and those of the other two tank battalions in the 4th Armored Division, as well as the tanks in his other armored divisions.

So it was about those individual tanks out front that the discussion this day ranged.

Those individual tanks were really his army's building blocks. And how those building blocks operated against the enemy determined the success of his army. If the tanks were held up — stopped, that huge Goliath — Third Army — was stopped. Conversely, as they moved, so moved his army.

So perhaps on this day, Gen. Patton had simply wanted to study and talk

about the actions of his building blocks, which had helped make his army so successful and him a world famous military leader. Certainly, he had mapped the strategy, and with his sixth sense, his great battle sense, he sometimes asked the impossible. And we implemented that strategy and often did the impossible. Or, perhaps, he was gathering material for another of his issues of "Lessons Learned" or "After-Action Reports." Or he may have been gathering background for a book.

I would never know the real reason. But I DID know that on this afternoon I had had a profoundly moving, unique, rich, rewarding, never-to-be-forgotten experience.

To my great surprise and dismay I would learn that, not long after my visit to Bad Tolz, because of what his seniors considered intemperate, injudicious, and inappropriate remarks about the Russians and Germans, Gen. Patton was relieved of command of his beloved Third Army, and assigned to head a "paper" Army.

Incredibly, merely four months after my session with Gen. Patton at Bad Tolz, that great soldier was dead! BUT astonishingly, over half a century later, that figure is vivid, vibrant, and still lives.

Brigadier General Albin F. Izyk commanded the 8th Tank Battalion of the 4th Armored Division in Europe during WWII; served two years in Vietnam, the second as Assistant Division Commander (ADC) of the 4th Infantry Division; commanded the 14th Armored Cavalry Regiment at Fulda, Germany during the Berlin Crisis of 1961; and was Assistant Commandant of the Armor School, 1965-1967. He retired in 1971 at Fort Devens, Mass., where he was the commanding general. He holds, among his decorations, the Distinguished Service Cross. In 1994, the U.S. Armor Association awarded him the prestigious Gold Medallion, Order of St. George.



"Chaffee's work in the 1930s, including successively expanded maneuvers, in many ways built upon foundations laid earlier in Germany from 1918 until 1926, and, to a lesser extent, in mechanized maneuvers held in England after that time..."



German and British Experimentation In the 1920s and '30s Inspired Emergence of U.S. Armor Force

by John Cranston
Armor Center Historian

Many writers (including this one) have concluded that MG Adna R. Chaffee developed the American Armor Force, virtually alone. Chaffee's associates have bemoaned the lack of organizational and financial support which Chaffee and other tank warfare enthusiasts received in the 1930s.¹

Chaffee certainly helped turn military opinion to support a strong armor force; his decade of quiet and consistent leadership paid off in the Louisiana Maneuvers of 1940 and the founding of the American Armor Force in July of that same year. However, Chaffee's work in the 1930s, including successively expanded maneuvers, in many ways built upon foundations laid earlier in Germany from 1918 until 1926, and, to a lesser extent, in mechanized maneuvers held in England after that time through 1938. Chaffee's outstanding achievements by 1940 may well have evolved because of his knowledge of these European precedents. Throughout combined arms exercises, he preserved the integrity of the mechanized and later of the armor force.

More than any other German leader, Hans von Seeckt, Commander-in-Chief of the new German Army (Reichswehr) from 1919-1926, laid the groundwork for a revitalized German fighting force. For von Seeckt, the military leadership

training and battlefield maneuvers for a mechanized force could take place without the latest equipment. In his large-scale mechanized maneuvers through 1926, von Seeckt trained his leaders first, and he trained them well. German armor was the first to benefit from this training.

A political pragmatist, Von Seeckt turned each and every event to his advantage. He took over a Reichswehr which had survived defeat by crushing the political left in the Spartacist Revolt of 1918/19. The crushing of the revolt stabilized the Weimar Republic, making the new government more dependent upon a strong army than its founders had anticipated. The former General Staff was reconstructed by von Seeckt under the redesignation of *Truppenamt* (literally: advisory council for troops). Von Seeckt accepted the Versailles reduction of officers from 34,000 to 4,000, but was able to compensate by recruiting 56,948 NCOs in 1924. Since Versailles placed restrictions on organizational strength, von Seeckt used the treaty's provisions to create "triangular" divisions, with three rather than four regiments.²

Above all, von Seeckt recognized the importance of maneuvers in assessing the mobility and maneuverability of his military forces. Troops often had to

train using wooden weapons mockups. Trucks frequently were substituted for tanks. The largest-scale maneuvers since World War I in Germany took place in 1926, von Seeckt's last year of active duty. There were two different maneuvers, each with five divisions. Tankers trained in defense, reconnaissance, support, surmounting obstacles, and night river crossings. By the end of the maneuver, the Third Cavalry Division reported to Army Headquarters that "battle without tanks is obsolete."³

The cavalry divisions (using mockups and a limited number of tracked vehicles) conducted their portion of the mechanized maneuvers in eastern rather than in western Germany. This was no accident. Under Gustav Stresemann, the perennial Weimar Foreign Minister until his death in 1929, the German Government pursued a policy of "fulfillment" of Versailles restrictions in dealing with governments in Paris and London. However, Germany had also been secretly negotiating with the newly-formed Soviet Communist Government in Moscow for the sale of military weapons in return for quietly training near or on Soviet soil. In 1927, just one year after von Seeckt's retirement, a German Armor School was established in the Russian university town of Kazan.⁴

Although interested in Armor doctrine, von Seeckt left to others, like Ernst Volckheim and Heinz Guderian, to formulate new tactics and strategy after his retirement in 1926.

British interest in a mechanized force increased just as von Seeckt was departing from the scene. The Tidworth Garrison, on the edge of England's Salisbury Plain, had been developed after the First World War to include ranges and maneuver areas ideal for tanks. In the summer of 1927, an experimental force of tanks and armored cars engaged in a series of maneuvers at Aldershot, England, on the Plain. The U.S. Secretary of War, Dwight Davis, attended one of these maneuvers, and concluded that the United States, too, needed an experimental mechanized force.⁵

Davis arrived on the scene just as Britain's J.F.C. Fuller, one of the two leading proponents of an experimental mechanized force, had decided to leave the Army. (Basil H. Liddell Hart was to remain on active duty.) Believing that he had been offered the command of the new Experimental Force, Fuller rejected in March 1927 the offer to command instead the 7th Infantry Brigade at Tidworth. Fuller was informed by his superiors that the Experimental Force was considered only temporary; nevertheless, he declined the offer to command the infantry unit, which might have led to the eventual command of the Experimental Force. Fuller officially retired in 1933. A solitary and relatively inflexible figure, with much to offer an experimental force, Fuller proved, in the eyes of one biographer, to be "his own best friend and own worst enemy." The decision to reject the Tidworth appointment may well have been the worst mistake in Fuller's career. With his knowledge of tanks and his forceful presence, plus his contacts in and outside the Army, Fuller's resignation meant the death of a strong experimental mechanized force in Britain in the 1930s. Fuller found it hard to work within the system. The system was to find it hard to operate without him.⁶

The 1927 maneuvers were not the last held on the Salisbury Plain. In 1934, the first tank brigade, formed in April, maneuvered there in July, attacking small fortified areas and then advancing in armored formations. In the ninth set of maneuvers, the tank brigade moved out after midnight, engaging in daytime concealment to avoid detection

by aircraft. In 42 hours, medium tanks traveled 120 miles, with light tanks up to 160 miles, proving the value of tanks and aircraft in battle. However, the tank brigade fared less well in the July 1935 maneuvers. Two divisions were fighting two other divisions in a corps vs. corps maneuver. Older tanks were distributed among infantry divisions for the first time since 1925. Infantry, rather than armor, was placed in the forefront. Perhaps, had Fuller not declined the post offered to him in 1927, armor and the two-year old tank brigade, with the concept of a mechanized force, would have fared better in the late 1930s.⁷

It is hard to say how much Chaffee borrowed from the German and British precedents. His doctrine and his opera-



General Chaffee escorts visiting congressmen on a visit to Ft. Knox in 1941.

tional skills resembled those of von Seeckt, rather than Fuller. When Secretary Davis's hope for an experimental mechanized force failed to materialize, Chaffee continued in the 1930s to work within the system. Like von Seeckt, he initially trained without tracked vehicle equipment. At Fort Knox, Chaffee trained the 1st Cavalry Regiment, "unhorsed" from Marfa, Texas, for the Fort Riley Maneuvers in the summer of 1934. The mechanized forces at Fort Riley, under Colonel Dan Van Voorhis, included an armored car troop and also a combat car squadron, with only six of the 18 vehicles actually "combat cars," or tracked vehicles. This 1st Cavalry Regiment initially fought the horse units of the Fort Riley Cavalry School Brigade. Then both forces fought a common enemy. Lessons learned included the need for more night training by the 1st Cavalry and support in overcoming obstacles — especially bridges. To at least one observer, horse units operated better at night.⁸ In the maneuvers to Allegan, Michigan, in August 1936, 1st Cavalry traveled 400 miles in two days. Under Colonel Bruce Palmer, 1st Cavalry then fought with the "Red" Team against the "Blue" Team for the first time in a division-level maneuver.

Horse units engaged in a close envelopment, with mechanized cavalry units in a wide envelopment, delaying the advance of the Blue Force. Lessons learned included the fact that mechanized force could now successfully engage in night surprise attacks.⁹

All this training paid off at the August 1939 Plattsburg maneuvers, largest American peacetime exercise to date, with the 1st and 13th Cavalry Regiments (both now in the 7th Cavalry Brigade) engaging in mock combat between two corps. The brigade leaders refined cavalry doctrine, with tracked vehicles traveling at night, without lights, to take the major road center of Peru by surprise. Unlike the British use of a mechanized force to support infan-

try, the 7th Cavalry Brigade at Plattsburg followed the German example by preserving the separate organizational integrity of the mechanized force.¹⁰

The 7th Cavalry Brigade went on to fight in the corps-level Louisiana Maneuvers of 1940, which were the largest peacetime maneuvers ever conducted in the United States up to that time. Together with the recently-arrived 6th Infantry Regiment (Mechanized), the brigade was attached to IX Corps. A Provisional Tank Brigade from Fort Benning, under BG Bruce Magruder, was attached to IV Corps. The two brigades fought first against each other and then on the same side, with mechanized brigades emerging as clear winners in the maneuvers. IV Corps borrowed from von Seeckt's organizational model, employing the "triangular" division concept with three, rather than four, regiments per division.¹¹

Chaffee consciously or unconsciously borrowed from the German and, to a lesser extent, from the British example. Major accomplishments included the ability to conduct long road marches without mishap and, at and after Plattsburg, the capacity to use tracked vehicles effectively at night. Through-

out his career, and especially after 1938, Chaffee took care to preserve the organizational integrity of his mechanized units, in keeping with the German example but in contrast to the British maneuvers of 1935.

Certainly Chaffee, like von Seeckt, could have benefited from more and better tracked vehicles. However, both of these leaders showed that, between the two world wars, officers and NCOs in a mechanized force could be trained in superior doctrine, tactics, and strategy without the latest weapons.

Notes

¹See especially MG (USA, Ret.) Robert W. Grow, *The Ten Lean Years: From the Mechanized Force (1930) to the Armored Force (1940)*. Manuscript in Patton Museum Collection, Fort Knox, KY. For the description of Chaffee, see Mildred Gillie, *Forging the Thunderbolt* (Harrisburg, Pennsylvania, The Military Service Publishing Company, 1947). Gillie worked with the now missing Chaffee Papers.

²Cite James S. Corum, *The Roots of Blitzkrieg: Hans von Seeckt and German Military Reform* (Lawrence, Kansas, University Press of Kansas, 1992).

³Corum, p. 186.

⁴Corum, pp. 190-195.

⁵Noted in Gillie, *Forging the Thunderbolt*, p. 20.

⁶See Anthony John Tythall, 'Boney' Fuller: *Soldier, Strategist, and Writer: 1878-1966* (New Brunswick, New Jersey, Rutgers University Press, 1977), p. 141 and quote on p. 179.

⁷Basil H. Liddell Hart, *The Liddell Hart Memoirs, 1895-1938* (New York, G.P. Putnam's Sons, 1965), Vol. I, pp. 245-53, 267-70.

⁸See "The Cavalry Maneuvers at Fort Riley, Kansas, 1934, *Cavalry Journal*, Jul-Aug 1934, pp. 5-13.

⁹Colonel Bruce Palmer, "Mechanized Cavalry in the Second Army Maneuvers, *Cavalry Journal*, Nov-Dec 1936, pp. 471-77.

¹⁰Gillie, *Forging the Thunderbolt*, pp. 130-33.

¹¹Gillie, *Forging the Thunderbolt*, pp. 161-164.

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Smart Tank Munitions (Continued from Page 25)

on the horizon. As they maneuver into position to launch their missiles, a tank in the overwatching platoon spots them and fires an X-Rod. The round easily sees the targets and maneuvers toward one of the helicopters. The long rod passes through the thin shell of the aircraft, causing only minor damage, but its expended rocket motor crashes into the side of the helicopter. As the damaged helicopter autorotates to the ground, the other helicopter pilot decides not to test fate and aborts his attack.

When the attacking tank platoons are 2000 meters from the objective, the three defending enemy tanks open fire. Because they are firing against maneuvering targets, their fire is not particularly effective. What they have done though, is to give away their positions. Some of the attacking tanks have 'smart' rounds in the chamber, as do the overwatching tanks. Without pausing, and despite traveling 30 miles per hour over rough terrain, the attackers let loose a barrage of guided, kinetic-energy and top-attack rounds at the defenders. Puffs of smoke identify projectiles whose rocket thrusters ignite to maneuver them against identified targets. Bright explosions above the ground mark the launching of EFPs

against armored targets. Two more defenders are destroyed. The final defender is seen by the overwatching platoon as it moves towards an alternate position.

Two more STAFFs are fired. Hits to the enemy's turret and engine compartment ensure that the objective will be taken without further loss of friendly tanks.

Conclusion

In these simple scenarios we have attempted to illustrate the potential impact of 'smart' tank munitions. Because of their longer range, they will open the spacial parameters of armor units. The added range will also provide commanders more time to shape the battle. Additionally, by providing a moving tank the same hitting capability as a stationary tank, 'smart' tank munitions can speed up the tempo of battle. These are just some of the implications. Members of the Armor Force must begin considering all the tactical implications of 'smart' tank munitions now. New ideas must be explored, tested, and simulated. This new technology will open a whole new era for the U.S. Armor Force. Now is the time to start preparing for it.

Building Better "Bullets" - The OPM-TMAS Story

The charter for the Office of the Project Manager for Tank Main Armament Systems (OPM-TMAS) was approved by the Secretary of the Army in 1979. OPM-TMAS's original mission was for the development, acquisition and fielding of 105- and 120-mm tank lethality systems for the XM1 tank system. Under its original mission, the OPM-TMAS staff managed the development and subsequent acquisition of the 120-mm M256 cannon, now in service on the M1A1 and M1A2. They also provided the M774 and M833 105-mm kinetic energy rounds. Additionally, under its original charter, the personnel at OPM-TMAS managed the development and fielding of 120-mm tank ammunition, most significantly, the M829 kinetic energy round, the M830 HEAT round, and their equivalent training projectiles, the M865 and the M831. In the mid-eighties, OPM-TMAS became responsible for the Armament Enhancement Initiative (AEI). This program is an effort to leap ahead in tank fired, antiarmor munition's lethality. OPM-TMAS's successes to date, under the AEI, include the M900, the M829A1 and its follow-on, the M829A2, and the M830A1 multi-purpose round. AEI also includes the Smart, Target Activated, Fire and Forget (STAFF) round, which is one of the subjects of this article. In addition to tank ammunition, OPM-TMAS is charged with fire control development and several advanced projects in this area are on-going at this time. OPM-TMAS's current Project Manager is COL Richard Bregard. He is assisted by a core staff of 35 civilian and military personnel. For questions concerning this article or OPM-TMAS, contact MAJ Bruce Held, DSN 880-2615.

“With the British Army Cheering Behind”

Flers-Courcelette: The First Tank Battle

by Captain Richard S. Faulkner

It was 0515 on 15 September 1916. The German listening posts on the edge of the Delville Woods picked up strange and ominous sounds coming from the British trenches, but the defenders were not overly alarmed. British bodies still littered No Man’s Land from the last futile attempt to dislodge the Bavarians from their strongpoint. But now, something was desperately wrong. Out of the pre-dawn darkness rolled a weapon the likes of which the Bavarian farm boys had never seen. As the mechanical monster opened fire, the startled Germans quickly fled or surrendered. This mechanical monster was “D1,” a Mark I tank of D Company, Heavy Section, Machine Gun Corps; the first tank in history to go into combat.

The Battle of Flers-Courcelette is separated from the stunning armored penetrations of the Gulf War by only 75 years. Though the tanks of those battles are as dissimilar as the Wright Brothers’ Flyer is to a stealth fighter, some of the basic concepts and problems of armored warfare have not changed. The first tank battle begins a legacy of training, maintenance, and infantry-armor cooperation that has remained with us even as technology and tactics have evolved.

Bringing Tanks to the Battlefield

In August of 1916, Sir Douglas Haig, the commander of British Forces on the Western Front, faced a dilemma. If a major attack was not launched on the Somme before winter, there was little chance of organizing a combined Allied offensive before the spring of 1917. With the French counterattacks at Verdun, Brusilov’s ongoing offensive on the Eastern Front, and the Italian attacks on the Isonzo Line, Haig was certain that one more “big push” would overtax Germany and the Central Powers and crack open the Western Front. To accomplish this breach, the British

commander would mount the heaviest attack since the abortive battle of 1 July. The four attacking corps would be supported for the first time by the Heavy Section, Machine Gun Corps, the unit which would later become the Royal Tank Corps.

As early as December 1915, Haig had been informed of a new secret weapon that could possibly restore open warfare to the Western Front.¹ In January, “Mother,” the prototype of all British World War I tanks, rolled out of the workshop and began trials. The following month, LTC Ernest Swinton published “Notes on the Employment of Tanks,” the first attempt to establish doctrine for the new system. Swinton described the weapon as a...

“Caterpillar” bullet-proof climbing motor, or “Tank,” a machine designed for the express purpose of assisting attacking infantry by crossing the defenses, breaking through the obstacles, and disposing of the machine guns. It is primarily a machine-gun destroyer...”²

After reading the memorandum and meeting with Swinton, Haig was convinced that the tank was a resource that must be used at the opening of the upcoming Somme Offensive.

Problems with training and procurement prevented tanks from reaching France in time for beginning of the offensive on 1 July 1916. The loss of almost 60,000 men on the first day of the battle led Haig to pressure the War Committee to send whatever tanks were available. Swinton and most of the other tank pioneers were against sending small numbers of tanks to the front. In “Notes on the Employment of Tanks” Swinton had argued:

“Since the chance of success of an attack by tanks lies almost entirely in its novelty and in the element of surprise, it is obvious that no repetition of it will have the same opportunity of succeeding as the first unexpected effort. It follows, therefore, that these machines

should not be used in dribbles” (original emphasis)³

The British commander would not be moved. In a letter to the Chief of the Imperial General Staff, Haig stated:

“Even if I do not get so great many as I hope, I shall use what I have got, as I cannot wait any longer for them, and it would be folly not use every means at my disposal in what is likely to be our crowning effort this year.”⁴

On 13 August 1916, the first tanks left England for France. By the end of August, two full companies, a total of 50 tanks, were on the Western Front.⁵

Training the Force

Haig’s constant pestering had gotten the tanks to France, but the two companies were far from ready for combat. The training in England had been rushed and woefully lacking. As late as June, “Mother” was the only tank available for driver training at the tank training camp at Elveden.⁶ Instruction on map reading, reconnaissance, and gunnery was also substandard. Though replica German trench works had been constructed, a shortage of tanks prevented most crews from practicing on the site. This shortage also resulted in many drivers leaving for France with as little as two hours of driving experience.⁷

A new training center was established in France at Yvrench. However, a lack of time and instructors prevented effective training prior to the tankers moving into the line. Most importantly, there was no training that integrated the tanks and the infantry. The secrecy surrounding the new weapon was so complete that many British infantrymen were as startled as the Germans by the tank’s first battle appearance.⁸ These training deficiencies would have disastrous effects on 15 September.

Problems With Maintenance

Once in France, the tanks were feverishly prepared for the coming battle. The majority of this time was spent establishing logistical and organizational bases for the new arm. The corps and division commanders that the tank companies would support were encouraged to observe the new weapons to get an appreciation of their capabilities and limitations. Many of these commanders wanted to see the tanks knock over trees and perform other “circus tricks.”⁹ These demonstrations, combined with the fact that the Mark I design had not been completely proven, resulted in growing maintenance problems. Shortages of spare parts, lack of trained mechanics, and the poor experience level of the crews, would decrease the already small number of tanks going into battle.

The British Plan

On 31 August 1916, Haig issued his battle orders. General Rawlinson's Fourth Army would be the main attack with the mission of making a gap through the Germans' three defensive belts. To accomplish this, nine divisions would attack on a six-mile front to capture Morval, Les Boeuifs, Flers, and Gueudecourt. General Gough's Reserve Army would simultaneously launch one corps in a supporting attack to capture Courcellette. Once the Fourth Army had made a gap in the Germans' last defensive line, the Cavalry Corps would exploit the breach and begin rolling up the enemy lines to the northwest.¹⁰ To support the attack, 42 tanks were assigned to the Fourth Army and six were allotted to the Reserve Army.

Rawlinson opted to spread his tanks over the length of the front rather than concentrate them on one or two critical axes. In the XIV Corps, three tanks were given to the 56th Division, three to the 6th Division, and ten to the Guards Division. The XV Corps allocated four tanks to the 14th Division, ten to the 41st Division, and four to the New Zealand Division. The III Corps assigned four tanks to the 47th Division, and two each to the 50th and 15th Divisions.¹¹ These “penny packets” of tanks would be further depleted by mechanical failures prior to reaching the

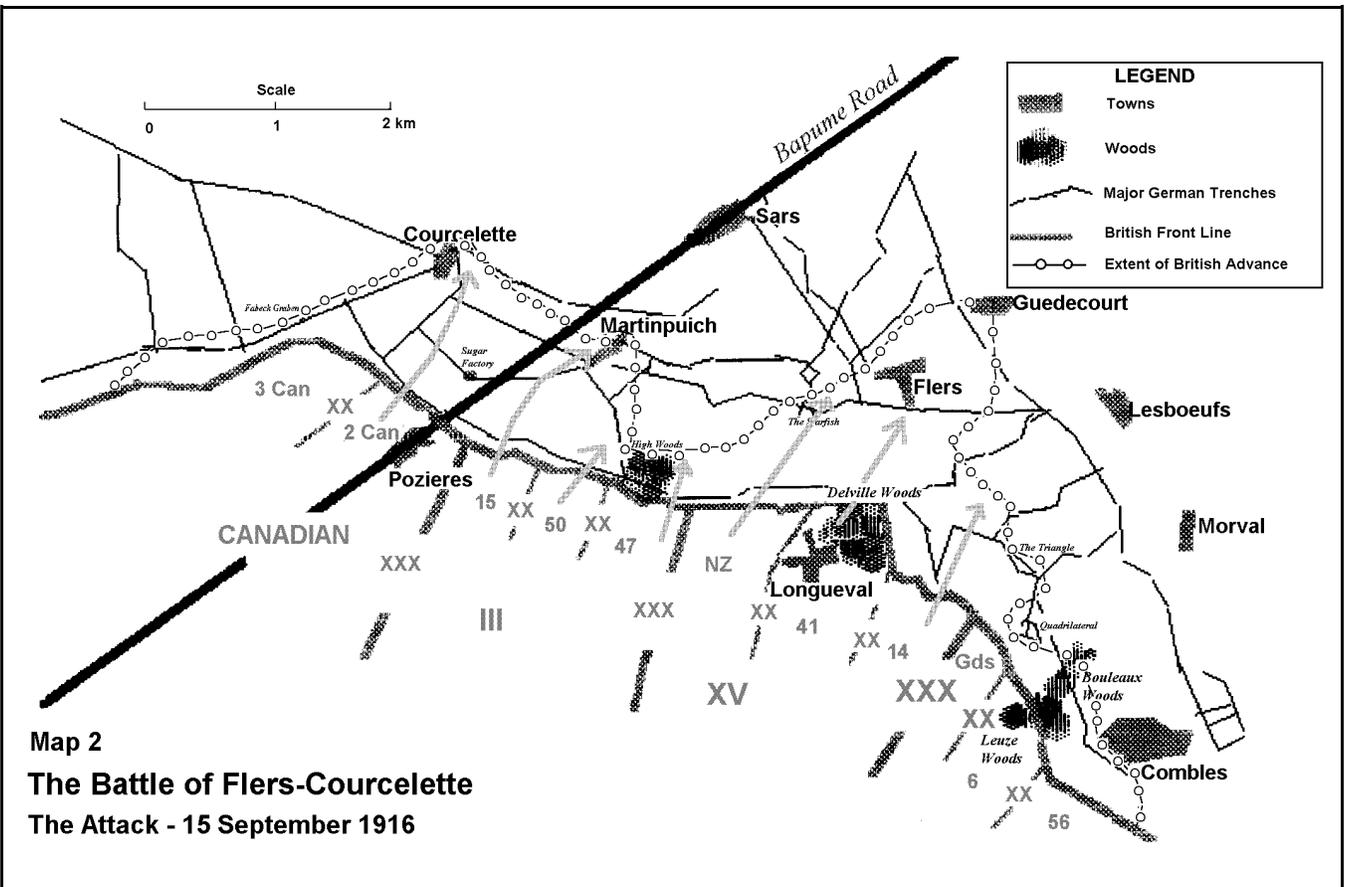
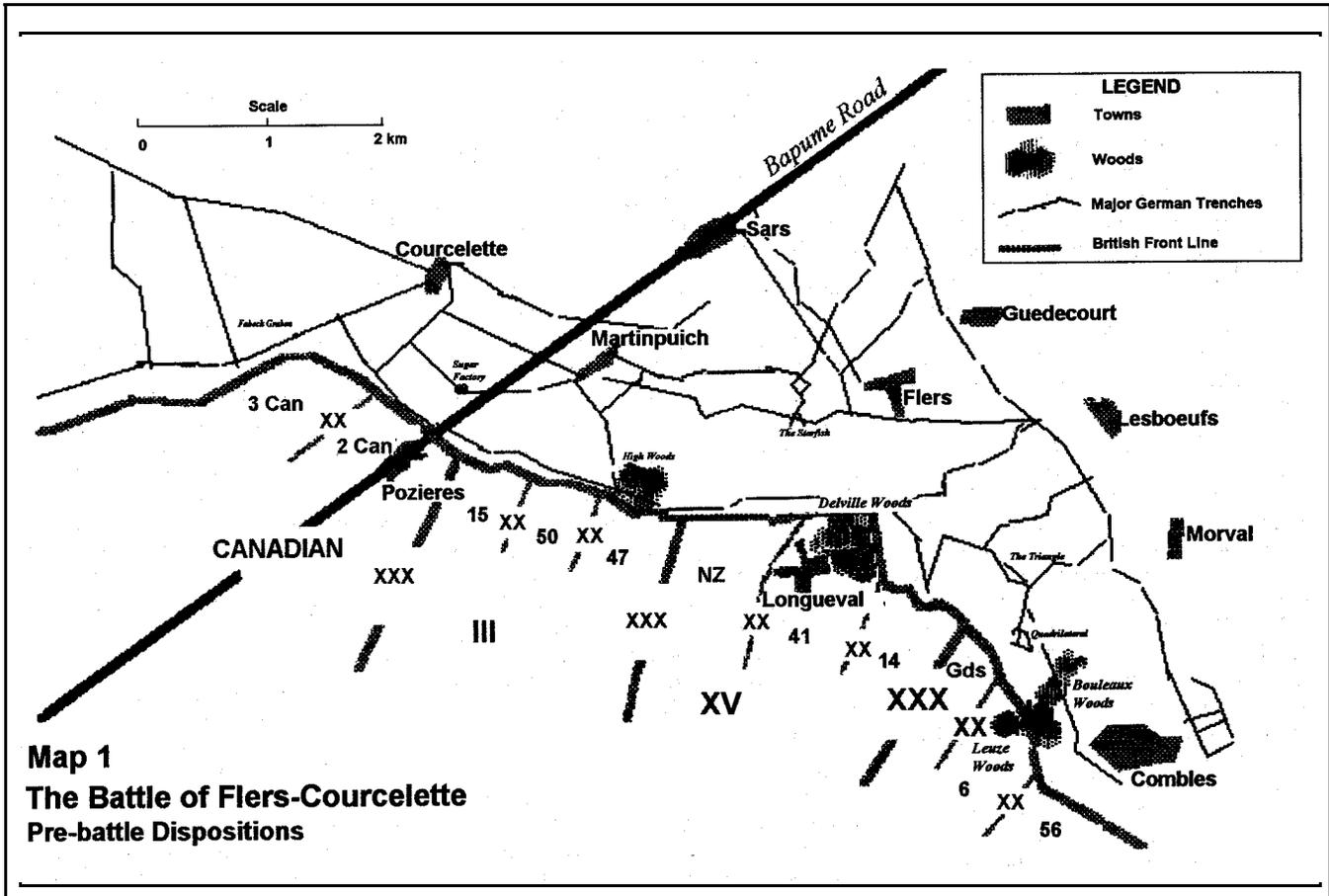


line of departure. Swinton's fear of wasting the element of surprise with “dribble” attacks was about to be proven true.

On the Other Side of the Front

Since July, the Germans had been strengthening the defensive lines on which the British attack would fall. The villages of Combles, Morval, Flers,

Martinpuich, and Courcellette had all been heavily fortified. Between these strongpoints ran uninterrupted lines of fighting, support, and communications trenches. These trenches were strengthened with thick belts of barbed wire and overlapping machine gun coverage. Other key terrain was made nearly impregnable by a liberal use of reinforced concrete bunkers and deep, shell-proof dugouts. These positions,



with names like the “the Quadrilateral,” “the Triangle,” “the Sugar Factory,” and the “Fabeck Graben,” were to be included in the British objectives for 15 September. The Germans also held strong positions on the center of the British lines in the High Woods. The High Wood positions had resisted numerous attacks and inflicted great slaughter on all attackers since 16 July. The Germans planned to make any attack on their lines an expensive venture for the British.

The British hoped that a ceaseless three-day artillery barrage of the German lines would fragment the German defenses enough to ensure the success of the ground attack. The heaviest concentrations of fire were reserved for the fortified villages and other strongpoints. The barrage accomplished little in reducing the enemy works. The only result was the further churning of the already shell-torn ground. This, combined with heavy rains on 13 September, would create trafficability problems for the attacking tanks. As the barrage thundered overhead, the assaulting tanks and infantry moved into their assembly trenches and positions.

The Battle Is Joined

The Battle of Flers-Courcelette began at 0515 with tank D1’s attack at Delville Wood. The 14th Division had been given permission for an early attack on the German works to prevent enemy crossfire as the British soldiers left their trenches. The first-ever tank assault went well. A British infantryman attacking just behind the tank recalled:

“The tank waddled on with its guns blazing and we could see Jerry popping up and down, not knowing what to do, whether to stay or run... The Jerries waited until our tank was only a few yards away and then fled — or hoped to! The tank just shot them down and machine gun posts...just disappeared”¹²

Soon after clearing the trench, D1 was knocked out of action by German shell fire. The elements of success and failure illustrated by D1’s brief life would be typical of tank actions for the remainder of the day.

On the British right flank, the tanks attached to the XIV Corps accomplished little. Of the three tanks attacking with the 56th Division, one threw

track at the line of departure and another became ditched near the German front line. The remaining tank was immobilized by shell fire in “no man’s land” but provided effective fire support to the infantry attacking the Combles Trench.¹³

In the 6th Division, the three attached tanks were to be used to reduce the “Quadrilateral” strongpoint. Mechanical problems left the division with only one tank to make the attack. The tank led the assault, but became disoriented and opened fire on a trench occupied by the 9th Norfolk Battalion. Quick action by a Norfolk company commander prevented a serious fratricide incident and also got the tank oriented toward the objective.¹⁴ The 6th Division’s lone tank failed to damage the “Quadrilateral.” When the infantry attacked, they found the strongpoint’s barbed wire and machine guns intact. Casualties were heavy and the “Quadrilateral” remained in German hands.

The performance of the ten tanks attacking with the Guards Division was even more dismal. Five of the ten tanks broke down or were ditched prior to the line of departure. Of the remainder that attacked, one broke its steering tail, one ditched, and three returned to the British lines after cruising around in “no man’s land” and accomplishing little.¹⁵

The tanks had better success in the XV Corps sector. Fourteen of 18 tanks assigned to XV Corps crossed the line of departure. These tanks were to pave the way for the 14th, 41st, and New Zealand divisions’ attacks, by destroying enemy machine gun positions in the fortified towns of Flers and Gueudecourt. The seven tanks that attacked with the 41st Division made the most spectacular gains of the day. These tanks pushed through the Germans’ first two trench lines and reduced the strongpoints in and around Flers. In Flers, the tanks spread panic in their wake. A Bavarian prisoner of war told his interrogators,

“One stared and stared as if one had lost the power of their limbs. The big monsters approached us slowly, hobbling, rolling, rocking, but always advancing. Someone shouted “the devil is coming” and the word passed along the line.”¹⁶

One tank, “D16,” attacked directly up the main street of Flers, doing considerable damage as it went. At 0845, this

event was reported by an aircraft observer flying over the town as “Tank seen in main street Flers going on with large number of troops following it.”¹⁷ This message was picked up by the British press and changed to read, “A tank is walking up the high street of Flers with the British Army cheering behind.”

Four tanks from the 14th and 41st Divisions broke through the Germans’ last defensive belt and managed to push to the outskirts of Gueudecourt. Unfortunately, the infantry attacking with the tanks had been disorganized when taking Flers. The Germans quickly rallied and patched up a hasty defense of the town. One by one, the tanks were bracketed and destroyed by shell fire. The moment passed, and the British allowed a great window of opportunity to close.

In the III Corps, seven of eight tanks started the battle. Though these tanks proved to be of assistance, they failed to live up to expectations. The closeness of the British and German lines along the High Woods had prevented suppression of the enemy during the opening bombardment. The III Corps and 47th Division commanders hoped to use the division’s four tanks to break the Germans’ hold on the strongpoint. The tanks were expected to move through the stump-studded and trench crossed woods to open the way for the attacking infantry. The going proved too rough for the primitive machines and all were lost to ditching or shell fire.¹⁸ The 47th Division’s attack against the High Woods stalled. After the commitment of most of the division’s reserves and a high number of casualties, the German strongpoint fell.

Both of the 50th Division’s tanks provided effective support to the infantry attacking between the High Wood and Martinpuich. One tank penetrated the German frontline and laid down a deadly enfilading fire. This tank was knocked out by shell fire, but not before its fire had allowed the infantry to secure their first objective with light losses. The remaining tank broke through two belts of German trenches and knocked out three machine guns on the eastern side of Martinpuich. However, the tank was unable to continue the attack due to lack of fuel and a bullet through its oil cylinder.¹⁹

The 15th Division started the attack with only one of two assigned tanks. The lone tank attacked behind, rather than forward of, the infantry. When the

infantry advance was held up to the southwest of Martinpuich, the tank moved forward and destroyed several machine guns and dugouts. The tank soon had to return to British lines for fuel, and was later used to bring ammunition forward to the infantry.²⁰

On the front of the Reserve Army, the tanks also met with mixed results. The Canadian Corps' 2d Canadian Division, with six tanks, was to launch a supporting attack toward Courcellette. Three tanks were tasked to aid in the reduction of the German "Sugar Factory" strongpoint. One tank became ditched in the Canadian frontline, and the other two were unable to keep up with the infantry. When the two lagging tanks reached the "Sugar Factory," they were used to mop up remaining pockets of enemy resistance. Of the other three tanks, one broke track prior to the line of departure, and the remaining two inflicted great loss on the enemy until becoming mired. A captured German soldier remarked that the use of tanks was "not war but bloody butchery."²¹

The first tank battle was less than auspicious. Though the tank had been very successful in some sectors and had succeeded in reducing casualties, all in all the tanks performed much more poorly than expected. Thirteen months of training, battle experience, and mechanical improvements would be required to turn the tanks into the

force that broke the German lines at Cambrai.

Conclusion

What is the relevance of this battle in an age of sabot rounds and turbine engines? Perhaps, it shows us that the challenges of training, maintenance, use of combined arms, and the massing of combat power are not new concepts of warfare. There are lessons in this battle from which we can profit. The British tankers, no matter how brave, were not prepared for battle. Their training prior to 15 September was not focused on the tasks required to survive and win on the battlefield. Though the tank was considered an infantry support weapon, no effort was made to bring the two arms together prior to the battle. This caused a lack of understanding that led many commanders to overestimate the abilities of the tanks. At the Quadrilateral and the High Wood, the dependence on tank support resulted in increased casualties to the infantry when the tanks failed to perform.

The tanks of 1916 were temperamental and prone to break down. This was due not only to their engineering, but also to the inexperience of their crews and mechanics. The first tank battle presents a hard lesson on the value of

maintenance and driver skills. Of the 48 tanks committed to the attack, 12 never made the line of departure and 10 became ditched or broken down during the battle. The PMCS and troubleshooting steps practiced by today's M1A1 crewmen are the legacy of the lessons learned by crews of those Mark I tanks.

The Battle of Flers-Courcelette also presents tactical lessons on employment of armor. Rawlinson's plan to spread the tanks across the whole of the Fourth Army front had disastrous results. His plan, coupled with mechanical losses, negated the shock effect and tactical surprise that the tanks allowed. The need to mass combat power is a problem with which we still wrestle. The weak, piecemeal attacks parried by the OPFOR at the NTC and CMTC are daily reenactments of the worst parts of 15 September 1916. Operation DESERT STORM, on the other hand, is the offspring of the aggressiveness, shock, and firepower demonstrated in other parts of the battle. D16's attack up the main street of Flers is the grandfather of Patton's drives of World War II, and the great grandfather of the VII Corps' destruction of the Iraqi Republican Guard.

Notes

¹John Terraine, *Ordeal of Victory*, (New York: J.B. Lippincott Co., 1963), p. 220.

²CPT Wilfrid Miles (compiler), *Military Operations: France and Belgium 1916: 2d July 1916 to the End of the Battles of the Somme-Maps and Appendices*, (London: MacMillan and Co., 1938), p. 50. (Hereafter "Maps and Appendices")

³Ibid., p. 53

⁴CPT Wilfrid Miles (compiler), *Military Operations: France and Belgium 1916: 2d July 1916 to the End of the Battles of the Somme* (Official Narrative History), (London: MacMillan and Co., 1938), p. 235. (Hereafter "Official Record")

⁵CPT D.G. Browne, *The Tank In Action*, (London: William Blackwood and Sons, 1920), p. 27.

⁶Basil Liddell Hart, *The Tanks*, Vol. I, (New York: Fredrick A. Praeger, Inc., 1956), p. 61.

⁷Browne, p. 27.

⁸Lyn MacDonald, *Somme*, (London: Michael Joseph Ltd., 1983), p. 279.

⁹Liddell Hart, p. 66.

¹⁰Miles, "Maps and Appendices," p. 61.

¹¹Among three major sources; J.F.C. Fuller's *Tanks in the Great War*, the British Official Records, and Liddell Hart's *The Tanks*, there are minor discrepancies regarding the total number of tanks involved in the battle and which divisions they supported. I gathered 48 tanks by scrubbing the divisional battle narratives in the Official Records pages 307-343.

¹²MacDonald, p. 275.

¹³Miles, "Official Record," p. 307.

¹⁴Ibid., p. 310.

¹⁵Ibid., pp. 311-312.

¹⁶John Foley, *The Boilerplate War*, (New York: Walker and Co., 1963), p. 23.

¹⁷Miles, "Official Records," p. 323.

¹⁸Ibid., p. 332.

¹⁹Ibid., pp. 333-334.

²⁰Ibid., pp. 334-335.

²¹Ibid., pp. 339-340.

Captain Richard F. Faulkner graduated from Kennesaw College in 1985. He enlisted in the Army Reserve in 1982 and was commissioned under the Early Commissioning Program in 1984, serving with the 273d MI Co. (USAR). He entered active duty in Armor in 1986 and has served as a tank platoon leader and company XO with 2-77 Armor, Ft. Lewis; asst. S3 for training for 3d Brigade, 1st AD in Bamberg, Germany; and commander, B Company 2-70 Armor. He also commanded Erlangen Community Area Support Team. He is presently pursuing a masters degree in American history at the University of Georgia for future assignment to West Point. He is a graduate of AOB, AOAC, CAS³, and Airborne School.

The New Platoon Gunnery Trainer

The "good old days" are gone, never to return. Never to return in the foreseeable future, that is. What were these "good old days" that we refer to here? The days of seemingly unlimited fuel, spare parts, bullets and beans, land, of tanks maneuvering through the countryside, and tankers doing what they like to do best: tank. So, tankers bid good-bye to that magic time when the norm was three to four gunneries, a couple of ARTEPS, and numerous side trips to the field per year. Content yourselves now with being swallowed by the "White Box." Simulations are here. They save us time, fuel, and money. We understand, you can't ever fully simulate the actual tank. OK, point well taken, but maybe things are not as bad as one might think.

In March of 1994, a little-known device was installed at Fort Knox, Kentucky, the second-generation platoon gunnery trainer PT-2000 (PGT), and it gives the commander a new freedom.

Granted, this trainer is still a "White Box," (actually four white boxes linked together), but beyond that, all similarity ends. The tank platoon can shoot, move, and communicate in a way never before possible in a simulator. That is important in these lean times. For less than the cost of one main gun round, a full tank platoon (less drivers and loaders) can train the critical tasks that bind a platoon into a cohesive fighting unit.

The PGT is a unique simulator in many ways. With a terrain database of 4x8 kilometers and the new PT-2000 graphics, the PGT makes significant inroads in the simulation field. The PGT has a pre-programmed set of 40 scenarios, from deliberate attack to hasty defense, and most missions in-between. The PGT presents a formidable challenge to any tank platoon. The built-in exercises, coupled with the Armor Exercise Generation System (AEGS), present the commander and platoon leader with a virtually unlimited training capability. The AEGS system can create any platoon exercise the commander desires. The commander has only to make his needs known to the system manager, with a little lead time. With this capability, the unit can work on specific weaknesses instead of firing generic exercises.

The PGT was designed around the needs of the tank platoon. It can function as a platoon gunnery trainer, a section gunnery trainer, and a crew gunnery trainer. It also includes a CAT '91 database, a graphic representation of Range 301 at Grafenwohr, Germany. The PGT database can simulate either desert or European environments. Environmental conditions may be varied from snow, rain, fog, day/night and various battlefield conditions, in any combination. Realistic scenarios and a realistic target array make for a

rapid tempo battlefield and a high stress environment.

The ultimate goal of any company/troop commander and platoon leader is to master command and control, fire distribution, and maneuver of his unit. This is the key to success in any battlefield situation. The PGT provides the opportunity for key leaders to train these extremely critical tasks. Improved spot reports, contact reports, terrain indexing, direct and indirect fire planning, sector responsibility, movement discipline, radio procedures, and logistical planning are just some of the benefits.

Real-time AAR feedback is possible via videotape, with a hard copy of the platoon's performance. The PGT AAR is made possible by videotaping the topographical map (a bird's eye view) of the database. This topo map displays the platoon's tanks as different-colored icons. Also, the topo map, along with the icons, allows the instructor/operator to track and maneuver the platoon through the database as directed by the platoon leader/commander. Limited formations and variable tank speeds, from 0 to 45 mph, are possible.

The tank commander, through the addition of two more vision blocks (the U-COFT has only one) at the commander's weapon station (CWS) now has a 180-degree field of view. These vision blocks, along with the head tracker, allows viewing of wing tanks and a vastly increased range of vision all around.

The face-to-face feedback from the platoons that have used the PGT indicates that it is a really practical trainer that gives outstanding results. Commander, the next time you and your unit train at Fort Knox, Kentucky, or Vilseck, Germany, schedule some time on the PGT. For more information concerning the PGT, contact Mr. Cook or SFC Osborne, A Trp, 5/16 Cav, DSN 464-1571/1572. For scheduling contact Mr. Travis Bell, S3, 5/16 Cav, DSN 464-5013.



Thermal Target Reference Points: An Inexpensive Approach

by Captain William A. Rademacher

My company, Bravo Company, 2-64 Armor, 1st Raider Brigade, 3d Infantry Division, was preparing for a rotation at the Combat Maneuver Training Center (CMTC) in February 1992. During our preparation, we discussed the issue of TRPs, and we chose the standard potion of GAA and rocks, sand, etc.

For a previous rotation, 2-64 battalion commander Bill T. Hutcheson had used propane powered TRPs with some success. This idea seemed promising, but I dismissed it because of the nearness of our rotation date.

Then one afternoon, as I was shopping in the AAFES Sports Store, I spotted a Coleman Leisure Line™ Lantern, #5130-700, and noticed that it was about the same diameter as a stove pipe from a "pot bellied stove." I bought the lantern and took it to work the next day.

I explained my idea of somehow inserting the lantern into the pipe to my first sergeant, SFC Gerald R. Wallace. We thought about it for a long time,

and then set to work on creating the "propane-powered thermal TRP."

Let me say first that we tested this TRP at Hohenfels in the spring, and at Schweinfurt in the summer and winter. I have not tested it in a desert or other environment. Again, this is merely one approach that worked for my company, and it was relatively inexpensive.

Take the lantern and screw it on top of a narrow propane bottle. Remove the lantern lid, handle, and glass. Install the mantle and burn in the mantle.

Now take the length of stove pipe and place the standard stack cap on top. This cap has convenient lines for staking down the TRP in high winds. Insert the lantern into the stove pipe until the bottom of the stove pipe covers the very top of the propane bottle. Mark the approximate location of the mantle with a marker on the outside of the pipe. Now remove the lantern and drill a pattern of holes through the pipe at the marked location on one side only. This pattern of holes will illuminate to

provide a reference point at night for a daylight sight.

Once you have everything ready to assemble, light the lantern mantle, turn the gas flow control halfway down, and insert the lantern into the open end of the pipe. Place the bottom protruding end of the propane bottle into a hole in the ground for support. Turn the side with the holes towards your position.

That is all there is to it. The TRP will burn for about 8 to 15 or more hours, depending on the burner setting. The wind cannot blow it out, and it should not go out on its own. Place two of these TRPs in a vee shape at ranges in excess of 1200 meters. These TRPs can also be painted on one side, for recognition purposes.

The only thing mildly fragile on this device is the burnt mantle, but they are of the bayonet slip on type, which are easy to install and replace. This TRP fits easily into M1A1 turret stowage boxes, and can be placed by loaders very quickly, during a hasty defense battle drill, or while a tank is driving the engagement area, etc.

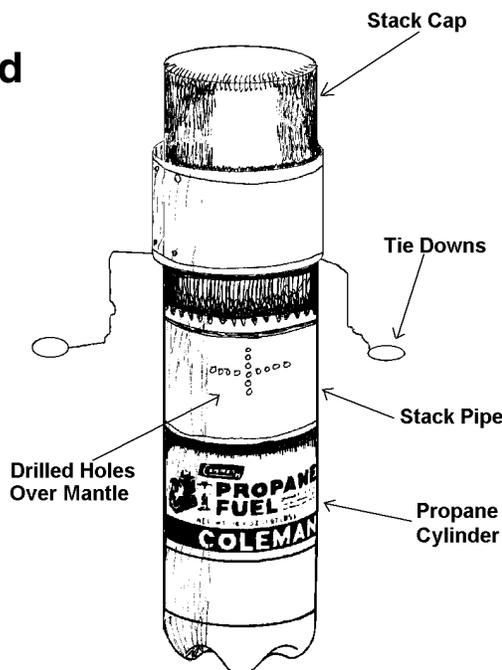
For more information, contact CPT William A. Rademacher at Delta State University, Cleveland, MS 38733, or by e-mail/internet/etc. on Compuserve at:

75342.3015@compuserve.com

Propane-powered Thermal TRP

Components:

- Leisure Line Propane Lantern by Coleman™ (Model 5130-700)
Cost: approximately \$14.95 - \$15.95
- (1 length of stove pipe), Heater Model M1945 Stack Pipe - CAGEC and Part No. (81349) MIL-P-551 SOL, LIQ
(Same as used on H-45 Heaters)
- (1 stack cap), CAGEC and Part No. (81337) 5-13-4442 SOL, LIQ
- (1 propane cylinder)



Captain William A. Rademacher graduated from Northern Kentucky University with a BA in History in 1985. He is a graduate of the Armor Officer Basic and Advanced Courses, and CAS³. His assignments include tank platoon leader, mortar platoon leader, tank company XO, and S3 Air in 3-32 Armor, 1st Cav Division; battalion adjutant, 1-69 Armor; and commander of Bravo Company 2-64 Armor and HHC 2-64 Armor in the 1st Raider Brigade, 3ID. He is currently the Professor of Military Science at Delta State University in Cleveland, Miss.

Engineers in the R&S Effort

by Captain Alexander J. Verret

Throughout history, military leaders have understood the necessity and importance of accurate and timely intelligence. The ability to gain and maintain contact with the enemy and identify his strengths and weaknesses has more often than not been the deciding factor between success and failure on the battlefield. The reconnaissance and surveillance (R&S) plan, derived from the commander's priority intelligence requirements (PIR), targets gaps in the unit's understanding of the current battlefield situation.

The role of R&S has become even more important on the modern battlefield because of the increased lethality of current weapon systems. Tables 1 and 2 show the outcome of battles fought at the Combat Training Centers (CTCs) in relation to the quality of R&S preparation and execution, for both the BLUFOR and OPFOR, before attacking. The data depicts an obvious correlation between the quality of the R&S effort and the outcome of an attack. The BLUFOR were successful in 70 percent of their attacks following a good quality R&S effort and were defeated in 76 percent of their attacks when the R&S effort was poor or non-existent.

The Problem

The primary battlefield information-gathering asset of a task force is its scout platoon. Data gathered from the CTCs, though, indicate maneuver battalions typically overtask their scouts and do not take advantage of other R&S assets available to them. Often, the scout platoon is the only R&S asset actively collecting battlefield information. Task force scouts are often too busy trying to gain and maintain contact with the enemy to stop and gather critical information about the terrain and enemy defenses necessary to ensure success of the upcoming mission. Furthermore, scouts are often not adequately trained in gathering engineer-specific information; consequently, when it comes time to conduct a breaching operation, critical obstacle intelligence (OBSINTEL) is unknown. The solution to ensuring that this critical information is gathered and disseminated is to incorporate engineers into the R&S effort. By creating and employing engineer reconnaissance teams, the task force (TF) S2 and S3 can focus the scout platoon on the location, composition, and disposition of the enemy, while the "engineer scouts" concentrate on analyzing the terrain and gathering OBSINTEL.

Engineers are the TF's obstacle and terrain experts. As the TF's principal breaching experts, they have a firm grasp of what they must learn about the obstacles to properly prepare for a breach. Necessary OBSINTEL includes:

- Obstacle locations
- Obstacle orientation/intent
- Obstacle depth
- Obstacle composition (wire, mines, tank ditch, etc.)
- Type of mines (AT/AP, buried/surface-laid, blast/SFF, fuze type, pressure-activated or tilt rod actuated, etc.)
- Presence of anti-handling devices
- Gaps/bypasses
- Potential breach sites
- Key terrain and approaches for breach

With accurate OBSINTEL, the S2 and TF engineer can determine the overall defensive posture of the enemy. Refer to Table 3, which outlines the tactical significance of threat obstacle activities.

With this information, along with intelligence about the enemy's composition and disposition, the TF commander can make an informed decision on whether to breach or bypass enemy obstacles. If he decides to breach, the TF engineer can now ensure that the breach force is properly task organized and has the necessary information to conduct the breaching operation.

Methodology

The TF engineer works closely with the S2 in the intelligence preparation of the battlefield (IPB) process, assisting in the terrain and threat analysis. The S2 threat evaluation consists of a study of the enemy's order of battle or, when such detailed data is not available, a generic doctrinal template. The TF engineer assists in the threat analysis by using his knowledge of the enemy's order of battle, obstacle tactics, and time available to the enemy for defensive preparation in order to evaluate the enemy's obstacle capabilities. The S2 then relates the threat evaluation to the

| Quality of R&S Effort | No. of Battles | Battle Outcome | | |
|-----------------------|----------------|----------------|---------|----------|
| | | Success | Failure | Standoff |
| Good | 13 | 9 | 1 | 3 |
| Poor | 50 | 4 | 38 | 8 |

Table 1. Battle outcome according to quality of reconnaissance effort (BLUFOR)*

| Quality of R&S Effort | No. of Battles | Battle Outcome | | |
|-----------------------|----------------|----------------|---------|----------|
| | | Success | Failure | Standoff |
| Good | 28 | 26 | 1 | 1 |
| Poor | 5 | 0 | 5 | 0 |

Table 2. Battle outcome according to quality of reconnaissance effort (OPFOR)*

*From Rand Study, "Applying the National Training Experience: Tactical Reconnaissance," Rand Corporation, October 1987.

| Observed Enemy Obstacle Activity | Tactical Significance |
|--|---|
| Protective obstacle activity. | The enemy has shifted to a hasty defense. |
| Protective obstacle effort on unit's flanks and on the seams between adjacent units. | The enemy is working on its first priority; defense preparations have just begun. |
| Protective obstacle effort along the forward edge of dismantled and vehicle fighting positions. | This is the last phase of protective obstacle effort; priority of work will soon shift to emplacing tactical obstacles. |
| Troops emplacing protective mines in strips perpendicular to their positions or trench line. | The minefield is being emplaced by maneuver troops; presence of trip wires and antihandling devices is unlikely. AP mines will be blast type and pressure detonated. The enemy commander has determined his defense is currently unthreatened and has decreased security to allow maneuver soldiers to emplace protective mines. |
| Troops emplacing protective mines in strips parallel to their positions or trench line. | The minefield is being emplaced by engineers and the presence of trip wires and antihandling devices is more likely. AP mines may be fragmentary or blast type and either pressure or trip wire detonated. |
| Protective and tactical obstacle emplacement conducted concurrently. | The enemy is preparing a deliberate defense and is unable to resume the offense for an extended period. Protective obstacles are being emplaced by maneuver troops while engineers are emplacing the tactical effort. |
| Tactical obstacle effort. | This helps confirm the location, orientation, and type of weapons used by the combat forces in the enemy's main defensive belt. Tactical obstacles are emplaced at approximately one-half the range of weapons in the main defensive belt. |
| Tactical obstacle effort activities located well beyond one-half the range of weapons in the main defensive belt (assume the main defensive belt has been identified and confirmed). | Observed obstacles may be specifically covered by the ATGM reserve, whose location will be approximately 3000m from the obstacle. The observed obstacle may support a combat outpost (COP), who will emplace obstacles at two-thirds of their weapons range, trying to deceive the attacker on the location of the main defensive belt. |
| Obstacle activity observed beyond the expected engineer capability. | The enemy force may have received extensive engineer reinforcement from its higher headquarters, indicating the enemy's main effort. The enemy force is making extensive use of decoy minefields and may be using decoy positions. |
| Employment of minefield marking systems. | This indicates the enemy's side of the minefield (friendly side from the defender's perspective). |

Table 3. Tactical significance of threat obstacle activities*

*FM 90-13-1, "Combined Arms Breaching Operations," Appendix A.

terrain and weather and develops the situation and event templates (Figure 1). The TF engineer parallels the S2's effort by fitting enemy obstacle information to the terrain. With the templated threat forces and obstacles related to the terrain, the S2 and TF engineer identify NAIs on the event template where significant enemy events and activities may occur, to include emplacement of obstacles. The entire staff then participates in the wargaming process to create and refine the decision support template. The staff identifies areas where the commander can influence the battle with fires (to include electronic) or maneuver as target areas of interest (TAIs). The staff then identifies corresponding decision points (DPs) to queue the commander as to when he must act on the respective TAI.

As a result of the IPB process, the TF staff identifies gaps and holes in its knowledge of the battle, and develops information requirements (IRs) to com-

plete the picture of the upcoming action. The commander then designates what he determines are the IRs critical

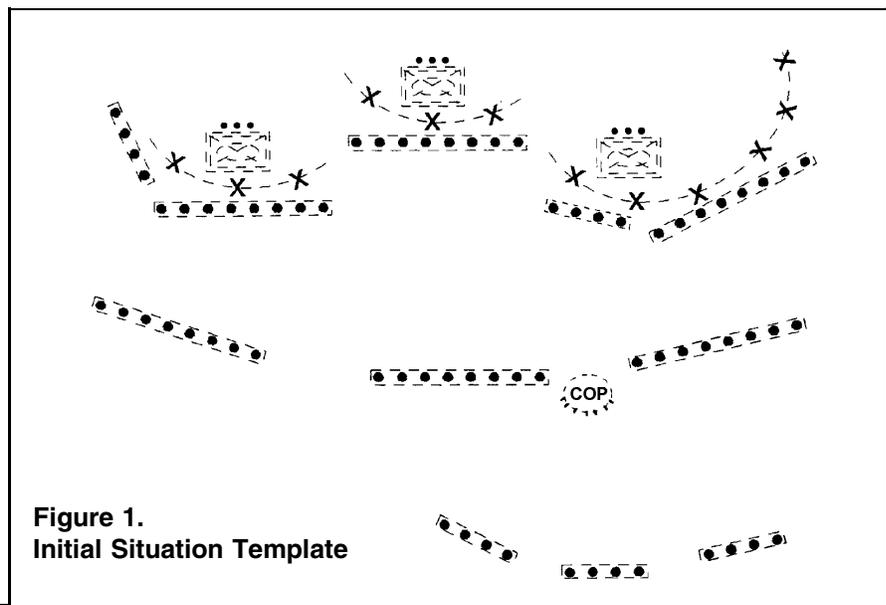


Figure 1.
Initial Situation Template

to the success of the operation as priority intelligence requirements (PIRs). Common PIRs include items such as:

- Where is the enemy's main defensive belt?
- Where are the locations of enemy tanks, antitank (AT) weapons, and infantry positions?
- Is the enemy defensive effort oriented toward a temporary halt or is it developing into a prepared defensive position?
- In what strength will the enemy counterattack, and where are his counterattack forces located?
- Which avenue will the enemy counterattack take?
- Where is the enemy's artillery?
- Where are the enemy's observation posts (OPs)?
- Where are the enemy's obstacles and fire sacks?

The S2, S3, and TF engineer develop the R&S plan and assign the task force's R&S assets to execute it. The S3 may task engineers to augment the R&S effort by assigning NAIs oriented on tactical obstacles (Figure 2), thus reducing the reconnaissance burden of the TF scouts and allowing them to focus better on the enemy.

Integration

The key to incorporating engineer assets into the R&S effort is to balance the necessity of the information to the

risk of losing a valuable breaching asset like an engineer squad. While reconnaissance is a difficult task in itself, it is particularly difficult to get the detailed OBSINTEL needed to conduct a successful breaching operation. For example, the reconnaissance asset must approach the obstacle to determine the type of mines, if they are buried. The enemy, as we do, covers its obstacles with fire and observation so the need for stealth is paramount to ensure success. Combat engineers have the expertise to gather the OBSINTEL, but without prior training with the TF scouts,

the inclusion of engineers into the reconnaissance effort will be awkward, as any ad hoc organization is. Effective cross-training must occur between the TF scouts and their supporting engineers. There are several ways to foster the integration of scouts and engineers:

Create an exchange program. TF scouts can train engineers in reconnaissance techniques and the engineers can train the TF scouts in demolitions and other engineer-specific tasks. Engineers and scouts have many similar tasks, and by using effective cross-training techniques, an overall increase in com-

petence and versatility in both units is inevitable.

Develop a habitual relationship between an engineer platoon and the scout platoon. A habitual relationship between an engineer platoon and the scout platoon would create that familiarity and mutual trust necessary to ensure a well-integrated R&S effort. The TF engineer and S3 should consider this when task organizing engineer assets during the operations order pro-

Continued on Page 45

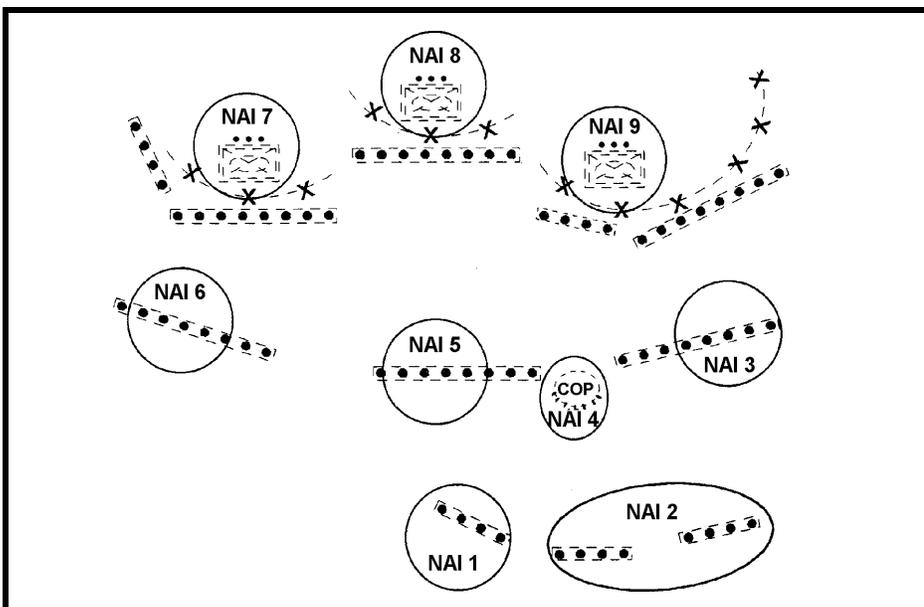


Figure 2.
Extract of the TF R&S Plan

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q |
|----------|------|-------------------|---|---|---|---|---|--------|---------|-----|---------|----------|---|---|--|----------------|
| PRIORITY | NAI | START STOP | SIR/INSTRUCTIONS | A | B | C | D | SCOUTS | MORTARS | GSR | REMBASS | ENGR PLT | | | COORDINATION | REPORTS |
| 1 | 789 | 0400 | What type of equipment does the enemy have and how is it positioned? Do not engage. | | | | | X | | | | | | | Coordinate with CO A for POL | Per TF R&S SOP |
| 1 | 3456 | 0600 1400 | Has the enemy emplaced tactical obstacles, if so, size, composition, type, bypasses? Is there a COP observing the obstacles? Do not engage. | | | | | | | | | X | | | Coordinate route with scout platoon. Coordinate with CO B for POL | Per TF R&S SOP |
| 2 | 4 | | Has the enemy deployed a COP? If so, where and what is its composition? Do not engage. | | | | | X | | | | | | | | Per TF R&S SOP |
| 2 | 12 | 1400 1630 | Has the enemy begun to emplace a second belt of tactical obstacles? Identify potential bypasses and gaps. | | | | | | | | | X | | | | Per TF R&S SOP |

Why the OPFOR Wins

by Captain John A. Nagl

Most of us know the feeling all too well. After forty-eight hours of continuous preparation — siting and emplacing obstacles, digging in tanks and Bradleys, setting up TRPs and noting their locations on range cards, OPORDERS, rehearsals, backbriefs, walking the ground from the enemy's viewpoint — after all of that, thousands of man-hours of preparation sunk into a deliberate defense, the OPFOR pours through you like you weren't even there. Most of the BMPs and T-80s don't even bother to turn their turrets toward your blinking tank, dead in the artillery prep, as the hated red horde rolls by in march formation.

I am fortunate enough to have enjoyed the experience of being embarrassed by the OPFOR at the Army's two premier mounted training centers, the National Training Center in California and the Combat Maneuver Training Center in Germany. Hot and wet at one and cold and wet at the other, the common feature of both training centers (besides the rain) is the presence of a dedicated, professional, full-time opposing force, trained in Soviet tactics and equipped with mock-ups of Soviet fighting vehicles. Like most of those who suffered through a motorized rifle regiment on the attack, I wondered why the OPFOR consistently kicked my tail.

I recently was given the chance to discover at least part of the answer. The CMTC's OPFOR, 1-4 Infantry, is not provided with dismounts for its BMPs by MTOE; units in Europe are tasked to provide soldiers to serve as dismounts and replicate the actual Soviet threat, which would include a squad of infantry in every BMP. My soldiers and I put on the black uniforms of the enemy for two weeks in September and served as Soviet infantry while two armor-heavy task forces fought in the box at Hohenfels. I rode with MRB commanders during MRR attacks and forward detachment missions and fought MRC defenses side by side with the MRC commander. And I learned why the OPFOR wins.



Although a few of the things I learned may be specific to 1-4 Infantry and fighting at CMTC, most are equally applicable to the NTC. This is not intended to be a primer on "How to Beat the OPFOR," although knowing the enemy is an important requirement for success on any battlefield. Even more important than knowing the enemy is knowing your own unit's strengths and weaknesses. Most of the things 1-4 is good at are skills in which BLUEFOR units need to improve.

Like most of us, before I fought with the OPFOR, I thought that they cheated. The other big advantage of the OPFOR, I was convinced, was its MILES equipment. The OPFOR used special boresighting equipment and custom-mounted transmitters to defeat the BLUEFOR. So I thought. I was wrong.

The OPFOR does not cheat. Bumper numbers reported as cheaters by the BLUEFOR receive Article 15s from the OPFOR battalion commander. During my rotation, an OPFOR BMP commander threw a smoke grenade after being killed ("trained" in the OPFOR's jargon). He was in the battalion commander's office, with his platoon leader and company commander, two hours after the mission. He did not enjoy the experience.

Although individual cases of cheating do occur, I do not believe that they are more prevalent in the OPFOR than in

the BLUEFOR. Soldiers on both sides want to win and push hard against the rules, but the OPFOR as a whole is less tolerant of MILES cheating than the BLUEFOR units with which I have fought. In addition, MILES II has made it much harder to cheat without discovery.

The OPFOR's MILES equipment is no better than that rotating units draw from the MILES warehouse. T-80s use the same transmitters that rotating units put into their tanks and don't even confirm their boresights before a mission. Lining up the crosshairs on the corner of the motor pool is good enough. "BMP guns" are not stabilized, have no optics other than a three-power telescope, and have no night-sight ability whatsoever. The OPFOR definitely doesn't win because of its special MILES equipment nor because of any extreme care it takes in boresighting.

I believe there are a number of reasons why the OPFOR consistently wins. These include the home court factor, the OPFOR orders process, OPFOR tactics, use of engineers and artillery, and use of reconnaissance assets. Dealing with each in turn:

THE HOME COURT FACTOR: The OPFOR knows the ground like the back of its hand. At CMTC, any PFC driver who has been assigned to 1-4 Infantry more than a month knows the

The (OPFOR) defensive orders process is very similar to that used by the BLUEFOR. Perhaps the biggest difference is in the first sentence: "Okay, we'll defend this the same way we did last time..."

routes through the box by heart. At the start of a mission, the vehicle commander tells the driver the checkpoints through which to drive: "50 to 13 to 17 to 37 to 24." He doesn't talk with the driver for the rest of the mission. Every vehicle knows the best places to fight from, where the enemy is likely to be, where to throw smoke grenades to cover movement through open areas. Nobody gets misoriented, confused, or lost. This is probably the OPFOR's single greatest advantage.

It is, however, not an unrealistic advantage. The chances that an enemy of the United States will invade Blackwell Range at Fort Hood or Range 301 at Grafenwohr are pretty slim. We almost certainly will fight enemies on their home turf. They'll know the good hiding places, defilade positions, and roadblocks. We won't. The OPFOR thus has a realistic advantage in its knowledge of the terrain.

THE ORDERS PROCESS: The OPFOR doesn't have an orders process for the offense. It waits until its recon elements tell it where the enemy is, then decides which routes to use in the attack. Routes can be changed even after LD because everyone knows all of the routes; FRAGO's are issued over the nets using checkpoints.

The defensive orders process is very similar to that used by the BLUEFOR. Perhaps the biggest difference is in the first sentence: "Okay, we'll defend this the same way we did last time..."

They've done this before, more than once. They know the ground. They don't need a rehearsal; last week, when they ran the same mission, was their rehearsal.

OPFOR TACTICS: Offensive tactics are simple: Remain in march formation along high-speed routes until contact is expected. Deploy aggressively and rapidly using well-rehearsed battle drills, massed direct and indirect fires, and shock effect to destroy the enemy. Return to march formation and drive on through. If a small pocket of BLUEFOR retains combat power and cannot be defeated quickly, place a "BLOCK" with a small element of your lead element taking up a hasty defense; following elements will remain in column.

THE OPFOR is more interested in destroying your battalion aid station than in killing every tank; if it destroys your ability to reconstitute, it already has won the next mission. The OPFOR is no longer allowed to destroy TOCs; BLUEFOR forces fall apart and are unable to perform the next mission if their TOC is destroyed.

OPFOR DEFENSIVE TACTICS are remarkably similar to BLUEFOR with the exception of OPFOR use of engineers and artillery. The engineers themselves are not better at their jobs than BLUEFOR engineers; OPFOR engineers are augmentees, borrowed for the rotation from engineer units throughout Europe. The OPFOR just uses its engineers much more effectively than do most rotating units. All available engineer effort is focused on one defending company at a time, rather than being piecemealed throughout the defense. All obstacles are personally sited by the OPFOR fire support officer, who registers the location of every obstacle with indirect fires.

For most defenses, there is no specific fire support overlay; the obstacle overlay serves for both. Forces defending an obstacle merely request fires on "Obstacle F." No shift missions are fired; every fire mission is "Fire for Effect Grid," and artillery fires are as focused as the engineer effort is. Probably most importantly, every obstacle and every choke point is under continuous observation by dedicated redundant observers employed in depth.

The defense is probably the place where the OPFOR has the most to teach BLUEFOR units. It does exactly what BLUEFOR units are trying to do when they defend, but the OPFOR does it much, much better. Rarely do more than a few BLUEFOR tanks trickle into the main engagement area of an MRC defense; the vast majority die to indirect fires at obstacles, merely trying to find the main defensive belt.

USE OF RECON ASSETS: The OPFOR's reconnaissance assets are probably its second-greatest advantage over the BLUEFOR. On offensive missions, divisional and regimental recon deploy early and almost invariably manage to travel completely through the BLUEFOR counterreconnaissance screen and main defensive belt undetected, while

getting six-digit grids to individual vehicle fighting positions. Knowing where the enemy plans to fight from is essential to his defeat; on one movement to contact in which I participated, the OPFOR was not allowed to LD its divisional and regimental recon prior to a mission because of ammunition problems affecting both BLUEFOR and OPFOR. The BLUEFOR fought the OPFOR to a draw, the best BLUEFOR results in any mission I observed. The OPFOR gets more intelligence from its reconnaissance assets and disseminates the intelligence more effectively than do BLUEFOR units.

On defensive missions, the OPFOR has its scouts, both mounted and dismounted, overwatch choke points to the forward edge of its Limit of Advance. They call in artillery, track the advancing BLUEFOR units, and destroy follow-on logistics elements with antitank weapons.

How To Beat the OPFOR

If all of these natural advantages make the OPFOR sound like a formidable enemy, they should. 1-4 Infantry is a capable combat unit, well trained and equipped for the sole purpose of providing your unit the most capable opponent you will ever face. The Combat Training Centers are designed to be harder than combat, to stress your unit to the greatest degree possible without actually putting rounds in the air. The OPFOR at CMTC has a motto: "You have two options when you fight the OPFOR: you can be defeated, or you can be humiliated." This is probably a good thing. If the OPFOR was easy to defeat, the training centers would not serve their purpose.

How to Win at CMTC and NTC

"Winning" at the Maneuver Training Centers is not synonymous with defeating the OPFOR, which, when all is said and done, is merely a capable training aid. "Winning" at the Maneuver Training Centers is actually training safely and well, improving command and control, orders drills, medevac procedures, basic soldier skills. I believe that by focusing on defeating the OPFOR, BLUEFOR forces lose sight of

Engineers in the R&S Effort

(Continued from Page 42)

FOR, BLUEFOR forces lose sight of what they are trying to accomplish while working through a rotation. The emphasis should not be exclusively on making MILES lights blink, but also should focus on improving weaknesses and sustaining strengths of the BLUEFOR unit.

This is certainly how the OPFOR measures the ability of its opponents. The OPFOR always wins the battles, but afterwards, it speaks of its opponents differently. Units that don't suffer injuries during the rotation, that take care of their soldiers despite the demands of simulated combat, that ask questions and learn during their AARs, and that improve throughout the rotation — these are units that the OPFOR speaks of respectfully after a rotation.

I didn't learn any secrets about how to defeat the OPFOR during the two rotations I spent fighting with them; the next time I face a motorized rifle regiment on the attack, I fully expect to be blinking. I hope that because of my experience, I will use my scouts, artillery, and obstacles more effectively. I will certainly do my best to take as many of them down with me as I can. While the T-80s and BMPs roll by, I will do my best to remember: Their job is to train my unit, under the most rigorous possible conditions short of war, to fight the next war outnumbered and to win.

The author would like to thank the officers and soldiers of 1-4 Infantry, who earn their motto every day: "Warriors!"

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duction. During training, incorporate the engineer and scout platoon in common training events. Have each platoon provide instructor/evaluator support for training events pertaining to each others' expertise. Ensure they are task organized together in training events. Developing this habitual relationship will ensure that everyone involved will understand each others' SOPs and styles.

Conclusion

Engineers and scouts have many similar missions with unique methods and capabilities to accomplish them. By integrating these talents into the reconnaissance effort, the R&S plan will be executed with greater precision, thus increasing the amount and quality of battlefield information gathered. TF scouts can focus on the enemy, while engineer reconnaissance teams focus on the collection of OBSINTEL.

It is essential, though, that task force reconnaissance training includes their supporting engineers, and that the TF scout platoon and their engineer reconnaissance counterparts constantly train together to ensure their seamless integration into the R&S effort. By ensuring this integration occurs, the TF commander will be rewarded with a more effective R&S effort and better odds for success in the upcoming operation.

Sources

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Captain Alexander J. Verret was commissioned in 1989 from the University of Vermont with a bachelor of science degree in geological engineering. A graduate of the Engineer Officer Basic and Armor Officer Advanced Courses, he served as a platoon leader and executive officer with 58th Combat Engineer Company, 11th ACR, and as regimental engineer, 11th ACR. He is currently the S1, 91st Engineer Battalion, 1st Cavalry Division at Ft. Hood, Texas.

Call for Papers

The Armor Center's Advanced Warfighting Working Group (AWWG) requests your thoughts and ideas on the topic of "Warrior Spirit in the Information Age." The group is currently working on a project to identify and develop ideas pertaining to the concepts of warrior spirit and the warrior ethic as they evolve to meet new requirements of the information age battlefield. Our new doctrine of FM 100-5 states that wars and conflict remain a human endeavor, and they are becoming increasingly more unpredictable, complicated, and lethal. Recent activities in Operations Other Than War (OOTW) and Digitization Field Trials have shown that new, unique demands are placed on leaders and soldiers, caused by the changing environment and technology proliferation. The AWWG's objective is to write a concept paper for the Army which captures the role of warrior spirit as needed by Information Age leaders and soldiers.

The AWWG would like your papers on this topic for review and potential use for this project. All papers will be read by a review committee, and authors of selected papers will be invited to attend a Developmental Workshop with the AWWG on 3 May 1995, as part of the Armor Conference. All papers will be forwarded to the Deputy Commanding General of the Armor Center and *ARMOR* Magazine for review.

Papers must be received by 15 April to be considered for invitation to the seminar. There is no length or format standard for papers. Please include information where the AWWG may contact you. Mail papers and/or diskettes to: Commander, HQ, 4th Squadron, 16th Cavalry, ATTN: AWWG, Fort Knox, KY 40121, or phone MAJ Mitchell or CPT DeGroat at DSN 464-6651 or commercial (502) 624-6651 for additional information.

National Guard Cavalry Squadron Executes on SIMNET

by Captain Patrick M. Hamilton

In April, the 1st Squadron, 124th Cavalry, the divisional cavalry squadron for the 49th Armored Division, was the first unit from the Texas Army National Guard to conduct SIMNET training. Boarding C-130 Air National Guard aircraft, they flew from Waco, Texas to Fort Knox, Kentucky (ground troops) and from Austin, Texas to Fort Rucker, Alabama (air troops). The mission was to conduct combined troop-level SIMNET operations (ground and air), using a long haul link between Fort Knox and Fort Rucker. The exercise enabled troop commanders to evaluate their platoons (ground) and scout weapons teams (air) on platoon-level ARTEP tasks and on their ability to work as an air and ground combined arms team. In completing this training, the squadron paved the way for other units in the 49th Armored Division to use this outstanding training opportunity.

Conception

In June of 1993, the squadron held a training meeting to finalize the Fiscal Year 1994 yearly training plan. Due to the fielding of the M1 tank to the division, OPTEMPO costs increased. This, in conjunction with funding restraints, spawned a recommendation to determine whether SIMNET could be a viable alternative to a three-day practice ARTEP at Fort Hood. The squadron commander tasked the S3 to conduct a cost analysis as a basis for justification (see Figure 1). OPTEMPO figures were compiled from several sources,

including the Mobilization and Training Equipment Site (MATES) at Fort Hood, the U.S. Army Aviation Center at Fort Rucker, and the 136th Airlift Wing, Texas Air National Guard.

Planning

Once the concept of conducting the long haul SIMNET exercise was cost-justified and endorsed by the division, the planning process began. Packets containing airlift requests and requirements for training simulators, billeting, mess, and ground transportation were sent through channels to each respective installation. These initial requests were submitted in September, 1993. After months of almost daily phone contact to each training site to facilitate scheduling changes and to add concurrent training events, the training schedule in Figure 2 was solidified in February 1994.

Execution

Advance parties consisting of S3 and S4 representatives were sent to each installation a day early to draw vehicles and billets and to finalize mess arrangements. At 0600 on 28 April 1994, the first of four C-130s lifted off and the mission was under way. At 1400 hours local time at Fort Knox, the last C-130 containing the majority of Bravo Troop touched down at Godman Field. All units reported in at both sites with no soldiers left behind and everything going according to schedule.

Alpha and Charlie Troops began on SIMNET with a two-hour train-up on the simulators Friday evening and two more hours Saturday morning, with mission execution scheduled from 0800-1400 hours Saturday. Both troop commanders had developed the operations order and issued it to their platoon leaders during the March drill. On Friday the first order of business was to build two rock drill areas — one at the SIMNET, and one at the billets. Then the process of briefbacks and rock drills took priority when not conducting simulator train-up.

The mission was built around several collective ARTEP tasks which were to be evaluated at annual training in June at Fort Hood. These tasks are listed in Figure 3. Using the National Training Center database, the two troops would conduct a four-phase operation. Phase I was to conduct a tactical road march from an assembly area to passage lanes. Phase II was to conduct a forward passage of lines through an armor brigade. Phase III was to conduct a zone reconnaissance. Phase IV was to establish a screen forward of the brigade and to fight a counterreconnaissance battle.

Although the tasks and overall missions were the same for both SIMNET iterations, each air and ground troop commander who worked together developed an order based on their mission analysis and training objective. On Saturday at 0800, the first ground elements departed the Alpha Troop assembly area on time. However, due to technical difficulties with the long haul link, Charlie Troop aircraft were slightly delayed. As the mission continued, it became painfully obvious that the simulation train-up time available was grossly inadequate and became a

MUTA 5* ARTEP Training Ft. Hood

| # | Vehicle Type | OPTEMPO Cost | Miles/Hours | Cost |
|----|--------------|-----------------|-------------------|---------------------|
| 14 | M1 | \$121.38/mile | 40 miles | \$67,916.80 |
| 31 | M113 FOV | \$29.33/mile | 40 miles | \$36,369.20 |
| 10 | OH-58 | \$320.00/hour | 8 hours | \$25,600.00 |
| 6 | AH-1F | \$1,267.00/hour | 8 hours | \$60,816.00 |
| 13 | HMMWV | \$.23/mile | 120 miles | \$358.80 |
| | | | Total Cost | \$191,060.80 |

*MUTA 5 (Multiple Unit Training Assembly) is five 4-hour periods of training.

NOTE: Costs do not include operation of M939 5-ton trucks or HEMTT Fuelers as OPTEMPO figures were not available.

Figure 1

SIMNET COST

(Ft. Rucker)

| Equipment Cost | Man Hour Cost | Service Fee | Cost |
|------------------------------------|---------------|-------------|---------------------------|
| WAIVED \$15,000 (C-130 cost) | \$5,300 | WAIVED | \$5,300.00 \$15,000.00 |

(Ft. Knox)

| | | | |
|--------------------------|--|--|--------------------|
| \$45,000 (C-130 cost) | | | \$45,000.00 |
|--------------------------|--|--|--------------------|

Total Cost \$65,300.00

Figure 2

Cavalry Team Lane Tasks

| <u>Scout platoon tasks:</u> | | <u>Tank platoon tasks:</u> | | <u>Aer scout Weapons Teams tasks:</u> | |
|---------------------------------------|-----------------|---------------------------------------|-----------------|---------------------------------------|-----------------|
| MISSION (ALL LANES) | TASK NO. | MISSIONS (ALL LANES) | TASK NO. | MISSIONS (ALL LANES) | TASK NO. |
| Occupy an Assembly Area | 17-3-1013 | Perform Assembly Area Activities | 17-3-0200 | Move to and Occupy Assembly Area | 01-2-0101 |
| Perform Pre-Combat Checks | 17-3-1033 | Perform Pre-Combat Checks | 17-3-0102 | Prepare for Future Operations | 01-2-0501 |
| Perform Rehearsals | 17-3-1034 | Employ C&C Measures | 17-3-0105 | Report Intelligence Data | 01-2-0502 |
| Prepare for Tactical Operations | 17-3-1040 | Prepare for Tactical Operations | 17-3-0101 | Conduct Screening Operations | 01-2-6106 |
| Employ C&C Measures | 17-3-1036 | Perform Tactical Planning | 17-3-0100 | Conduct Route Recon | 01-2-6103 |
| Perform Tactical Planning | 17-3-1035 | Conduct Rehearsals for a Mission | 17-3-0216 | Conduct Area Recon | 01-2-6101 |
| MISSIONS (LANE 1) | TASK NO. | MISSIONS (LANE 1) | TASK NO. | Engage Targets | 01-2-0105 |
| Perform a Tactical Road March | 17-3-1012 | Conduct a Tactical Road March | 17-3-0212 | Conduct Zone Recon | 01-2-6102 |
| Perform Passage of Lines | 17-3-1014 | Perform a Passage of Lines | 17-3-0215 | Perform Actions on Contact | 01-2-6104 |
| MISSION (LANE 2) | TASK NO. | MISSIONS (LANE 2) | TASK NO. | Detect/React to OPFOR | 01-2-0103 |
| Recon Obstacles & Bypass | 17-3-1020 | Execute Traveling Overwatch | 17-3-0210 | | |
| Perform Route Recon | | Conduct Hasty Occupation of BP | 17-3-0227 | | |
| (Includes Bridge Classification) | 17-3-1017 | Execute Actions on Contact | 17-3-0221 | | |
| Execute Actions on Contact | 17-3-1021 | | | | |
| MISSIONS (LANES 3, 4, & 5) | TASK NO. | MISSIONS (LANES 3, 4, & 5) | TASK NO. | | |
| Conduct a Screen | 17-3-1024 | Execute Actions on Contact | 17-3-0221 | | |
| Perform a Zone Recon | 17-3-1018 | Produce a Plt Fire Plan | 17-3-0104 | | |
| | | Occupy a Plt Battle Position | 17-3-0222 | | |

Figure 3

key point in after-actions reviews. It was quickly discovered that maneuver, command and control in "SIMNET land" is in many ways more difficult than the real thing. However, after about four hours of execution with some quick AARs from the OCs, the troops began to work through the problems. At the end of the eight-hour operation, the soldiers had become proficient at fighting their vehicles and were eager to stay and execute more missions.

Bravo and Delta Troops experienced many of the same problems, and in the final after-action review for SIMNET, it was determined that eight to twelve hours of train-up should be conducted prior to mission execution.

Concurrent training, conducted when units were not in SIMNET, consisted of UCOFT for M1 and Bradley crews, M1 Platoon Gunnery Trainer, M1 Driver Trainer, and Army Safety Center briefings for the air troops. Concurrent training opportunities are very limited at Fort Rucker on a weekend.

The squadron and troop maintenance sections conducted rigorous M1 hull and turret (STE M1) training (see Figure 2) conducted by the Armor Training Brigade. Several of the more experienced mechanics commented that this was without a doubt the best maintenance training they had ever received.

On Sunday morning, the priority was to clear the billets, get the vehicles turned in, and get the soldiers to the airplanes. We scheduled visits to both the Patton Museum at Fort Knox and the Aviation Museum at Fort Rucker, and both were very worthwhile. The

Patton Museum, at the request of the unit, opened early to accommodate departure schedules, which we greatly appreciated. The squadron chaplain held worship services in the memorial garden on the north side of the Patton Museum just prior to the final bus ride to nearby Godman field.

The return flight was a blur. Most of the soldiers slept when they could, relived SIMNET battles, or discovered who had reached a higher "reticle aim" in the UCOFT. A predominant comment made by many of the soldiers before they were released that day was, "My friends at work won't believe what I did this weekend."

Lessons Learned

The major lesson learned during this exercise was that SIMNET train-up requires at least eight to twelve hours. The optimum training could be received by National Guard and Reserve units if they could spend a week of their annual training in SIMNET. Another observation was that Fort Knox's policy of total support of the Guard and Reserve has created more training opportunities than there is time to use them. Therefore, a unit must have definite training objectives established and then schedule training opportunities which are focused on those objectives.

The air and ground coordination possible in SIMNET can greatly improve it in the real world. This was confirmed during annual training when the squadron TAMS evaluators from the 1st Squadron, 7th Cavalry at Fort Hood consistently commented on the out-

standing air and ground coordination during the ARTEPs. However, the current communications link in the SIMNET long haul is not adequate and needs to be improved.

Finally, SIMNET is a great training opportunity in itself, but there is one factor that makes it especially attractive to the Reserve Components. It is an opportunity to do something different. Many units tend to go to the same training sites month after month and year after year. The recruiting and retention value of this type of training is immeasurable. As the squadron commander stated upon our return to Texas, for years the soldiers will talk about the time they got on C-130s and flew to Fort Knox and Fort Rucker and received some of the best training they had ever had.

Captain Patrick Hamilton was commissioned through ROTC at Texas A&M University in 1986. He has attended AOBC, M60A3 and M1 Tank Commanders Course, AOAC, and is currently enrolled in CAS³. His duty assignments have included scout platoon leader, troop XO, and S3 (Air) in 1-124 Cavalry, TXARNG. He is currently the A Troop commander and has been the full-time squadron training officer since 1990.

The 2d Armored Cavalry Regiment A Force for Peace Enforcement Operations

by Lieutenant Colonel Joseph G. Dodd, Jr.

Recent events in Somalia, Cambodia, Bosnia, and Macedonia have shown the need for forces trained and ready to conduct peace enforcement operations. A U.S. Army Infantry School Draft White Paper published in August 1993, "The Application of Peace Enforcement Operations at Brigade and Battalion," defines peace enforcement as a form of combat, armed intervention, or the physical threat of armed intervention that, in most cases, is pursuant to international license authorizing the coercive use of military power to compel compliance with international sanctions or resolutions. The primary purpose of peace enforcement is the maintenance or restoration of peace under conditions broadly defined in the international community (Draft White Paper, page 2). This White Paper lists light infantry, armored, and aviation forces as maneuver forces that are suitable for peace enforcement operations. The 2d Armored Cavalry Regiment is another maneuver force that is organized and trained for these missions and may be

the best suited for these types of operations.

Just as the Army leadership directed the publishing of a White Paper to provide a doctrinal foundation for future writing and training in the peace enforcement arena, the Army leadership also recognized the need to train forces that might be deployed to conduct these operations. Hence, the Joint Readiness Training Center at Fort Polk, Louisiana, conducted its first Peace Enforcement Rotation in November 1993. Units from the 2d ACR, recently restationed at Fort Polk to be the XVIII Airborne Corps' cavalry regiment and to augment the JRTC OPFOR, participated in this rotation and will participate in future peace enforcement rotations. Two cavalry troops portrayed two belligerent forces and were required to conduct certain specific tasks associated with peace enforcement operations, which included conducting screens and reconnaissance patrols, establishing and manning road blocks, conducting convoy security operations,

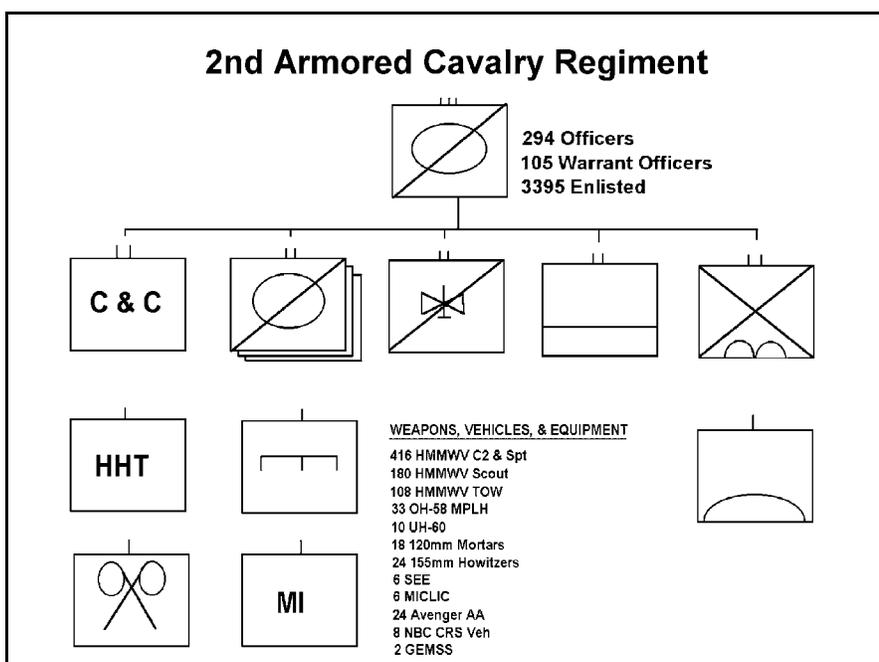
and interfacing with non-government organizations. Based on these experiences, and considering requirements outlined in the U.S. Army's recent White Paper on peace enforcement operations, cavalry squadrons in the 2d ACR are well suited for these operations due to their deployability, versatility, and if necessary, lethality. The units are especially suited for establishing the lodgment, expanding the lodgment, establishing conditions to stop hostilities, and establishing conditions for the exit of forces as listed in the framework for peace enforcement operations.

2d ACR Organization

The 2d ACR has three cavalry squadrons, a regimental aviation squadron, a regimental support squadron, military intelligence company, chemical company, ADA battery, engineer company, and headquarters and headquarters troop. Each cavalry squadron has three cavalry troops, an antitank company, and a howitzer battery equipped with eight towed 155-mm howitzers. The cavalry troop has two scout platoons, each equipped with 10 hard-topped HMMWVs (M1025/M1026) with five M2 .50-cal heavy machine guns and five MK-19 40-mm machine guns. Each troop also has two antitank platoons, with each platoon having four HMMWV-mounted TOWs. Each cavalry troop also has two 120-mm mortars. The antitank company is organized into three antitank platoons, each with four HMMWV-mounted TOWs.

2d ACR in the Framework of Peace Enforcement Operations

Establishing the Lodgment — 2d ACR forces are organized and equipped to establish the lodgment after lead forces have secured the entry point. The cavalry squadrons are trained to conduct security patrolling, conduct force protection, establish



command, control, and communications facilities, protect the logistics build-up, and establish checkpoints and roadblocks to control entry into the lodgment area. Additionally, the 2d ACR is capable of conducting link-up and relief operations with SOF elements which will most likely be posted at key choke points in the initial stages of the operation.

Expanding the Lodgment — Expanding the lodgment is the 2d ACR's most likely METL task. In addition to security patrolling, squadrons are trained to conduct area, zone, and route reconnaissance in order to expand the lodgment to provide protection for combat, combat support, and combat service support elements that will continue to arrive in the lodgment area.

Establishing Conditions to Stop Hostilities — The first step in stopping hostilities is the separation of belligerents. The squadrons in the 2d ACR are equipped to conduct combat operations that range from show of force to movements to contact or — in coordination with light infantry, armored, and/or aviation forces — conduct limited objective attacks to seize key terrain. As the belligerents are compelled to disengage through either coercion or combat, the cavalry units are trained and equipped to assume the tactical positions of the displaced forces, establish the buffer or demilitarized zones, and report this progress to all parties. Finally, the troops and squadrons are trained to conduct security and reconnaissance operations to maintain the separation of the belligerents.

Establishing Conditions for the Exit of Forces — Similarly, once the belligerents separate, 2d ACR units are trained and equipped to keep them apart by conducting screen and guard operations, establishing checkpoints and roadblocks to control movement into and within the buffer zone, and conducting mounted and dismounted reconnaissance patrols.

Other Requirements for Success

The Draft White Paper also discusses the requirements for fire support, air defense, mobility and survivability, and logistics assets in peace enforcement operations. The 2d ACR has all of these

assets in the regiment, either organic to the squadrons or found in the separate troops.

Fire Support — Each cavalry squadron is equipped with eight 155-mm towed howitzers (M198s), and each cavalry troop has two organic 120-mm mortars. Furthermore, the regiment's aviation squadron is equipped with 32 OH-58D Kiowa Warrior helicopters and 11 UH-60 Blackhawk helicopters.

Air Defense — The 2d ACR has an organic ADA battery equipped with 24 Avengers. Platoons are habitually associated with the squadrons, and all units are trained for passive and active air defense measures.

Mobility and Survivability — The 2d ACR has an organic engineer company equipped with six SEEs and six D7 dozers. The engineer platoons are also habitually associated with the squadrons and are trained to conduct mobility, countermobility, and survivability operations. The engineers are well trained in countermine operations to enhance mobility. For countermobility and survivability, the engineers provide expertise in constructing barricades, bunkers, and fighting positions.

Logistics — The 2d ACR is extremely well suited to provide combat service support to sustain the force. Each squadron has robust logistical, medical, and maintenance resources that allow them to self-sustain for the initial phases of the operation. Additionally, the regimental support squadron (RSS) task organizes its maintenance troop, medical troop, and supply and transportation troop to provide additional support for each deploying cavalry squadron. When the RSS deploys into theater, it has an organic materiel management center (MMC) capable of resupplying all classes of supply to include Class VII major end items. The RSS also has assets to make water in locations where the water supplies are limited or non-potable.

Conclusion

The 2d Armored Cavalry Regiment is well suited for peace enforcement operations. Even though the squadrons do not train specifically for operations other than war, the METL training that the squadrons conduct prepares them well for peace enforcement missions.

Additionally, the squadrons continuously rotate through augmenting the JRTC OPFOR, which also enhances their collective and soldier skills. The U.S. Army Infantry School's White Paper on peace enforcement operations is an outstanding document that is well written and thoroughly researched. Readers and planners need to understand that, in addition to light infantry, armored, and aviation forces, 2d ACR cavalry squadrons are also trained and equipped for peace enforcement operations and may be the maneuver force best suited for many contingencies.

Lieutenant Colonel Joseph G. Dodd, Jr., received his Infantry commission from the U.S. Military Academy in 1975. A graduate of Airborne and Ranger School (Master Parachutist); Infantry Officer Basic Course; Infantry Officer Advanced Course (Correspondence); Armor Officer Advanced Course, Army Comptrollership Program, Syracuse University (MBA); British Army Staff College (Camberley, England); and Command and General Staff College (non-resident); he is currently attending the Industrial College of the Armored Forces. His previous assignments include rifle and weapons platoon leader, 2d ID; rifle platoon leader, company XO, and S3 Air, 2-75 Rangers; battalion XO, 2-87 Infantry, 10th Mountain Division; brigade S3, 2d Brigade, 10th Mountain Division; budget officer, Army Budget Office; squadron commander, 3d Squadron, 2d ACR (note, took command of 2-1 Infantry on 8 July 1992 at Ft. Lewis Wash., reflagged 3d Squadron, 2d ACR in April 1993, changed command of 3d Squadron, 2d ACR on 23 June 1994 at Ft. Polk, La.)

LETTERS (Continued from Page 3)

that must be fired to the tasks, conditions, and standards for that table, not a mirror of Tank Table VIII.

FM 17-12's training strategy is designed to make combat ready crews and platoons. ST 17-12 RC training strategy is designed to rehearse, teach "coursemanship," and qualify on Tank Table VIII. Instead of changing the standards, maybe we should stop fooling ourselves and eliminate the pre-mobilization Tank Table VIII requirement for the Reserves. This would also allow commanders to focus on training, not qualifying. Then, during post-mobilization training, shoot Tank Tables VIII through XII, where the TIME, training facilities, and equipment are available.

SFC CONRAD C. HINKEL
Armor Assistor, Master Gunner
Readiness Group Dix
Ft. Dix, N.J.

The Combat Arms Leader

Dear Sir:

Three recent articles in *ARMOR* — LTC(P) Dempsey's "The Green Tabbers of Force XXI" and MAJ Morrison's "Armor Officer 2000" from the September-October issue, plus CPT Salerno's "Is Well-Rounded Actually Better?" from the May-June issue — offer informed insights into the shortfalls that exist in our current professional development and assignments system and the challenges posed to that system in a future of reduced force structure and increasing demands on those remaining. Assuming that the Army's post-Cold War restructuring will ultimately change how we train and manage our officers, I believe we need to keep in mind the fundamental characteristics that define great leaders and strive to foster those in whatever revised system takes shape.

FM 100-5 gives some very clear guidance on what the Army expects from the officers chosen to lead today's force-projection soldiers. The manual states that competent, confident leadership is the most essential dynamic of combat power... Leaders inspire soldiers with the will to win. They provide purpose, direction, and motivation in combat. Leaders determine how maneuver, firepower, and protection are used, ensuring these elements are effectively employed against the enemy.¹ Given that mandate, our doctrine also describes some of the qualities we must develop to succeed. Initiative, agility, flexibility, and versatility are all offered as essential qualities in leading our forces on future battlefields. The officer who develops and applies these primarily mental qualities will be the winner in highly fluid maneuver warfare. The manual further states that "...command is more an art than a science. In battle, it is often guided by intuition and feel gained from years of practice and study."² Our professional responsi-

bility is to make sure that our training program and selection process results in the best practitioners of this art at all levels.

To achieve this end state, I am on the other side of the specialization debate from CPT Salerno. My personal view is that although our tools of combat may change due to technological, doctrinal, and/or organizational development, the principles controlling their application are unwavering. I agree completely with CPT Salerno that "experience carried from one assignment to the next will be a key element in maintaining readiness."³ However, I draw a different conclusion. Rather than gaining that experience only in tank battalions, cavalry squadrons, light or mechanized infantry battalions, or any other subset of the combat arms world, the combat arms officer needs the widest possible exposure to all the tools and tactics of maneuver warfare so that he can become an expert, not in the tools' technical operation, but in their tactical application. I don't agree with the vast disparity that CPT Salerno points out between, for example, armor and cavalry tactics. The principles are the same and the missions are all simple variations or components of the only two things combat arms forces do: attack or defend. "...One of my cardinal rules of battle leadership — or leadership in any field — is to be yourself, to strive to apply the basic principles of the art of war, and seek to accomplish your assigned missions by your own methods and in your own way."⁴ This guidance does not change with the TOE.

The idea that we can delay combined arms pollination until our leaders achieve high rank is losing its relevance. As a young lieutenant, I saw my company commander faced with maneuvering a force consisting not only of tank platoons, but of mechanized infantry, engineer, chemical smoke, and air defense platoons as well. He was also responsible for putting fire support on target through his FSO. Of course, my experience is the norm. Was it possible for my commander to be an "expert" on all of the systems suddenly arrayed in his team? Certainly not. Would his specialization in armor vs. cavalry or mechanized vs. light infantry help him apply this wide range of capabilities any better? As force structure goes away and equipment capabilities increase (through digitization, firepower, etc.), I believe the integration of combined arms systems will devolve to progressively lower echelons. Any specialization of the combat arms officer, however junior, that degrades his ability to orchestrate maneuver warfare is to the overall detriment of the force.

If, as I do, you determine that a combat arms officer's primary role is to apply the Army's tools using maneuver warfare tactics, a valid question arises regarding "technical proficiency." I maintain that the combat arms leader's role in our Army is not to be the technical master of the wide array of equipment he is charged to employ. The Army provides its leaders with all the ex-

pert technical advice needed in the form of first sergeants, platoon sergeants, master gunners, armorers, supply sergeants, maintenance technicians, maintenance team chiefs, operations sergeants, administrative specialists, etc. The officer who finds himself forced to become the technical expert on any system is either not enforcing proficiency and training standards or is not properly delegating authority and responsibility to the soldiers he leads. The combat arms leader cannot allow himself to be "...forced into a cult of detail and made to master the intricacies of logistics and administration. Professionalism becomes equivalent with the ability to memorize tables of organization and equipment, and if one officer displays his knowledge of details, the next will show his expertise by asking for more. But I submit that technical expertise in the combat arms officer is irrelevant, profligate, and even harmful if it is not linked directly to his ability to outthink the enemy."⁵ As I explained to a new platoon leader confused about his role in the maintenance process, the leader's role is not to fix equipment, but rather to cause equipment to be fixed. The same principle applies to the other "technical" aspects of the combat arms profession.

For the combat arms officer to achieve "tactical proficiency" generally requires nothing more than education, effort, experience, and the ability and inclination to think creatively. Again, the tools he controls will continually change, and the amount of exposure our leaders have to the capabilities and limitations of those tools will directly impact his ability to employ them effectively. I agree with Leonhard that war is a thinking man's game.⁶ "Genius is attainable by the average leader who disciplines himself to learn subtlety and craft. The emphasis, then, is on the historically demonstrable fact that a clever leader can routinely whip a force larger than his own." Therefore, combat arms leaders "...must groom their ranks in order to produce bold, well-read, dashing battlefield leaders, adept at out-thinking their foes."⁷ Educating combat arms leaders to think creatively is the key-stone to winning the thinking war in two clear ways. "First, by developing creativity in future leaders, we shed the constraints (a focus on process and method) that have fostered management at the expense of leadership. Creativity implies a broader view of the world, freedom to be intuitive, and the willingness to take risks... The second outcome is better reactions to the ever-increasing rate of technological change — creativity fosters an entrepreneurial spirit, a vision of the future that ensures flexibility in problem-solving. Our military leaders must be capable of such vision if we are to remain an effective fighting force."⁸ Fostering these qualities through training and education is the challenge for senior leaders, CTCs, and the schoolhouse, which today, in my view, focus too much on process and method at the expense of exploring and applying creative tactical thought.

Given the bewildering variety and scope of the combat arms leadership skills I've touched on, I agree with MAJ Morrison that in the future our professional development models should focus on developing a leader's warfighting skills and that only those demonstrating proficiency be selected to orchestrate our future combined arms fights.⁹ I also believe that the cut will have to be made earlier in an officer's career than it is now. A broad range of assignments is key to developing the kind of leader I've discussed, but that range must confine itself to developing warfighting skills and teaching those skills to others. Authorizations in the Officer Distribution Plan discussed by both LTC(P) Dempsey and MAJ Morrison appear, in my view, to be the inhibitor to this end, not the number of officers the drawdown has left behind to fill them. Hopefully, as authorizations are eliminated, the criteria will be how well that particular authorization contributes to developing the combat arms leader I've described.

LTC(P) Dempsey hinted at one possible outcome of our current restructuring that would drastically impact the way we do business and, in my view, help the combat arms leader succeed. "We are not simply downsizing in the manner of past postwar periods. We are truly restructuring... It may even challenge our understanding of branch."¹⁰ I have deliberately avoided describing my hypothetical leader as an armor, infantry, artillery, or any other branch of officer because the combat arms leader of the future may not get any more specialized than just that — combat arms. Whereas now we do not make that distinction until the general officer level, future tools (digitization, for example) and what I hope will be the creation of truly combined arms organizations at lower echelons (as reduced force structure dictates) will demand a great deal more agility, flexibility, initiative, and versatility from our leaders than what our current branch-specific combat arms officers are trained to possess. Therefore, our critical challenge is to devise a system that lowers the generalization threshold, as opposed to building more specialization barriers. As professionals, we have to be sufficiently open-minded to put aside our biases and consider the possibilities. "The good military leader will dominate the events which surround him; once he lets events get the better of him, he will lose the confidence of his men, and when that happens, he ceases to be of value as a leader."¹¹ In our current restructuring, unlike those of recent history, we must leap past our institutional inertia to create the leaders our soldiers need to dominate tomorrow's battlefields.

Notes

¹FM 100-5, *Operations*, HQDA, June 1993, p. 2-11.

²FM 100-5, p. 2-15.

³Captain George Salerno, "Is Well-Rounded Actually Better?," *ARMOR*, May-June 1994, p. 47.

⁴General Matthew B. Ridgway, *The Korean War*. Garden City: Doubleday & Co., 1967.

⁵Robert R. Leonhard, *The Art of Maneuver: Maneuver Warfare Theory and Airland Battle*. Novato, Calif.: Presidio Press, 1991, p. 250.

⁶Leonhard, p. 248.

⁷Leonhard, p. 249.

⁸Robert L. Taylor and William E. Rosenbach (editors), *Military Leadership: In Pursuit of Excellence*. Boulder, Colo.: Westview Press, 1984, p. 211-212.

⁹Major Douglas J. Morrison, "Armor Officer 2000," *ARMOR*, September-October 1994, p. 47.

¹⁰Lieutenant Colonel (P) Martin E. Dempsey, "The Green Tabbers of Force XXI," *ARMOR*, September-October 1994, p. 49.

¹¹Field Marshal Viscount Montgomery of Alamein, *The Memoirs of Field Marshal Montgomery*. Cleveland: The World Publishing Co., 1958.

CPT KENNETH H. WEBB
2-72 Armor, Korea

AD Missing from Light Cav Plan

Dear Sir:

In his article, "Light Armored Cavalry — The Right Force at the Right Time" (Jan-Feb 95), CPT David Nobles outlines his concept of the ideal light armored cavalry regiment, both in terms of equipment and organization. It is his proposed organization of the regiment that prompts this letter.

CPT Nobles' organization chart seem reasonable enough, until one notices that several Battlefield Operating Systems are missing, namely fire support, air defense, and chemical (a portion of mobility/counter-mobility/survivability). Any concept without the King of Battle could be critiqued on that alone, but I would like to focus on CPT Nobles' omission of air defense.

I will begin by highlighting some of the key points that CPT Nobles makes in his article. He refers to his light cavalry as being a highly flexible, deployable organization, able to fulfill missions in a mid- or high-intensity scenario. He states that our future enemy is more likely to be poorly to moderately equipped, but plays down the importance of low-intensity operations, implying correctly that a unit should not be tailored for low-intensity scenarios only. CPT Nobles also frequently refers to corps assets that would be available to this light cavalry organization, allowing it to make a contribution on all battlefields in any contingency.

My disagreements with this article center on three main issues. First, a light, deployable force is more than likely going to be one of the first units into an area, before corps or any of their assets arrive. This unit

would be deployed into theater with no air defense or field artillery.

Let us suppose, however, that they were provided corps assets. Non-habitual relationships have frequently resulted in disaster in our training centers (not to mention during real conflicts), which brings me to my second point. Habitual relationships, especially in the cavalry, are a must. A unit that is required to do so many unique missions needs to have slice elements that work with them on a regular basis. This is of special concern to air defense units, who frequently must "adjust" their doctrine in order to provide proper air defense for the cavalry (as has been the case with the 2d Armored Cavalry Regiment).

The platform of this habitual relationship must be an air defense battery (as opposed to a separate section or platoon). This not only provides the perfect vehicle for the desired relationship in the regiment, but also allows the unit to sustain itself by providing the necessary support to maintain its highly sophisticated air defense weapon systems.

My final point concerns CPT Nobles' comment about our poorly to moderately equipped future enemy. Even a poorly equipped enemy can be highly lethal, as operations in Somalia and Chechnya have shown. From an aerial standpoint, it has been proven time and time again that one or two armed enemy helicopters can wreak havoc on a unit without air defense capabilities, and the proliferation of worldwide Russian helicopter users alone is enough to nullify anyone's false sense of security regarding the capabilities of our future enemies.

I cannot legitimately critique CPT Nobles overall concept, but I feel I am qualified to say that he gives no acceptable justification for omitting air defense from the light cavalry regiment. In fact, I do not think such justification exists.

ERIC HOLLISTER
1LT, AD
Regimental ADCOORD
Cav Air Defense Battery, 2ACR

Combat Accounts Requested

Dear Sir:

I have been commissioned by my publisher to write a book of combat stories from all wars in which American tanks fought. I'm asking that your readers harvest their memories — from all wars, 1917 to the present — and send the results to me at the address below.

RALPH ZUMBRO
Route 5, Box 722
Ava, MO 65608
PH: (417) 683-5503

BOOKS

German Battle Tactics on the Russian Front, 1941-1945 by Steven H. Newton, Schiffer Military/Aviation History, Atglen, Pa., 1994. 272 pages. \$24.95.

After World War II, as part of a U.S. Army program, captured German officers wrote accounts of their experiences on the Russian front. Not only was this motivated by an interest in learning more about German methods, but also to learn, from a "Western" perspective, Russian combat methods and conditions. Some accounts were extensively reworked or consolidated by American historians, the result being some 20 booklets published in the 1950s by the Department of the Army as the German Report Series. These dealt with specific topic areas, such as night combat, terrain factors, tank maintenance, airborne operations, rear area security, and small unit actions. They were subsequently republished by the Center of Military History in the 1980s.

Much material remained unpublished, however, and Dr. Steven Newton, Associate Professor of History and Political Science at Delaware State University, has performed a valuable service in making some original accounts available now to the general reader. There are ten accounts of specific engagements, most by division and corps commanders, spanning the Russian war from 1941 to 1945. The XXXXI Panzer Corps chief of staff relates the drive on Moscow, the 253d Infantry Division commander discusses the counterattack at Kharkov in 1943, and others present corps- and division-level actions on the Volkhov, and the relief of encircled units at Kovel and Vilno in 1944.

Most of the essays had apparently been translated hurriedly by U.S. Army junior officers with faulty knowledge of the German language and German military organization and terminology. Dr. Newton has re-edited these, adding clarifying footnotes after each selection; for example, XXXXI Panzer Corps Chief of Staff Hans Röttiger had no use for the new corps commander, Walter Model, and refused to mention him or his decisions. Dr. Newton is also conscious of the self-serving interests of some of the German authors, writing as captives of their American opponents, from placing blame on (the dead) Hitler or on others, to Gustav Höhne insisting that his 8th Jaeger Division would never consider evicting Russian peasants from their huts in the dead of winter, but rather shared billets with them.

One encounters useful insights into operations under the extreme conditions obtaining in Russia, many to be recognized by those familiar with the German Report Series. These include letting engine motors idle frequently in winter, as the antifreeze was inadequate, and not oiling machine guns, for the oil would congeal, but rather firing occasional bursts. "Winter roads" were created, packed down by tanks, leaving paved roads unused in winter; they would

crack in extreme cold and break up, and were better left protected by a blanket of snow. Iced ski trails were used for troop movements because it was impossible to move through the deep, powdery snow. Soldiers sheltered in platoon tents on fir boughs, with trench stoves heating at each end. Admonitions about logistics shortfalls when units were frequently reassigned, and maintaining traffic control points with towing services at a distance from river crossings to prevent congestion at bridge sites, are well-taken advice.

Dr. Newton is a career Army National Guard NCO, and both his Introduction, "The German Soldier's War in Russia," and the dust jacket description, are correct in emphasizing that too little is known of unit operations at a low level, or of the experiences of the individual *Landser*, the German soldier. These ten essays do provide some sense of this, though only in a most general way. The accounts are at corps and division level, and do not deal with battalion, company, and platoon-level actions, as in CMH's DA Pam 20-269, "Small Unit Actions During the German Campaign in Russia," where 2d Battalion defends at Verkhne-Golubaya, or Captain Viehmann's company recaptures Hill 747, or a main supply route is blocked by a Russian KV tank. (Analogous American studies include the river crossing at Arnaville, or the tank-infantry team of B Companies at Singling.)

Some of the selections conclude with analyses, as lessons learned, but the focus is narrative, rather than topical. While aspects of relief operations, or operations in snow or mud can be deduced, the strength of the narratives is to provide details about the battles themselves. Topical areas like arctic or anti-partisan (*guerrilla*) operations are not included, nor are small-unit concerns like rations, weapons effectiveness, or coordination of supporting fires.

Maps with division-size symbols help clarify actions, though these are digitized, computer-generated maps, and all roads and river-lines are jagged. Orders of battle are given at the ends of chapters. These are useful references, though often not necessary to the text. In Rendulic's account of Army Group South in Austria in 1945, the OBs of the U.S. 65th, 71st, and 80th Divisions are listed, including all battalions, yet the divisions themselves are hardly mentioned in the text. Five pages of German OBs and nine pages of Soviet and American OBs, with some 60 clarifying footnotes, are again a useful reference, though unrelated — nor even known — to Rendulic.

Dates of rank and positions held by the German authors are listed in the appendices, as are also explanations of German corps organization and unit strength estimations. There are no illustrations, though Russian front images are familiar to most readers. The text print is clear and readable, but unfortunately marred by numerous typographical errors. The strength of the book is not insight into the experiences of the German *Landser*, nor analyses of tac-

tics and conditions in Russia, but rather additional narratives and details of engagements on the Eastern Front, whose immensity still engenders awe on the part of students of military history today.

A. HARDING GANZ
Associate Professor, History
Ohio State University, Newark Campus

Landing Zones: Combat Vets From America's Proud, Fighting South Remember Vietnam by James R. Wilson. Duke University Press, 1990. 341 Pages. \$5.99, paperback.

Literary critics argue that among the characteristics of the literature produced by modern Southerners are a tragic sense of life and a deep-rooted sense of the interplay of past and present. They would not be disappointed in this dark anthology of the Vietnam War remembered, but a reader led on by its subtitle to expect a unique Southern perspective on combat in Southwest Asia will find instead a predictable collection of frustrated veteran accounts. Unlike the Civil War, the entire nation suffered the angst of the Vietnam defeat, and the Southerners who served in disproportionately higher numbers than their geographical peers returned to take their place in a homogeneously disenchanting national chorus. This is a collection of accounts of Vietnam veterans who happen to be from the South and not a key to Southern character, culture, or courage.

As a collection of Vietnam veteran accounts, it does deserve praise for the heterogeneity of its voices. James R. Wilson interviews representatives of all services (to include a Red Cross "Donut Dolly"), all races and genders, and all ranks, from General Westmoreland to enlisted man Leo Spooner, Jr. The 24 accounts span ten years of the conflict and reflect operations in all military regions of the country. Given the vast representative range Wilson seems to have set for himself, he has succeeded remarkably well, and there are some exceptional oral histories. Colonel Benjamin H. Purcell's narrative of his prisoner of war experiences is free from that veneer of regenerative propaganda that creeps into so many POW accounts. The women's stories are fresh because their voices have been ignored so long. Roosevelt Gore's objective but emotionally compelling account of racial discrimination rivals the best narratives in Wallace Terry's *Bloods*, but as in many Vietnam narratives, self-analysis turns too quickly to self-pity.

It is a cliché to say that when and where you served in Vietnam determined what kind of a war you saw; there was not one Vietnam experience but over two-and-one-half million individual experiences. This anthology supports the cliché. However, Wilson tries to pull those experiences together with a Post-Traumatic Stress Disorder (PTSD) thread: the majority of the veterans

he talks to suffer from some sort of PTSD, and it is that common theme that gives this collection the self-absorbed, self-pitying tone that marks too much Vietnam literature.

For better or worse, last century's proud, fighting South was certainly more stoic in its suffering.

COL JOSEPH T. COX
Dept. of English
U.S. Military Academy
West Point, N.Y.

Ostfront 1944, The German Defensive Battles on the Eastern Front by Alex Buchner. Schiffer Publishing Ltd., Westchester, Pa., 1991. \$29.95.

On this 50th Anniversary of D-Day, in the United States, we focus on the events of the Western front. However, battles also occurred on the Eastern front that were immense in scale and are little known to us. *Ostfront 1944* is an outstanding account of those battles from the German perspective. The author, Alex Buchner, is a German Army veteran and was wounded three times during the war. He ended the war an Oberleutnant and company commander.

The book specifically deals with a series of defensive battles that occurred from January through August 1944. The author selected and described battles that resulted in the isolation of German units and their subsequent attempts to escape. Included are Cherkassy, Ternopol, the Crimea, the destruction of Army Group Center in White Russia, and the destruction of Army Group South Ukraine in Rumania. All of these battles were major defeats for the German Army. Two of them ended in the annihilation of entire field armies and casualties that rivaled or surpassed Stalingrad.

What is particularly striking about these battles is the rapidity with which they occurred. The Soviet offensive in White Russia began on 22 June, the anniversary of *Barbarossa*, and was complete by June 28. When it was over, Army Group Center had ceased to exist. The Germans lost all the Third Panzer Army and the Fourth Army as well as most of the Ninth Army. They lost seven of nine corps and 28 of 34 divisions, a total of 350,000 men. These are losses on a scale scarcely imaginable in the U.S. Army.

This is not merely a story of armies, corps, and divisions. Alex Buchner starts at the macro level and then narrows his focus to individual leaders and soldiers caught in the maelstrom. When you read about the escape from Cherkassy or the attempted evacuation of the Crimea, the impact of the statistics is minimal compared to the harrowing accounts of the survivors.

He also gives a glimpse at the ferocity of combat in the east and the efforts of German soldiers to escape from the Russians. Examples include Unteroffizier Diercks and

Oberleutnant Steinmeyer. Diercks wandered over 650 kilometers in 49 days from the pocket at Bobruisk. Oberleutnant Steinmeyer of the 161st Infantry Division traveled and fought over 570 kilometers in 32 days to escape the Russian encirclement in Rumania. Then there were those not so fortunate. In the Crimea,

"General Gruner, commander of the 111th Infantry Division, walked toward one of the Russian tanks to surrender. The tank opened fire, killing the general. Then, as so often the case with the Soviets, the officers and highly decorated soldiers were led away from the others. This was followed by shots and screams. The remaining Russian auxiliaries were lined up on the cliffs and shot."

A further indication of the scale and ferocity of the fighting is the simple statement regarding the 206th East Prussian Division. Every one of its 12,000 soldiers, from the commanding general to the last grenadier, were missing in action at Vitebsk July 18, 1944. There were no survivors.

Ostfront is primarily a story about soldiers. You will not find in-depth discussions and analysis about various aspects of German defensive tactics and doctrine or Soviet offensive methods. The reader will gain a great appreciation for the ability of the Russians to mount major offensives, seize and retain the initiative, set the tempo of operations to isolate, encircle, and annihilate the German defenders. The Russians learned the hard lessons of 1941 and '42.

I highly recommend this book to all members of the combined arms team. Alex Buchner vividly illustrates the awesome combat potential of the Russians and the extreme cost of failure associated with combat against them. This is a lesson that we should not forget because of the breakup of the Soviet Union. Furthermore, this is a story that is little known or understood in the West, and may dispel some of the "Wehrmacht Envy" currently in evidence. In our rush to downsize and reshape the military, the stories of the survivors should remind us of the terrible realities of combat.

CPT ROBERT A. NELSON
A Co, Ops Grp Live Fire Team
Fort Irwin, Calif.

Timelines of War: A Chronology of Warfare From 100,000 B.C. to the Present by David Brownstone and Irene Frank. Little, Brown and Company, Boston, Mass., 1994. 29.95.

One of the most common tasks I've had in the past five years as the history instructor in the Armor School has been to provide answers to fairly simple questions about military history — who, what, or when. I wish I could have had this reference tool for the past five years. If you're looking for a detailed narrative history of warfare, seek another source. *Timelines of*

War is a reference aid. This book is laid out in a tabular form, which makes comparisons between developments and activities in the various regions of the world easy. It provides sufficient information on technology, diplomacy, economics, personalities, and events to provide an idea of where to go for further information. Its entries are detailed enough in themselves to refresh memory and bring back information an absent-minded instructor has forgotten.

The Dupuy's Encyclopedia of Military History has been the standard work of this nature in the past. Timelines will not replace it entirely. However, I found the side-by-side arrangement of regional developments to be more useful and interesting than the Dupuy's area-by-area chronology.

A work of this scope, especially a reference work, is bound to have some errors, minor usually and occasionally major. But with the exception of a few typos and fewer differences in interpretation of some events or developments, I was not able to discover any on my first read through.

I would heartily suggest its purchase to serious researchers and instructors. And, I would urge everyone who seriously thinks about war and its evolution to become familiar with it as a research tool; know where it is in the library and how to use it.

SFC JOHN T. BROOM, Ph.D.
Professional Development Division,
The Armor School,
Fort Knox, Ky.

How to Locate Anyone Who Is or Has Been in the Military by LTC Richard S. Johnson (Ret.). MIE Publishing, San Antonio, Texas, 1993. 246 pages. \$19.95.

Ever ask yourself, "What ever happened to SFC Doe, my first platoon sergeant?" This little book can show you the way to find him. It is a collection of every possible means of using scarce information to find friends, relatives, you name it. All you need is a little persistence and patience. LTC Johnson has included toll-free telephone numbers, addresses of the military worldwide locators, VA agencies, etc. The best recommendation I can give is that I am trying to get in touch with an Academy classmate, using the book as a guide. At a cost of \$3.50 and a stamp, I hope to soon be writing to my old roommate.

LTC Johnson received higher praise than my poor pen can produce. He is specifically mentioned in LTG (Ret.) Hal Moore's book, *We Were Soldier's Once...and Young*. LTG Moore used LTC Johnson to find soldiers that fought in the battles in the Ia Drang Valley. This effort made a real contribution to both military literature and history.

KEVIN C.M. BENSON
MAJ, Armor
Ft. Bragg, N.C.

1995 Armor Conference

Tentative Agenda
29 Apr - 4 May 1995

Victory Then - Victory Now - Victory Tomorrow Mounted Forces - 1945-2005

| | | |
|-------------------------|--|---|
| Saturday, 29 Apr | 1300-1900 | Armor Trainer Update registration (Gaffey Hall) |
| Sunday, 30 Apr | 0800-1800 | Armor Trainer Update activities (Gaffey/TBD) |
| Monday, 1 May | 0800-1300 0800-1700 1200-1600 | Armor Trainer Update activities (Gaffey/TBD) Vendor displays open for viewing (Skidgel Hall) Armor Conference early registration (Skidgel Hall) |
| Tuesday, 2 May | 0800-1700 0800-1600 1330-1450 1500-1600 1630-1800 1800-2100 | Armor Conference registration, Ft. Knox Leader's Club (FKLC) External Scheduling Conference (Skidgel 1) Brigade and Regimental Commanders' Meeting (Gaffey 2) Honorary Colonels of the Regiments Meeting (Gaffey 2) Commanding General's Garden Party (FKLC) Regimental Assembly (FKLC) |
| Wednesday, 3 May | 0630-0745 0730-1000 0800-0815 0815-0915 0915-0945 0945-1100 1100-1200 1200-1300 1300-1700 1830-2230 | Breakfast (FKLC) Late registration (Hawkins Hall) Welcome/Admin Announcements (Gaffey 1) Keynote Address (Gaffey 1) Armor Association Meeting/Break (Gaffey 1) CG's Report to the Force (Gaffey 1) (Including presentation of Franks Award) Presentation (Gaffey 1) Lunch Break Presentations/Demonstrations (TBD) Cocktails and Armor Association Banquet (Patton Museum/Armor Inn) |
| Thursday, 4 May | 0830-0930 0930-0945 0945-1000 1000-1130 1130-1300 1300-2400 | "Armor Following the Storm" (Gaffey 1) Presentation of Kouma Award (Gaffey 1) Break CSA Address/Farewell (Gaffey 1) Chief of Armor Luncheon, CG's Report Out (FKLC) Attendees depart |

- POC for general officers billeting: Protocol Office, DSN 464-2744/6951, commercial (502) 624-2744/6951.
- Limited on-post billeting may be available for other personnel. Contact Mrs. Easter, DSN 464-3491, commercial (502) 943-1000.
- POC for equipment displays: DCD, DSN 464-3484/2176, commercial (502) 624-3484/ 2176.
- Overall POC for Armor Conference, CPT(P) Iddins, DSN 464-1065/8878, commercial (502) 624-1065/8878.
- Conference uniform is battle dress uniform; banquet is coat and tie; garden party is BDU, casual, or Class B with short sleeve shirt and open collar.
- Tickets for social functions will be sold during registration (estimated cost of social events - \$80.00).
- Visit requests for foreign nationals must be submitted through their embassies in time to allow for normal processing.

Armor Trainer Update Information

The FY 95 Armor Trainer Update is scheduled for 30 April-1 May and will be held in conjunction with the G3/DPTM Ft. Knox Scheduling Conference on 2 May, and the Armor Conference 1-4 May. Registration will be at Gaffey Hall on 29 April. Late registration will be 30 April from 0715-0800 in Gaffey Hall. This year's ATU will not only offer updated information of interest to RC officers and NCOs, but will focus on the integration of simulation technology into the RC mounted force training strategy. Since the ATU will immediately precede the Armor Conference, attendees will have the opportunity to view over 120 displays, including the Guard Unit Armory Device, Full Crew In-

teractive Simulation Trainer (GUARDFIST 1) which is currently being fielded, and the GUARDFIST II, a computerized interactive system used to simulate day and night scenarios for training artillery and mortar forward observers.

All personnel who plan to attend the FY 95 ATU should preregister by contacting SFC Thomas at DSN 464-2886/commercial (502) 624-2886. The FAX number is DSN 464-1456. Written requests for information should be sent to: Commander, USAARMC, ATTN: ATZK-SA, Ft. Knox, KY 40121-5000.

Fort Knox External Unit Scheduling Conference

In our continuing effort to make Fort Knox the east coast hub and station of choice for external unit combined arms training, the G3/Directorate of Plans, Training, and Mobilization will conduct the 3d Annual External Unit Scheduling Conference on 2 May 1995.

Fort Knox has proven its intent to meet and support external unit training. Our initial goal was to identify available resources 16 months out for external unit support and guarantee availability once scheduled. We have not only met this goal, but have expanded resources available for external unit training. Fort Knox resources available for external unit training include SINCGARS, MILES, Weaponeer, NBC Chamber, O/C Team, JANUS, COFT/PGT, Maintenance Trainer, Training Areas, Tank Driver Trainer, TSFO, MWSTC (Old SIMNET), and several

state-of-the-art ranges from small arms to Tank Table XII.

Fort Knox is working hard to build and maintain a reputation as the premier station of choice for total training. In order to maintain this reputation and improve our ability to identify and schedule resources for external units, we will soon add the capability for electronic data transfer. This will allow external units to directly access Fort Knox scheduling data via modem to verify resource availability and tentatively schedule these resources.

This year's scheduling conference will be held in Skidgel Hall, with registration from 0800-0900, briefings beginning at 0900, and actual scheduling at 1300. The POC is Ms. Evans, commercial (502) 624-1288; DSN 464-1288.