

ARMOR

The Magazine of Mobile Warfare



May - June 1984

United States Army Armor School



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

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ARMOR *The Magazine of Mobile Warfare*

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COVER

With combat engineers out front, an M60A1 of the 194th Armored Brigade approaches an obstacle under smoke cover. Sergeant First Class Dale Butler of the 194th PAO made the photograph during maneuvers last fall.

LETTERS

Hitler Table Missing

Dear Sir,

During the final days of WW II, the 9th Armored Division came into possession of a most unusual table. It was made of solid oak and in its top was an inlaid brass map of the Reich's autobahn system. The table was presented to Hitler on his 50th birthday by Dr. Todt, chief of the organization that had built the autobahn system.

The table had once been on exhibit in the old Patton Museum in Building 1810 at Fort Knox. Now it is missing and the museum is very anxious to find it and restore it to public exhibit.

Will anyone who has any knowledge of this most interesting piece of WW II memorabilia please contact the Patton Museum of Calvary and Armor at Fort Knox, KY 40121.

JOHN A. CAMPBELL
Director,
Patton Museum

Research Assistance Available

Dear Sir,

I would like to offer my services as a professional researcher to the readership and staff of *ARMOR* Magazine. I am especially interested in the WW II era and have access to the Public Records Office and the major libraries in and around London. I would be happy to make whatever arrangements are necessary with interested persons. I may be contacted at the following address:

MR. GILBERT DOWDALL-BORWN
16 Grosvenor Road, Langley Vale
Epson Downs, Surrey, England
KT 18 6JQ.

Patch Permission Presented

Dear Sir,

First Lieutenant Conyers' query on the authority for wearing the 2d Armored Division combat patch by former members of the famous 1st Regiment of Dragoons, that appeared in the January-February 1984 issue of *ARMOR* Magazine sent me to the basement book boxes for a nostalgic search.

As a former platoon leader and troop commander of B/2-1 Cavalry, I had received the same incredulous stares and questions in 1968, and through diligent research, had managed to acquire an official authorization letter, by Order of the Secretary of the Army.

The problem, of course, was finding it fifteen years after the fact, in hundreds of pounds of professional books and pre-microfiche records.

(For younger soldiers, pre-microfiche records are formal-looking paper documents that used to tell you what to do or to relate what you had done. They were bulky but, unlike microfiche, readable — if anyone wanted to.)

The two-hour search was tedious, therefore, but did allow me to reminisce over some well-written letters of recommendation and other documents "unauthorized for retention in the microfiche record."

The letter I was searching for was, of course, in the last box. It is dated 26 Nov 1968 and addressed to the CG, 2nd Armored Division from DA, TAGO, Washington D.C. 20315. It cites para 3, DA Warning Order 795800, DTG 042004Z Jan 67 and concludes BY ORDER OF THE SECRETARY OF THE ARMY, that because 1-1 Cav and 2-1 Cav remained assigned to their respective divisions while in the RVN, the correct war patch for troopers of these units was their parent division patch: 1st AD and 2d AD.

I hope this information helps Lieutenant Conyers and other RVN veterans who were privileged to serve in the Army's most decorated cavalry regiment.

FRANKLIN Y. HARTLINE
Lieutenant Colonel, Armor
Warren, MI

Tank Driving Course Notes

Dear Sir,

As the developer of the driver course depicted in "Training For Low Visibility Driving" in the January-February 1984 issue of *ARMOR* Magazine, it was gratifying to see the use of the course that Lieutenant Colonel Blasche proposes.

Because tank driver training seems to receive less attention than does training for other crew positions, some expansion on the origin and potential use of the course might be of interest.

The course was originally developed under an ARI-sponsored contract to identify and measure tank driver skills for the purpose of establishing standards for tank driver simulator development. The procedural parts of a driver's job such as starting, stopping, accelerating, turning and braking are simple, but in an operational context his skills become complex. We found these complex skills to be largely ignored in doctrinal and research literature. So, working backward from a selected list of tank-mission requirements, we isolated driver actions and decisions contributing to the missions and translated them into short individual events that could be reliably scored. A key feature of the test course is that it yields quantitative (non-subjective) scores. A major departure from actual mission conditions is that driver

interaction with the TC is not allowed—a restriction necessary to isolate and evaluate the driver's decisions only.

The value of the course, I believe, extends beyond its original research purpose. As Colonel Blasche proposes, it has great potential as part of a driver training program in field units. The nine events are collectively labeled a "test" because they are administered under test-like conditions to enhance standardization and produce quantitative scores. But the course is best suited for use as a training exercise, one that has the added benefit of being scoreable.

The advantages that I see for unit training are: It is cheap. Some stop watches, engineer tape, scrap range lumber and a measuring tape are about all that is needed. Damage-injury risk is virtually non-existent. Even real estate requirements are minimal. It is especially suitable for Reserve/Guard units that have few tanks and limited maneuver training areas during many weekend training assemblies.

It is flexible. The nine events are independent: each may be performed separately or in combination with others. It is ideally suited to "in the cracks" training. Moreover, the events themselves can be adapted to local conditions. And although developed around the *M1*, most events are directly adaptable to the *M60* series.

It is fun. Those who have tried the course have ranged in driving experience from 15 minutes in OSUT to several years experience in units. All enjoyed the challenge. The opportunity to score the events adds to the competitiveness. And performing without TC instruction and feedback seems to enhance driver confidence rather than detract from it.

I think the course adds a much-needed dimension to training in that often-neglected position—the tank driver, and I would like to see the events tried out and refined as necessary by units. If interested units are unable to obtain the ARI Report cited, I would be pleased to provide details of the course and suggestions for setting up and scoring the events if they would write to me at: HumRRO, 295 West Lincoln Trail Blvd., Radcliff, KY 40160.

ROY C. CAMPBELL
Radcliff, KY

MOUT Training Needed

Dear Sir,

Lieutenant Colonel Dal Piaz' article "Armor in Europe—a New Perspective" that appeared in the January-February 1984 issue of *ARMOR* Magazine highlights an often-overlooked fact about the central European landscape—it is a combination of open rolling tank country and congested urban areas.

While conventional wisdom dictates the bypassing of built-up pockets so as to not become mired in urban combat, that is easier said than done in today's European countries. That being the case, urban areas must be tactically used and exploited to slow the Threat.

Colonel Dal Piaz correctly points out our lack of training for military operations in urban terrain (MOUT). As a former member of a combat arms exercise team in a Reserve Maneuver Training Command, I saw first hand how this lack of training is translated into indecisiveness when faced with an urban battlefield.

Our team specialized in MOUT and scratchbuilt a CAMMS urban terrain board with surrounding countryside.

In most cases, the infantry battalions we exercised, whether in the offensive or defensive role, did not know how to effectively use the urban "clutter" to their advantage. Also, attached armor assets were almost always never fully used.

Devoting significant training time to MOUT is a realistic decision for the commander—especially if his mission is combat readiness in the European environment.

ROBERT J. ROEMER, JR.,
Captain, Armor
Buffalo Grove, IL

Comments on AirLand Battle

Dear Sir,

In reference to General Clarke's letter on the AirLand Battle in the January-February 1984 issue of *ARMOR* Magazine and his 4-point criticism, let me make the following points: (1) too complicated. As a CGS student corps commander and later as a brigade S5 on a *Reforger* exercise, in both instances with an abbreviated staff, problems similar to those expected to be met in real combat were adequately solved in a timely manner. (2) replacements for men and material. Have you forgotten the Reserve and National Guard? We are not all inept political appointments as General Ridgeway referred to us in his book on Korea. Much progress has been made here. (3) face an enormous risk. The whole concept of ground combat involves risk. (4) would our NATO allies go along? Responsibility for action in each corps sector is that corps commander's responsibility and such responsibility extends throughout the NATO structure and is coordinated with other sectors.

I am not negative to the AirLand Battle concept as it is an armor, artillery, intelligence, infantry, airborne and everybody else operation with the infantry, armor and artillery in the fight against the first echelon, the airborne infantry and artillery in the fight against the second echelon and the intelligence working to locate the second and third echelons as well as the fourth and fifth echelons.

Our logistic lifeline to Europe is thin

and quite vulnerable. Should we find ourselves in a conventional war, keeping the force supplied may become difficult. Therefore, the excellent article "Fighting With a Three-Man Crew" should be taped inside the turret of every armored vehicle in Europe. We may, eventually, discover that the Swedish *S-tank* with its two-man crew a viable alternative to our overseas manning problems.

A final thought: a sitting tank (broken down or out of fuel) is a sitting target and the smart crew will disembark. Once clear of their tank what have we provided them with for personal protection? The *M16* rifle isn't the best answer; it's too cumbersome to be easily carried in the tank. What about the *M12* or *MAC 10* submachine gun? (For some similar thoughts on tank crew survival outside their vehicle see "Living With Tanks" in the March-April 1984 issue of *ARMOR*. Ed.)

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

M1 APU Tests Welcomed

Dear Sir,

Regarding *M1* APU feasibility tests, maybe we could throw a welcome party for "Little Joe." He's sure been gone a long time. (See "*M1* APU Feasibility Test," January-February 1984 *ARMOR*.)

I was very glad to read that they added this auxiliary power generation unit to the *M1* tank as its independent power generation ability has been missed.

Let's see now, we've gone back to four-gun companies: we have a consolidated headquarters company for all of the combat support and combat service support units; we've put a Little Joe back on our tanks and we are moving the platoons around by sections again. True, we only have four-tank platoons, but then I could never keep all five running at the same time anyway.

What next? Addition of a bow gunner on the next generation of armored fighting vehicles?

This is where I came in.

JAMES O. SPENCE
Major (P) IG
Ventura, CA

Russian WW II Tank Figures Questioned

Dear Sir,

In his article "The Soviet Mechanized Corps in 1941" that appeared in the November-December 1983 issue of *ARMOR* Magazine. Mr. Parrish made some valid points as to why the Soviet armored forces—enjoying quantitative superiority over the Germans in tanks—suffered such severe setbacks during the initial period of the war. Few would question that surprise as well as the qualitative superiority of the German Army over the Soviets played a key role

in those setbacks. One factor not mentioned by Mr. Parrish as having played a significant role in the Soviet defeats was the extremely low level of maintenance readiness on the part of the Soviet armored forces.

Although Soviet armor strength at the beginning of the war may well have been 24,000 tanks of all types (German intelligence prior to the war estimated 15,000 machines, a figure agreed upon by the Soviets), a majority of these were not operational on the eve of the war. Soviet sources tell us that 73 percent of all older model tanks (*BT* series, *T-26*, *T-28*, *T-35*, *T-37*, *T-38*) required repairs of some nature above unit level. Of these, 29 percent required complete or major overhaul and the other 47 percent required repairs at the unit level. (These figures are quoted from Marshal O.A. Locika's "The Building and Military Use of the Soviet Tank Forces in the Great Patriotic War.") Restoration of these vehicles was hampered by a number of factors.

On the eve of the war there existed a shortage of tank repair facilities in the Soviet Union. Of 38 repair bases, only 9 restored tanks, while of the 72 garrison repair shops, only 7 serviced tanks. Thus, only 16 facilities were available for repairing tanks in the entire Soviet Union. This shortage of maintenance facilities was accompanied by a similar shortage of maintenance assets within the Soviet armored forces. This was especially true of units equipped with newer model tanks (*T-34s* and *KV-1s*).

Another and perhaps the most significant factor preventing the restoration of the sizeable fleet of inoperable Soviet tanks was the severe shortage of spare parts. This was brought about by the Soviet decision to emphasize the production of newer model tanks and associated tools and spare parts. The Soviets were unable to remedy this problem fully prior to the outbreak of war.

How many machines then did the Soviets have available to meet the invasion? Of the 24,000 tanks on hand, 3,050 (mostly older models) were stationed in the Far East as a safeguard against a Japanese invasion. Another 1,861 tanks were the newer models, 636 *KV-1s* and 1,225 *T-34s*, leaving about 19,000 older models. Of these, only 27 percent, or about 5,150 tanks, were operational. Add to this another 1,475 newer models (508 *KV-1s* and 967 *T-34s*), which were stationed along the five western Soviet border regions. (This figure assumes 100 percent operational readiness for newer tank models even though the lack of maintenance assets as well as the engine and transmission problems characteristic of the early *KV-1s* would have kept this figure below 80 percent.)

The Soviets thus had 6,626 tanks of all types to meet 4,300 tanks and self-propelled guns of the combined German, Finnish, Romanian and Hungarian armies which invaded the Soviet Union. (The Finns, Romanians and Hungarians deployed about 300 machines). This would have given the Soviets a superiority in

tanks of 1.5:1 (at best), a far cry from the 3:1 figure quoted by Mr. Parrish. This superiority was negated by two factors. The first was the concentration of German armor along a few routes. The second was the tremendous number of tanks lost in the first days due to lack of spare parts. It is estimated that by July 1941 there remained 1,500 tanks in the Soviet inventory.

The low level of maintenance readiness among the Soviet armored forces thus accounted for approximately 70 percent of Soviet tank strength before the war started. This figure increased significantly after the first few days of battles. One wonders what the results would have been had these machines been operational when the war began. This is one of the more important lessons that can be taken away from studying the opening battles of WW II on the Eastern Front.

As to Mr. Parrish's statement that "powerful weapons in superior numbers do not guarantee victory," it would behoove him to remember that it was the Soviet armed forces, backed by more than 25,000 tanks, that won over the Germans, despite the crippling defeats of 1941.

GILBERTO VILLAHERMOSA
Captain, Armor
Fort Knox, KY

Old Style Training Won't Hack It

Dear Sir,

If military training is the means by which commissioned officers and NCOs impart fighting qualities, including technical skills, to their soldiers, then the old "art" of military training fails in today's Army.

Idleness and boredom, classes *en masse* and uneven results are the hallmarks of training to a standard of simplicity with the commander's intuition as the major guide. The old art demanded no better performance of an NCO than of any other enlisted rank, since all training management and input flowed from the seat of the pants by which the officers flew. In those simpler times, the Army could get by in such a manner by overpowering the enemy with sheer numbers and materiel.

The U.S. Army, whose traditions must point to its Confederate cousins for almost all examples of truly imaginative economy of resource, must now fight outnumbered and win. Old, homely simplicity and "art" will no longer cut it. The Army, which too rarely met its boasted standards of "fustest with the mostest", must now produce the most training results in the fastest time with the least expenditure of resources.

Historically, the military trained for decades between missions to methods with which leaders felt comfortable. These methods were usually based on their past combat experience. The Army leisurely trained to do the wrong thing. Only contact with the enemy broke the inertia.

Maintaining competitiveness and increasing the return on investment are keystones of civilian business. When the methods of business, where the battle for survival is fought every day, are applied to the military, the demands for tight, reasoned planning, quality control and tangible products provoke cries of "paperwork and poppycock" from those people not accustomed to careful management of time and material resources.

Does it work? It works in my USAR company and it works in my civilian factory. It works when the NCOs take charge. It works when meticulous and imaginative planning is demanded. It works when time is not considered to be open ended.

To gauge a leader's ability to impart fighting qualities to his men and conduct successful tactical operations, don't look at his subjective reports of unit training level, or to his military bearing, or to his letters of commendation. Look, instead, at his maintenance program. The same requirements of organization and mastery by the NCO of his men and machines apply to motor stables as well as to BTMS. If a leader has not planned and led his maintenance effort toward its measurable, objective mission, how can he do the same in a combat operation? If he cannot train his troops for maintenance and instill maintenance discipline, how can his artful intuition do so on the battlefield?

Incompetent artists used to be exposed only in the first battle. Now, the failures to achieve results in BTMS and maintenance can winnow the weak leaders out in time to win the first battle.

MICHAEL W. SYMANSKI
Captain, Armor
Danville, IL

Army Aviation Logistics School Established

Dear Sir,

The U.S. Army Aviation Logistics School (USAALS) was established at Fort Eustis, Virginia on 1 October 1983 as part of the implementation of the Aviation Branch.

The school is responsible for all Career Management Field (CMF) 67 and Officer Specialty Code (OSC) 71 training development, combat development, and resident/nonresident instruction.

The Aviation Maintenance Officer Course is being redesigned to establish an Aviation Logistics Officer Course (AVLOC) for OSC 71 officers. The revised officer course and the conduct of a "How to Support" seminar in the near future are among the school's highest priorities.

Major General Aaron L. Lilley, Jr. is commandant of the school and Colonel Albert B. Luster is the assistant commandant for both the U.S. Army Aviation Logistics and Transportation Schools. Colonel Ronald L. Bellows is the deputy assistant commandant for the Aviation Logistics School, and Colonel John E. St.

John holds the same position in the Transportation School.

Resources for the USAALS were furnished by the U.S. Army Transportation School, formerly responsible for aviation logistics development and training.

ALBERT B. LUSTER
Colonel, Transportation Corps
Ft. Eustis, VA

The Nuclear Flaw in the AirLand Battle

Dear Sir,

After reading "Is AirLand Battle a Paper Tiger" in the November-December 1983 *ARMOR* Magazine I have concluded that the U.S. has a problem with its AirLand Battle doctrine and that problem, in turn, forces the U.S. and its allies down one road: the use of tactical nuclear weapons to stop a Soviet armored attack in Europe because the U.S. and its allies lack the antiarmor firepower to stop such an attack.

But, what about our own armor, our *TOWs*, *Dragons*, *Hellfires*, *Copperheads*, *SADARM* munitions, *DPICM* bomblets, etc., you ask? All the above weapons and munitions have a problem called launcher density. How fast can one team load and fire a *TOW*, and how many tanks can a *TOW* kill? One. No matter how good you are, you get one tank per missile.

SADARM and *DPICM* bomblets are basically fire-and-forget weapons and both depend on target location and rapid response by the artillery. All of them cost bucks, and there will not be many around to shoot. All the launchers for these munitions and missiles also cost bucks and the density is also not what we would like.

But what about the infantry squad in an *M113*, or on foot? What antiarmor weapons do they have? *LAWs*? Maybe a *Dragon* or 90-mm or 106-mm recoilless rifles? I know, I know: combined arms. But there will be more times than not where whole companies will not be able to use combined arms for one reason or another. What do these people do?

The air defense problem is of the same magnitude and the costs are at least as great. How many *Stinger* teams go with a company? If your platoon is attacked by a pair of *HIND*-Ds at 2,300 meters distance, what do you have to fire at them that will neutralize them?

The problem has been highlighted at the National Training Center in exposing U.S. units to a Soviet-style OPFOR that really knows its business. U.S. units have shown that they lack the organic ability to smash a local attack or to spring a platoon-sized ambush that can destroy a company. What can we do about it?

My solution is to take the existing hyper sonic kinetic energy rocket, (*HSKER*), a 61 cm x 5 cm steel casing with no warhead and a launch velocity of

1,500 meters/second, lengthen it by 9cm, insert a 6cm x 3cm plug of C-4 with an inertially armed, millisecond (.001) delay impact fuze, and load four in a modified M202A1 flame weapon launcher four-rocket magazine. Modify the sights to fire a flat-trajectory weapon at a kilometer or greater distances. You now have a man-portable, multi-shot direct-fire weapon that is capable of destroying armored or thin-skinned vehicles. The aerial threat to a unit is reduced by having a system that can attack and destroy aircraft and helicopters with a cheap barrage-type projectile.

The M-200 70-mm folding fin aerial rocket pod could be modified to have over 30 50-mm tubes; these pods could be placed on aircraft and helicopters to fire rocket pairs at ground targets. The pod could replace the twin TOW launcher on some BFVs.

If the concept proves valid, the U.S. has escaped the fatal results of the present weapons systems and doctrine. The fighting in Europe could start at the border with small teams, rather than allowing the Soviets a chance to get up a head of steam as they approach the covering force.

LARRY A. ALTERSITZ
Major, FA
NJNG

Urban Perils Noted

Dear Sir,

The article by Lieutenant Colonel Dal Piaz, "Armor in Europe—A New Perspective," in the January-February issue of *ARMOR* Magazine certainly is thought-provoking. His recounting of the urbanization of much of Western Europe made me think of typical American urbanization areas such as the Los Angeles basin. And with that in mind, it is easy to go on to another difficulty that Colonel Dal Piaz may not have considered—the differences in building construction that have taken place since the end of WW II.

Prior to that war, buildings were more solidly constructed than they are today. They were heavier and had thicker walls. Witness the pictures of WW II urban areas, with heaps and piles of bricks and rubble and timber blocking the streets.

Today's construction is of an entirely different nature. Since WW II, most public and commercial buildings have been built on the "curtain wall" principle in which the frame is the major supporting structure with the walls only providing protection against the wind and weather. Many of these walls are nothing more than immense sheets of glass. Glass falling from buildings can cause casualties to troops below. Glass shards can inflict troublesome cuts and wounds and must be looked out for by troops fighting in the rubble.

At the cost of some extra weight some accessory items of apparel may be useful. Ballistic overpants (similar to camouflage snow overpants) and snap-on sleeves for the armored vest should help to reduce injuries from flying glass. Safe-

ty goggles that can be worn over prescription lenses would protect the eyes and a light-weight balaclava-type hood would protect the head and face.

While these views do not stem from a formal study of wounds, they are offered to stimulate thinking along these lines.

GORDON J. DOUGLAS, JR.,
Fullerton, CA

Father of Polish Armor

Dear Sir,

With reference to Steven Zaloga's article, "Polish Cavalry Against the Panzers," that appeared in the January-February 1984 issue of *ARMOR* Magazine, I would like to add some information about General Stanislaw Maczek, the "Father of Polish Armor."

General Maczek began his military career in 1918 and served as a captain during the Bolshevik invasion of Poland in 1920. Maczek commanded a battalion given the mission to split Marshal Budenny's army, a task he accomplished with tremendous success. The action drew praise from Marshal Josef Pilsudski who had recently been elected Poland's Chief of State, and Maczek was decorated with the *Virtuti Militari*, an award comparable to the U.S. Medal of Honor.

In 1939, when WW II began, Maczek was a colonel commanding the 10th Motorized Cavalry Brigade. In the campaign of September, 1939, Maczek's brigade fought two German armored divisions, but after the Russian forces crossed Poland's eastern frontier, Maczek's brigade was ordered by the Polish commander-in-chief to escape across the Hungarian border. A month later, Maczek was fighting in France and was promoted to the rank of general. General Sikorsky then offered him command of an infantry division being formed in France at Camp Coetquiden. The volunteers for the new Polish army included the remnants of the 10th Brigade.

The general directed his 10th Brigade survivors to a center in Poinpoint where he was forming a new 10th Brigade.

The following April the brigade was moved to southern France. Although equipment was scarce, with few tanks available, the German offensive in May forced the issue and the brigade was made battle ready. The unit was soon on its way into the Paris area, specifically the area near Versailles. Marshal Pétain and General Weygand used the Polish unit to help save the crumbling defenses of France. Half of General Maczek's troops attached to General Requin's 4th Army were ordered to cover the withdrawal of several divisions and fought a terrific battle in Champabuert-Montgivroux. They performed extensive reconnaissance in territory that had been deeply penetrated by the enemy.

The unit was involved in an attempt to breakthrough to Dijon and fought in the bloody battle of Montbard.

At the time France surrendered, the brigade was completely surrounded in the Moloy Woods. Maczek made the decision to destroy his equipment and ordered his men to attempt to reach the unoccupied territory of southern France. It took 18 days to break through. At Clermont-Ferrand, Maczek received the praise of General Weygand for services well done. Finally, when he reached Marseilles, German agents controlled the port, and Maczek, pretending to be a private discharged from the Foreign Legion, managed to reach Oran and Casablanca. He pushed on to Lisbon and finally joined the Polish forces in England.

On 21 September 1940, General Maczek was once again in command of his 10th Brigade. In the following two years the unit became known as the 1st Polish Armoured Division.

In 1944, this division was part of the Allied invasion of Normandy and on 8 August 1944, Maczek—known for his tactical talent—was given the task of breaking through and penetrating enemy territory with the explicit mission of cutting off German supply lines and road junctions.

The Division penetrated 25 miles and reached the locality of Trun with orders to close the gap between the British-Canadian Army and the American Third Army. Continuous fighting for 48 hours brought Maczek's division toward Chambois where they took command of the hills, each over 260 meters high, which dominated the entire Falaise valley. That same afternoon the American 385th Infantry Regiment entered Chambois, completing the encirclement of the German 7th Army. For three days and nights the surrounded Germans fought desperately but the Polish and American units, separated from their main armies by some 7 miles, withstood the tremendous German counterattacks. The Battle of Falaise Gap destroyed the German 7th Army and the battle for France was over.

General Maczek's division went on to fight at Abbeville and St. Omer in France; Ypres, Roulers, Theilt, Aeltre, Ghent, Lokeren, St. Nicolas, Hulst and Antwerp in Belgium, and at Breda, Moerdijk, Oosterhout and Ter Apel in Holland. On 6 May 1945 they entered Wilhelmshaven and two days later Germany surrendered.

The 10th Brigade was the only Allied unit that engaged the Germans on both the first and the last days of the war. The victorious Poles, however, were unable to return to their homeland, and after two years of occupation duty in Germany they returned to England and were disbanded.

Today, Maczek is living in Scotland where he celebrated his 92nd birthday in March. And many of the surviving members of his division are still active members of the First Polish Armored Division Association.

WALDEMAR CZYZ
Lieutenant Colonel (Ret.)
Blasdell, NY

COMMANDER'S MATCH

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



Manning The Armor Force

The modernization of the U.S. Army is posing new challenges for the manning system. Some problems derive from the characteristics of new equipment and the complexities of the future battlefield. But modernization is also highlighting the urgent need to correct deeper, long-standing structural problems.

Increasing the tactical and technical proficiency of our officer and NCO corps is essential if we are to fight on a non-linear, extremely stressful battlefield with sophisticated combat systems whose ranges, lethality, and employment capabilities surpass anything known in contemporary warfare. We must develop the Armor leader who can meet the challenge of the Army 21 operational concept and use agility, deception, maneuver, firepower and all the other tools of combat to face the enemy with a succession of dangerous and unexpected situations more rapidly than he can react to them.

We will continue to see new technologies fielded. Vehicle-integrated intelligence and robotics will place new demands on leaders to integrate many tasks simultaneously. Most critical will be the leader's ability to operate within the decision loop with quicker reaction time than the enemy.

But the present force has not been developed with these goals in mind. In fact, some features of the officer and enlisted personnel management systems conflict with these goals. Our ability to recognize and select men for the specific human performance capabilities we will need in the future remains at a 1940 level of sophistication. We have few ways of predicting performance with any accuracy. And, as the segment of our population of military age declines, we can anticipate growing competition for higher quality recruits. We will have to distribute these qualified recruits only after thoughtful reflection on the demands and relative priorities of the Army's needs.

The present system hinders the professional development of Armor officers by requiring the branch to man additional specialty positions in the TDA force—this impacts on both the development of the officer and the combat readiness in the deployed TOE force.

On the NCO side, we see assignment patterns which can

erode proficiency in a soldier's career field and an education system unable to provide adequate training opportunities. Moreover, there are serious structural problems that hinder promotion feasibility. And the exigencies of force stationing mandate short turnaround time in CONUS units, creating significant turbulence.

These are some of the challenges that we must meet if we are to increase the tactical and technical proficiency of our officers and NCOs. These challenges will be pursued by a series of actions in the following areas: Accession, structure, professional development, and training.

Accession

Battlefield success will be determined in part by the quality of soldiers enlisted and retained in the Armor Force. Studies of present Armor manpower inventories show that there may soon be a high percentage of mental category IVs at skill level 3. Since the tank commander occupies the basic leadership position in Armor, it may be unacceptable to have a high percentage of category IVs. In fact, it has been proposed that only mental categories I and II should be enlisted in Armor. (An unofficial statement attributed to personnel at the National Training Center indicates that the most successful tank commanders are those in the higher mental categories. They are better able to make quick and accurate assessments of the situation and are therefore more successful in maneuvers. The Armor Center plans to evaluate this data and to examine other studies being conducted. We will make a recommendation of minimum standards for enlistment in Armor based on scientific data.)

The Predictors of Combat Performance study noted the similarity between many tasks of the TC and the fighter pilot. Both, for example, involve independent operation of a highly complex weapons system to kill like enemy weapons systems through the use of hand-eye coordination, visual acuity, superior maneuver and rapidity of engagement. The Armor Center is attempting to gather meaningful NTC data on the subject. We will be working closely with the Soldier Support Center's Predictors of Combat Performance Study Group. And we will be undertaking excursions of our own.

We will, for example, compare demographic data on successful Armor soldiers—represented by serving master gunners—and unsuccessful Armor soldiers—represented by those separated before completing their initial term of service. The results of all these projects will help us specify the type of individual Armor must attract to help realize the full combat potential of our weapons systems.

Structure

The Armor Center's restructure proposal for CMF 19 has been approved by Department of the Army and will be implemented in the October 1984 C.T.U.

We can grow our own senior NCOs if all eligible E4s and E5s are developed by their commander and subsequently promoted to E5 and E6. The restructure changes are: providing one E7 and one E5 as tank commanders in the HQ tank section; providing an E4 gunner for the E5 tank commander in each HQ tank section and providing more E6s in the U.S. Army Recruiting Command to offset the loss of E6s in the HQ tank section. In addition, the battalion master gunner and operations sergeant positions are upgraded to E8 and E9, respectively, and an E9 master gunner authorization at division, brigade and regimental level.

USAARMS has developed a proposal to establish a management system which will assist in the creation of an Armor Force of Excellence entitled, *Fast Track*. A soldier will initially enter the *fast track* by high quality performance in Armor OSUT. He would be promoted to PFC to identify him clearly to the gaining unit. He would remain on the *fast track* through continued high performance and receive consideration for early attendance to PLDC and BNCOC. High performance in both these NCOES schools would warrant administration of a tank commander qualification test (TCQT). Passing the TCQT would qualify him for promotion to SSG with 4 years time-in-service. The system would include passage from regular to *fast track* and reverse if performance declines. Continual monitoring of the progress for those soldiers in the *fast track* system will be accomplished by unit-to-unit annotation of the DA Form 5286R-1 (Individual Training Records Continuation Sheet).

Professional Development

Branch Qualification of Armor Officers: Currently this is a rather vague concept, especially at grades above O3. In an attempt to clarify branch qualification, the Infantry, Artillery, and Armor proponents met and agreed to revise DA PAM 600-3. The revision will include a description of the experience an officer needs at each grade level in order to demonstrate qualification of company grade officers. The combat arms proponents recommended delaying the designations of additional specialties until after Combined Arms Services Staff School. This would facilitate longer development of the officer in branch-specific positions and would further enhance his ability to attain full tactical and technical proficiency. Further, the combat arms proponents have requested the DCSPER to clearly define the kind of input which proponents can forward to the DCSPER to be considered for inclusion in officer selection board guidance. Optimally, the input would include specific qualifiers, abilities which should be demonstrated in order to be considered branch qualified. Other proponent guidance, such as prioritization of assignments to supervise school instructors, would be included.

DA PAM 600-3 is presently undergoing revision. It will address the issue of Armor officers remaining branch qualified throughout their first 10 years of service before going into their additional specialty.

NCO Career Model: Currently, there is no enlisted career progression model to assist CMF 19 soldiers with career

management. The Armor Center has developed a CMF 19 career development layout (in the format of the model for officers in DA PAM 600-3) for active component NCOs. The Armor Center has made modifications to the model recommended by the Manning Armor panel at the 1983 Armor Conference and will forward it to DCSPER. In addition, the Armor Center will coordinate with the National Guard Bureau and Chief of Army Reserves to develop a career progression pattern for reserve components (RC). Currently, a draft has been developed. We plan to publish it as a USAARMC special text in the third quarter of FY 84.

Training

NCO Requalification: Qualification of Armor NCOs is essential to success on the battlefield. To ensure that NCOs are technically and tactically proficient when returning to TOE units from TDA assignments, the Armor Center has proposed the establishment of an NCO requalification program. Currently, NCOs returning from extended USAREC assignments attend a requalification training program at Fort Knox. This program would be expanded to include all NCOs (E6 and up) returning to TOE assignments after an absence of 2 or more years. A training program is currently being developed that can be used at Fort Knox or at unit level. The NCO would either attend the course in TDY status enroute to the unit, or would be requalified at the unit within 90 days of arrival. Failure to requalify at the TC level would result in administrative action (elimination, reclassification, etc.). In addition, an interim resident course would be established for RC units pending receipt of the *M60A3/M1* at home station. Following receipt of the new equipment, home station training would be conducted. The RC training division could be used to conduct requalification training for tank commanders during the annual 2-week active duty for training.

Officer Requalification Training: Officers serving away from TOE units lose some degree of their technical and tactical proficiency. Currently, there is no way to ensure that officers have the requisite skills when returning to TOE units from TDA assignments. The Armor Center is developing a course to be taught to majors, senior captains, and lieutenants whose last assignment was out of the mainstream of Armor. The course would be taught on TDY status while enroute to TOE assignments. The POI will include hands-on training in gunnery and maintenance and will provide the officers with the latest doctrine.

Branch Qualification of Armor Command Sergeants Major: There are 105 CSM positions associated with Armor/Cavalry. Currently, 94 of those positions are filled by branch qualified CSM. The assignment policy at MILPERCEN for CSM is to make the initial assignment as a CSM in the branch in which the CSM is branch qualified, if possible. The Chief of Armor has requested assistance from the DCSPER to staff Armor units (particularly *M1*) with branch qualified CSM, even though these positions are not documented presently as requiring branch qualified CSM.

Each member of the Armor force must be led to play a part in this process. It must be a collective effort calling on the combined experience and insights of us all, private to general. I earnestly solicit your comments as we work on our specific programs and your active participation as we execute.





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

Preparing for the ANCOC

The Advanced Noncommissioned Officers Course (ANCOC) annual selection list identifies a select group of noncommissioned officers—staff sergeants, staff sergeants (P), and sergeants first class, who will attend a 19E or 19D track ANCOC (Armor) course. The selection process is highly competitive, and rightfully so. The armor or cavalry platoon sergeant has one of the most demanding—if not the most demanding—noncommissioned officer leader role in the army.

During the last year we surveyed the education level of noncommissioned officers attending the course at Fort Knox, Kentucky. In every case the records reflected that they exceeded the course prerequisites. However, after administering the California Achievement Test, we found in many cases the students' basic skills in math and reading comprehension fell short of course requirements. Also at a disadvantage were students who had not maintained or practiced their MOS skills to sustain the desired level of proficiency.

Let's look at some programs that will assist all NCOs prior to attending this school. These are simple educational programs that can be taken without a great deal of time or resources. These programs can generally be found at any Education Center, Learning Center, or Professional Development Center.

Before we address the programs, though, it is important to understand the NCO's and his commander's responsibilities to ensure that the NCO arrives here prepared for the advanced course. He must be mentally prepared to concentrate on Skill Level Training instead of the basic skills of math and reading comprehension. To discover those deficiencies at the school is too late.

Immediately upon learning that you have been selected for attendance at ANCOC (Armor) school, you should go to your education counselor, talk with your commander, review your records and request to take the necessary tests to determine your math and reading comprehension levels.

The NCO that does well needs to ensure that his test scores are inserted into his records. The NCO who does not do well needs to attend some basic skill classes to improve in his deficient areas. The command plays an important role

here. There must be some guarantees before the NCO enrolls in a course. The main requirement is that once enrolled, attendance is mandatory. You commanders have to stand fast, ensuring the NCO gets the time needed to attend the basic skills course and that he understands that attendance is mandatory. The price you pay for a short absence will be returned to the Army many times when he returns from ANCOC.

Every soldier going to school should take a *speed reading course*. They are available at all centers. Just a short refresher, self-paced program will pay big dividends at school. For the Sergeants Major Academy, it is mandatory. It should be mandatory for all courses. Developing your ability to read and comprehend more material in less time will eliminate a lot of frustrations at school. Increasing your reading capabilities reduces the time needed on homework and read-ahead requirements, giving you more time to work on the areas where you know you are weak.

Ask your battalion operations sergeant or your education center for the ANCOC (Armor) Program of Instruction (POI) so you can review the course objectives prior to attending. Note the lesson reading requirements for each task. Remember that the school teaches the standards by the manual, not, perhaps, the same way you do it in your unit. If your unit is following the manuals, SPAs, etc., that's great, but if you are in an organization that has developed its own way, you have problems. An example of this problem is revealed in the gunnery skills requirement for the 19E and 19D. There are fewer third time NO GOs in the 19D course than there are in the 19E. Why? Although the end objective is the same, there are considerably more gunnery hours in the 19D track than the 19E because of the Delta's lack of experience on the tank. So Deltas learn the subject the school way and are not inhibited with bad habits. Echoes experience more first time NO GOs because they may have poor training habits or deficient basic gunnery skills. Knowing the requirements prior to arriving at the school will be a big boost to your success. If you cannot find a copy of the POI, have your battalion operations sergeant obtain a copy by writing: Commandant, Armor School, ATTN: Directorate of Training and Doctrine, Fort Knox, KY, 40121.

MASTER GUNNER'S CORNER

*Captain Guy C. Swan, III
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One Unit's Gunnery Challenge

Although the 2d Battalion, 77th Armor, the only tank unit at Fort Lewis, WA finds itself in an ambiguous position relative to the 9th Infantry Division's transition to a High Technology Motorized Division, its tank gunnery training program has been molded to fit new constraints and has also been closely coordinated with the unit's direct support artillery unit, the 2d Battalion, 4th Field Artillery. The constraints on the battalion's tank gunnery training include reduced ammunition allocations, high personnel turnover, an aging fleet of *M60A1* tanks and the usual post-camp-station support requirements.

Realizing that prime training time is at a premium, tank gunnery and other tactical training cannot be mutually exclusive; they must mesh. In other words, our tank gunnery program has as its goal not merely 100-percent qualified crews but, rather, nine tank platoons and three tank companies that can fight and win on an integrated battlefield against known Threat operational doctrine. This means that tank gunnery in 2-77 Armor is in fact "battle gunnery" and includes extensive intelligence training, the use of indirect fires, attack helicopters and other elements of the brigade commander's slice of combat multipliers.

To accomplish this task, we established a phased program that goes from "back-to-basics" classroom instruction through realistic subcaliber training at Fort Lewis to live-fire tank gunnery and company level combined arms live-fire exercises (CALFEX) at Yakima Firing Center, WA.

The Fort Lewis phase of battle gunnery is approximately four weeks long and begins with a week of intensive class-

room and hands-on training called KASH-for Knowledge, Attitude, Skill and Habit. The program of instruction is presented much like a service school course with master gunners and senior NCO's holding formal classes. With the rapid personnel turnover we face, KASH training conducted quarterly maintains a good level of sustained readiness. KASH accomplishes several things for us. It gets all 19E soldiers, especially those returning from overseas *M60A3* units, refamiliarized with the *M60A1*. By tailoring classes to TC/gunner teams and driver/loader teams, expertise can be achieved in a shorter period of time. The thrust of the classes is teaching the technical aspects of the various systems on the tank and how they function to achieve first round hits. With a good technical grounding, crews are more likely to understand gunnery skills when they begin subcaliber training.

The Habit part of KASH begins on the subcaliber ranges. Tank Tables I-IV fired with a .22 caliber BREWSTER device on a 1:60 scale range is the next phase of our training. While these exercises are conducted right out of FM 17-12-1, we use them for another important purpose. Alternate TCs and gunners are identified and begin training. This helps us maintain a pool of experienced personnel from which we can draw as key personnel turn over.

Next, we move to a specially prepared 1:60 scale range for Tables VP and VP². This is where we begin to develop fighting tank platoons.

First, preliminary sand table training is held. The battalion S2 displays the Threat tactical formations our tank platoons

can be expected to face on today's battlefield. The battalion commander and company commanders graphically show how to fight Threat echeloned attacks and belted defenses. Additionally, the direct support artillery battalion commander and company fire support team (FIST) chiefs discuss Threat artillery doctrine and positioning. Once all of this is accomplished, platoon leaders are given operations orders for the conduct of Table VP.

Attack, defense and covering force/scenarios are presented and the range pop-up target array reflects the Threat formations portrayed on the sand table. The direct support artillery survey section developed and produced a scaled map for platoon leader, platoon sergeant and TC use. Threat actions and movements are displayed by exposing targets on a time schedule based on expected Threat closure rates. Company and platoon radio nets are exercises to include the command post (CP) and FIST. Awareness of the battlefield is emphasized as second echelon forces are popped up. When battle conditions are varied (as with EW, NBC, incoming artillery), the platoon leader's ability to command and control can be highly stressed. Usually, 4-6 repeats are necessary to develop acceptable levels of proficiency before going on to Table VP².

In Table VP² we add the dimension of indirect fire support. Using the M32 14.5-mm artillery subcaliber device and the 4.2-inch mortar pneumatic firing device, the platoon leader calls for indirect fires. The concept of battle gunnery takes on meaning as the platoon leader distributes and controls his direct fires while planning and executing indirect fires through the FIST. Platoon leader and platoon sergeant duties are delineated, SOPs established, battle drills practiced, and communications errors corrected. Similar scenarios to those used on Table VP are presented and platoon leaders learn to anticipate enemy actions, especially those of the second echelon. Tape recording radio nets assists the company commander's debriefing and reinforces the need for brief transmissions and alternate modes of communications to preserve unit nets.

The next phase of battle gunnery is Table VI which is fired using the M240 machinegun mounted on the BREWSTER. The exercise is done on a 1:2 scale range. Combining the BREWSTER with the M240 coaxial machinegun and an M240 specially mounted in the cupola enables the crew to improve crew drill. We emphasize the simultaneous main gun and machinegun engagements to raise crew proficiency with all weapons systems. Every task required of the crew on Table VI can be duplicated at reduced cost on this range.

After completing day and night fire, we begin Table VIIM which is very similar to the old tank crew proficiency course, but with a few significant changes. The MILES system is mounted on the firing tank and by mixing target panels with MILES-equipped target tanks, we can add realism to the training. When engaging target tanks, the evaluated crew must 'kill' the target tank within the distinguished time standard prescribed in FM 17-21-1. Failing that, the target tank takes evasive action and returns fire. It doesn't take long for crews to develop rapid crew drill under these conditions. Since these mock battles are performed at actual engagement ranges, the skills learned on the 1:60 scale range and the 1:2 scale range can be put into 'real time/distance' perspective. As in all of the training during battle gunnery, detailed debriefs by tank crew evaluators (TCEs) are critical and a good deal of time is spent on critiques.

When the crews return to the 1:2 scale range for Table VIIC, meeting the distinguished time standard is again stressed. Using the 7.62-mm BREWSTER, corrective action is taken on deficiencies noted on Table VIIM.

The successful completion of Tables VIC, VIIM and VIIC means that the platoon is ready to go on to Tables IX and

IX². These two tables are done on a 1:10 scale range using the 5.56-mm BREWSTER. As on the Table VP and VP² range, the artillery survey section prepared a scaled map for leader use. Similar preliminary sand table instruction is given and operation orders are issued. The difference here, though, is the added dimension of movement not found on the stationary 1:60 scale range. During Table IX, the platoon leader not only controls his platoon's direct main gun fires, but also maneuvers the platoon, albeit over very short distances. 'Set-move' drill is practiced while platoon signals, sectors of fire and leader responsibilities are hammered out. When indirect fires from the 14.5-mm device are added for Table IX², the platoon leader has the opportunity to exercise all the operational aspects of a platoon—direct-fire, maneuver, indirect fire and communications—all on a range of about 800 meters long by 200 meters wide. The company commander and FIST chief fill dual roles as players and controllers during the attack and defense scenarios. The Threat formations are moved over some 5-8 kilometers and the battles last about 12-15 minutes.

Even with all the activities the platoon finds itself involved in, gunnery skills are still of the utmost importance. Battlefield awareness, location and identification of second echelon forces, rapid decision making and reporting that accurately paints the battle picture for higher commanders are all expected of the platoon leader.

Before deploying to Yakima Firing Center for the live-fire gunnery and CALFEX phases, the battalion completes subcaliber battle gunnery with company-level fire coordination exercises (FCX). The subcaliber FCX is a leader exercise played on the 1:10 scale range.

The key players are the battalion commander, company commander, XO, FIST chief, the three platoon leaders and the attached TOW section leader. After a detailed company operation order is given, the platoon leaders and TOW section leader mount their vehicles on the range. Their individual fighting vehicles represent an entire platoon or section. Large baffles erected between their vehicles restrict their view to assigned sectors of observation and fire. The company commander, XO and FIST chief are positioned where they cannot see the range target area. As Threat actions are initiated and targets activated, the commander must rely on the platoon leader's reports to fight an enemy attacking over 8 kilometers in about 12 minutes. The company commander is told that close air support and attack helicopters are available on five minutes' notice to the brigade commander. Between firing the 5.56-mm BREWSTER, directing the bursts of the 14.5-mm artillery, accepting the battle handoff from the covering force, attempting to locate the enemy main attack and suppressing the second echelon with indirect fires to assist the direct-fire fight, the unit leaders really get a workout.

The lessons learned in this type of high stress environment are many, but perhaps the biggest one is that there *won't be enough time* to do everything we want to do to accomplish the mission. But by understanding how the Threat intends to fight and then training to beat him, we can better use the time available to do what is necessary to win.

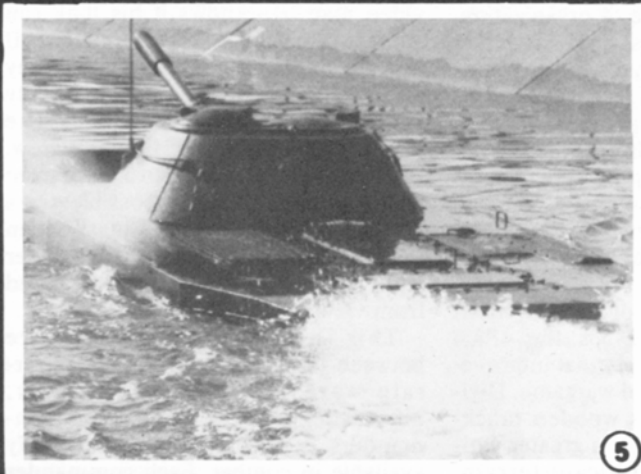
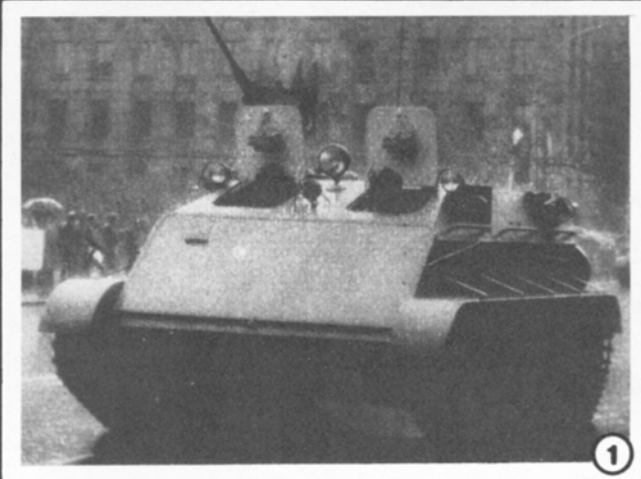
The subcaliber phase of our battle gunnery training program accomplishes the goals we set for ourselves. It combines tank gunnery training with tactical and intelligence training and exposes platoon leaders and company commanders to the resources available on the integrated battlefield. By doing selected portions of this training on a monthly basis, we can better stabilize crews and platoons in spite of high personnel turbulence. The worth of the program is measured when the battalion holds company CALFEXs at Yakima. We are better prepared to fight as platoons and companies rather than as a group of individual tank crews.

RECOGNITION QUIZ

This Recognition Quiz is designed to enable the reader to test his ability to identify armored vehicles, aircraft, and other equipment of armed forces throughout the world. *ARMOR* will only be able to sustain this feature through the help of our readers who can provide us with good photographs

of vehicles and aircraft. Pictures furnished by our readers will be returned and appropriate credit lines will be used to identify the source of pictures used. Descriptive data concerning the vehicle or aircraft appearing in a picture should also be provided.

(Answers on page 49)



New Simulators Provide Greater Realism

by Major James D. Brown, Captain Robert L. Kloecker, and Mr. Jochen Reimer

The greatest achievement of the small computer revolution is the way it has put high technology to the task of solving the ordinary problems of the day. In the armor field, computing power in small, affordable, packages is already working in one allied nation's training scheme, bringing realism to tank combat training.

The device is called an Interactive Combat Simulator and was designed by a Munich-based defense research group, Industrieanlagen-Betriebsgesellschaft. The German firm produced a tank combat simulator over a decade ago in response to directives from the German Ministry of Defense. This simulator, called the *APKA*, is a computer-aided device that supports tactical exchanges of combat power. But unlike most other kinds of simulators, the *interaction* is between two groups of humans who control the forces fighting against each other. The computer is not a protagonist. It does not create situations, nor inject unexpected events, nor limit the flexibility of the opposing forces. Instead, it is an extension of the human participants—moving weapons systems, responding to fire commands—and keeping track in meticulous detail of every event as the battle unfolds. Its original purpose was simple: to use computer technology to create a substitute for the wargames portrayed on scaled terrain boards and ministered by scores of tactical players, umpires, and recorders. The specifications for the simulator envisioned a device which would preserve the best features of the wargame while overcoming some of its most limiting disadvantages. The result was to be a system that would primarily serve the needs of researchers.

The scaled-terrain wargames have long been stock-in-trade investigative tools in many countries, including the U.S. They are used to examine tactical concepts and proposed combat organizations. New weapons systems can be placed in a mock battle context. Combat organizations and their potential effectiveness can be measured. Normally, the wargame was one of several approaches to resolving a single problem. What distinguished it from other research media, though, was the possibility for creating realistic tactical exchanges through the control of both

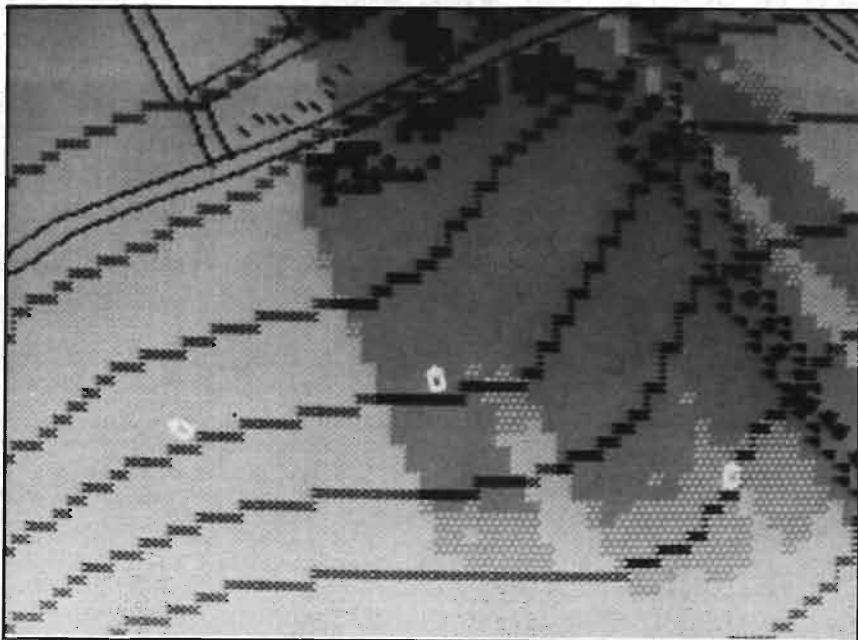


Figure 1. Tanker's eye view of console picture, with tanks in white. Shadings show exposure data.

opposing forces. Experienced military specialists command the opposing forces, hopefully making the same kinds of tactical decisions they would in an actual battle.

Since the wargame is fought on scaled terrain with miniature tactical vehicles, there are great savings in time, equipment and manpower. Even so, the typical wargame requires extensive preparation of terrain and scenarios. Controllers and recorders must be trained and the actions of umpires must be integrated into the flow of the battle.

In full swing, the traditional wargame is a masterpiece of organization. As the battle progresses in, say, five minute intervals, players hurry to displace their units, pass reports or engage in conflict. Umpires hovering about the battle area judge results, sometimes using on-call computer programs to predict relative losses. At the high points of a battle, umpire intervention may cost an hour of actual time for every twenty minutes of battle.

After eight years of development through several prototypes, the *APKA* simulator offers a substantial improvement over the standard wargame. Digitized terrain replaces wooden mock-ups, and makes possible a greater variety of militarily-significant terrain.

High speed computers keep track of all weapons positions and calculate all possible lines of sight in a fraction of a second. Other computers deal with the movement and shooting commands of all weapons' commanders simultaneously. Umpires and their interventions are eliminated, as are the personal biases they may add to the outcome. As a result, the battle unfolds as suddenly in the simulation as it would in reality.

The computer also makes it possible to limit the information which a tank commander receives about his current situation. In the simulator, the commander sees his tank's location on a video map. He knows if his tank can still move and if it is able to shoot. If other friendly tanks are in view, they also show on this screen, as do enemy tanks which are acquired by the computer's imitation of the tank crew. But if the tank is moved to a place from which observation is impossible (in a woods or behind a terrain mask) then the computer prevents the commander from seeing activity that is now masked from view.

This is an important difference between the *APKA* and the scaled-terrain wargame. In the simulator, information used by the weapons commanders is limited to that normally available in combat. Each commander

must rely on radio reports or take some positive action to gain more information, like moving to places where he can directly see the battlefield. In so doing, he risks exposure to the enemy who is, at the same time, trying to win an opposing tactical objective. In the normal wargame, participants have the advantage of an overview of the battle area. No action is required to develop detailed battlefield intelligence.

“...Tables regulate the shooting probabilities and lethality/vulnerability properties of the weapon and its ammunition...”

Terrain Data

The terrain data stored in the computer is a fully digitized representation of a portion of the earth's surface. In principal, any size terrain box can be stored in the computer as long as the computer memory is large enough or one is not too fussy about the level of detail. The current simulator divides a 6.2 x 6.2 kilometer area into one million parts. Each part, about 20 feet square, is described in terms of its elevation (to the nearest 4 inches), kind of vegetation, trafficability, and whether there is a part of a building in that square.

A separate line of sight (LOS) computer uses the terrain data and the updated locations of each weapon system to continuously monitor all possible lines of sight between vehicles. Since this particular simulator can handle up to 40 vehicles at once, there are at any moment 780 possible lines of sight between pairs of vehicles to be surveyed, a workload too great for even a dozen umpires to effectively perform. Moreover, since terrain elevation is accurate to the nearest four inches, the computer can also keep track of the degree of vertical exposure each vehicle presents to its opponents, even if both vehicles are moving.

Weapons Technical Data

Real or imaginary weapons characteristics are stored in the computer memory in great detail. If the weapon commander instructs the computer to move the tank forward, the computer consults data files to see how fast the vehicle can go on this terrain, whether it is going up or down a slope, and whether impassable obstacles will prevent movement. Other tables regulate the shooting probabilities and lethality/vulnerability properties of the weapon

and its ammunition. These data are readily available in research publications or can be estimated, a useful degree of flexibility when examining the potential benefit, for instance, of improved cross-country mobility or greater armor protection.

Tactical Operational Data

These data include the initial disposition of forces at the start of a battle. This enables the trainer or researcher to describe, in advance, a start condition to be used in a given scenario. The start conditions are saved in a computer file. At any time, one of dozens or hundreds of terrain boxes and tactical start conditions can be unloaded and ready for action in less than five minutes. In practical terms, the machine is always ready for the next training or research problem since setup times within the training or test event are nearly eliminated.

Linked Data Processors

These are the computers that do the LOS computations. They also take the tactical command data (movement and shooting commands) of each weapon commander, responding without noticeable delay even if all possible vehicles are moving at the same time. Since every battle action is imitated in these computers, it is possible to record all these activities for replay after the battle (diagnosis) or for later evaluation in detail (analysis). Some kinds of diagnosis and analysis can be combined. For example, if suitable peripheral equipment is included, plots of enemy acqui-

sitions or kill rates can provide worthwhile feedback to participants and evaluators moments after the battle ends.

The simulator packages all these capabilities in a platoon of wheeled transports and trailers (See figure 2). The linked data processors, containing the terrain, scenario and weapons characteristics are all in the computer truck. A single computer operator handles the tasks of loading the data and calling up the required scenarios. Once the trial starts, the operator is free for other duties since no intervention is required during the trial.

The evaluation van contains the computer which provides the analysis and evaluation capabilities. The service trailer provides administrative storage. The visitor wagon, equipped with briefing materials and a video display that provides an overview of the battle in progress, serves an obviously useful purpose.

Vans 1, 2, and 3 all look like figure 3 on the inside. Four of the five weapons commander stations are shown. Each station has two chairs, one for the commander and one for an assistant who acts as the vehicle driver. Each person has a black-and-white TV monitor on which they see the local battle area. Each person has a set of controls to give driving and shooting commands to the computer. The overhead map is an extra three-dimensional picture of the 6.2-km square area in the computer memory. Standard intercom connecting boxes link all commanders in a pseudoradio net.

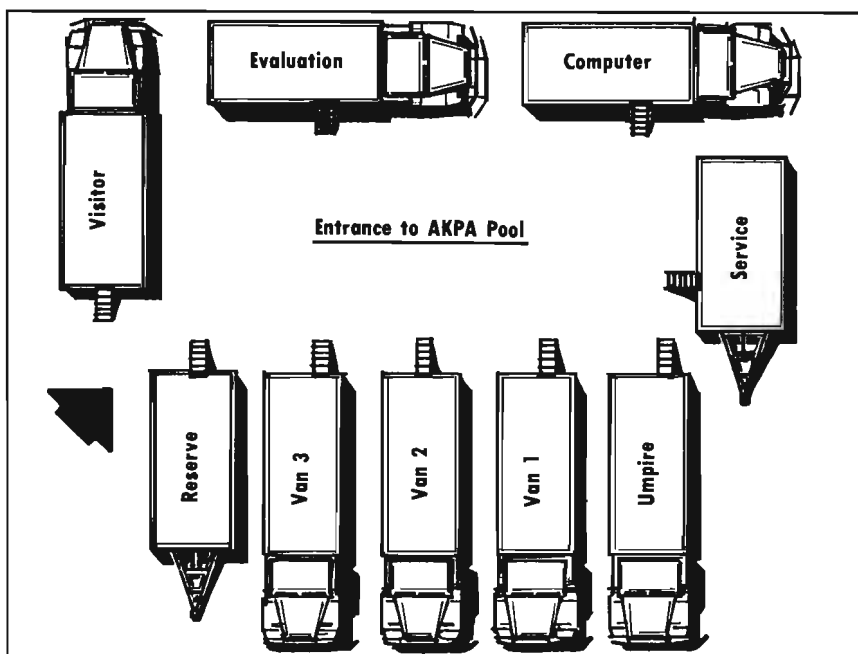


Figure 2. The AKPA simulator, set up in a typical arrangement of vans and trailers.



Figure 1 shows the view on one of the consoles. The video background is a top-down view of a portion of the terrain box. Topographic symbols are fairly obvious: a few roads in the southern portion of the display, some buildings, and contour lines running east-west. Three tanks are sitting in three different kinds of shaded areas, which actually symbolize the degree of exposure the tanks present.

The tank combat simulator is organized to support 5-tank platoons. Ideally, the TCs of an actual platoon would occupy the weapons commanders' seats. Other crewmembers would fill in as drivers.

The participants in the simulations

usually require some practice until the video symbols and target data are easily recognized and used to greatest advantage. For example, drivers must become accustomed to the special movement controls so that they can readily cause the tank to deploy in response to the commanders' orders. Movement controls include a forward-reverse lever and a knob for steering the tank. The driver watches the tank move in response to his inputs by observing a video picture similar to figure 1.

The commander has a similar video picture except he can select an overall view of the terrain box that shows his tank's location as if on a military map. Acquired targets show up on either

Figure 3. Inside view of one of the APKA vans, showing five weapons stations, with seats for tank commanders and drivers. Large overhead maps show entire maneuver area while screen localizes the battle. Tabletop controls allow entry of driving and shooting commands.

view as a distinct enemy symbol. The commander can cause an engagement to take place by using a joystick to move a cursor (a movable dot on the screen) to the target and pushing a fire button. The computer takes over, waiting an appropriate time for a simulated final lay (or weapon reload) and selecting the appropriate chance-of-hit parameter before assessing the engagement result.

Naturally, some improvements of the unit's man-machine interface are possible. One only needs to be convinced that the additional interface properties are important to the test or training objective and worthy of the additional expense. For example, the top-down view of the video map could be replaced by a three-dimensional, horizontally oriented perspective. The commanders' and drivers' controls could be changed if experience shows that some other design improves soldiers' interactive skills.

Training and Research Potential

The German research and development community has already used this

...What the USAARMS is doing...

The Armor Center has recognized the potential training value of interactive simulation systems. An aggressive program is being pursued to develop a family of interactive simulators to provide tactical command and control training at the platoon through battalion levels.

USAARMC is monitoring several ongoing developmental efforts in the area of tactical simulations. One of these is an enhanced version of the APKA presented in the preceding article. Another effort is being pursued by the Defense Advanced Research Projects Agency (DAR-

PA). This project, called SIMNET, is an effort to net large scale simulators over long distances. In addition, there are several other efforts being pursued by the private sector which look promising.

A battalion-level command and control simulator is being evaluated at the Combined Arms Center. This system—Army Training Battle Simulation System (ARTBASS)—is being used by both active and reserve components to improve command and staff actions in a simulated combat environment.

interactive combat simulator in some of its programs. The device was used to study the potential benefits of a tactical vehicle armed with an elevated cannon. Other successful applications include selection of optimal locations for transmitter antennas to maximize area coverage in terrain where there are significant signal masking problems. The device was also used to find nap-of-the-earth approach routes through areas observed by hostile air defense radar.

The simulator's fully digitized terrain and total data capture capabilities make it a useful tool in these applications.

In other tests, the tactical interaction between opposing forces may be of primary interest. There, the simulator's feedback to weapons commanders and rapid line-of-sight processing improves the credibility of the battle outcome: Plots of umpire interpretations are eliminated in favor of exact calculations by the machine. Results can therefore be more closely associated with the leaders' decisions and the technical characteristics of the weapons.

In recent joint tests, U.S. and German researchers have been using the simulator to develop meaningful requirements for artificial intelligence in combat vehicles. These tests looked years into the future, to a time when satellites or sensors could provide battlefield intelligence to ground commanders. These were tests of the human ability to put this kind of technology to use. In other words, the simulator provided a forum for getting an advance look at the human's ability to capitalize on a technological advantage—under the assumption that the technology *could* be developed if justified.

Military observers in these trials have suggested that the interactive tank combat simulator may have interesting possibilities as a training device. They note that platoon leaders and tank commanders are confronted in the simulations with the same kind of command and control problems as they face in combat, except that the conditions are obviously less stressful. A platoon leader must assess the mission and its implied tasks. He must conduct reconnaissance, form a plan and issue orders. During the battle he must take overt action to gain information about the enemy's activities while attempting to preserve the security of his own intention. He must react, reassessing his plan if necessary, as a result of unexpected adversity.

While observing the leader's response during these trials, it was noted that platoons suffered the consequen-

ces when they violated established weapons employment principles. For example, selecting firing positions without providing for overlapping fires in the defense proved disastrous when even one tank was lost to enemy fire. The leaders' improvement in controlling sectors of fire and displacing within their battle positions seemed to reflect a greater appreciation of these principles as the trials wore on.

Similarly, during offensive operations, platoons were forced to wrestle with the conceptual problems that confront junior leaders—such as how to focus mass in the attack and how to effectively coordinate across lateral boundaries. Small unit leaders had opportunities to control small organizations of combined arms by mixing *TOW* systems with tanks in specially-contrived tactical situations.

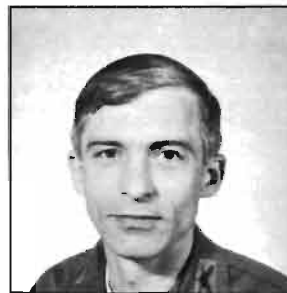
The methods platoon leaders and tank commanders used to overcome their obvious problems were not explainable as gamesmanship. Solutions were most often in the form of revising internal operating procedures in the platoon or changing the rules of the engagement.

Sometimes the solutions were surprisingly innovative, to the point of challenging the *trainer's* notions of what was or was not an acceptable tactic. In one case, two platoons attacking a single objective encountered heavy opposition from the defender. The left platoon suffered losses to the point of being combat ineffective while the right platoon met with light opposition. Yet an opportunity appeared on the left, and the two platoon leaders quickly arranged an immediate tactical tailoring: the right platoon leader placed two of his tanks under the control of the left platoon leader and assumed an overwatch position. The left platoon, suitably reinforced, exploited the advantage and secured the objective. It was not a textbook solution, but just the sort of *street-sense* we claim as an advantage in our soldiers.

It remains to be proven whether such learning in the interactive simulator really means an improvement that will be measurable in battle. But considering that other tactical training opportunities like *REALTRAIN* or *MILES* are hard to orchestrate and even more difficult to analyze, it seems interactive simulations can fill a very big gap in our training of small unit commanders. Also, considering the research possibilities this simulator method also offers, future armor developments in training, doctrine and new materiel requirements are likely to benefit as well.



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Battling for the Initiative

by First Lieutenant Richard D. Phillips



Initiative is the keynote to success in war and upon its possession hinges the fate of nations. Napoleon said, "In war, the moral is to the physical as 3 is to 1." Among the moral aspects he referred to was initiative. With that in hand, the commander is able to dictate how his assets—and, to a large extent, those of his foe—are used. But the availability of assets has never won a battle or a war; only the proper use of assets has brought victory.

The question that arises is, "How can one deny the initiative to an enemy who has a numerical advantage?" The answer lies in hard fighting, the conscious disruption of the enemy's plans, and the acceptance of calculated risks. Hard fighting entails accepting losses, but what it produces is many more losses to the enemy who does not possess the advantages of the defense. More importantly, blunting his thrust wears him down.

The second and third principles go hand in hand. In order to disrupt the enemy's plans, calculated risks must be taken. Disrupting the enemy's plan brings about many things, specifically the waste of his assets and his efforts. He finds that his assets have either been stopped or have been wasted in senseless obedience to orders that can only bring destruction.

The U.S. Army sought to devise a doctrine that would allow it to attrite the enemy while avoiding excessive losses, a doctrine that would give added depth to a numerically thin defense. The result was a defense based largely upon delay which consists of the following:

- Inflicting losses on the advancing enemy by indirect fire and tactical air assets, and then augmenting this with direct fire.
- When the enemy has deployed and is about to close, slipping out of his grasp to a new, or subsequent, position to the rear in order to reinflct the earlier bloody scene.
- When the enemy has been attritted to reasonable numbers, standing fast to blunt his thrust or destroy him.

Although this rather Fabian doctrine sounds quite acceptable, some problems arise if it is realistically examined.

As the enemy advances, the defenders assail him with indirect fire. As the range closes, and the enemy enters the maze of prepared obstacles, direct fire commences. Despite

the sophisticated target acquisition systems now in use, the tank gunner's accuracy will probably be greatest inside 1,200 meters. However, by now, it is time to be moving to the next defense position, a move that can create problems.

If enemy attrition is one of the main goals, then the greatest opportunity for this is being missed. Just as the enemy reaches the most devastating kill zone, the defenders are *en route* to the rear. True, this zone is also the enemy's best range, but the defender enjoys the advantage of prepared positions.

This brings up the argument that the most dangerous moment for the defender is when he begins to pull out of his prepared position. The enemy has begun to close and the defender's vehicles are now leaving the protection of their positions. The defenders can cover their move with smoke, but the newer Soviet vehicles have thermal sights and can see through smoke.

Finally, as the defenders move to their next position, they attempt to gain distance between themselves and their assailants, using the superior speed of their vehicles. Once repositioned, the scene can be set for further attrition of the enemy. This second phase of attrition will be assisted by the defender's artillery. The problem here is that the speeding defender will also be receiving such fire from the attacker, and probably more of it. Therefore, the defender, too, will suffer from disorganization and added to that, his covered and concealed routes may be impassable, or barely passable. Thus, upon entering the new position the defender finds that he has not, in fact, put any space between himself and the enemy, but has only surrendered precious ground. This is not what is meant by hard fighting.

The biggest problem is that the attacker has maintained complete control of the initiative. His movements are unimpeded by prolonged defensive presence and his plans have not been disrupted. He is free to bring the full brunt of his numbers to bear at times and places of his own choosing. For an army based so largely upon the sheer weight of numbers, this is crucial. It must keep up its momentum in order to steamroll its opponent. Under this scenario, it had done just that.

An alternative defensive scheme would be to establish a solid line of positions with the greatest possible depth. Be-

cause the enemy is initially, at least, able to mass great power at points of his choosing, a strong armored reserve must be maintained. Although frontline units are not to remain rigidly in place, they retreat only when they must, after having fought hard for the ground they defended. The enemy, thus, pays for it, and the farther he gets into the depth of the main battle area, the more he will have paid.

It would have to be accepted that some units will be cut off and some destroyed, and that breakthroughs are probable. Thus, the counterattack is the central ingredient in this type of defense.

The enemy is counterattacked as he threatens to break a portion of the line. There are several advantages to this. First, the enemy will have just undergone a baptism of fire which will, hopefully, leave him in a state of disruption. His fighting power is decreased and large numbers of his survivors may be disposed of cheaply. His elements may be strung out and his command and control links weak. He is not organized to defend, but for the continuation of his attack. In this situation, relatively small counterattacking units can achieve decisive results. In addition, the enemy is confronted with unexpected developments as forces descend upon him from unexpected directions (flanks, rear) at his most vulnerable moment. His plan begins to break down and his efforts begin to lose purpose as the situation changes. He is beginning to lose the initiative.

When pressure upon a sector becomes too great, defending units must be flexible enough to adjust. The difference between a delay and a retreat should be noted. A retreat implies one has fought and been forced back. A delay is a planned retrograde movement made in your own time.

It is not necessary to wait for a breakthrough to employ a counterattack. Frontline units may hold a reserve to unleash upon the attacker from an unexpected position or direction, either before or after he has deployed. The resultant chaos may disrupt the attack and provide necessary edge to destroy his main force and then steal his initiative (figure 1).

This idea of the defensive is by no means new. It has been employed successfully over the centuries at many places and has well served many an outnumbered defender. It may be very useful to examine one such instance—the Battle of El Alamein in which General Rommel's German and Italian army, although defeated by the vastly superior British Eighth Army, defied the odds in its successful bid to survive.

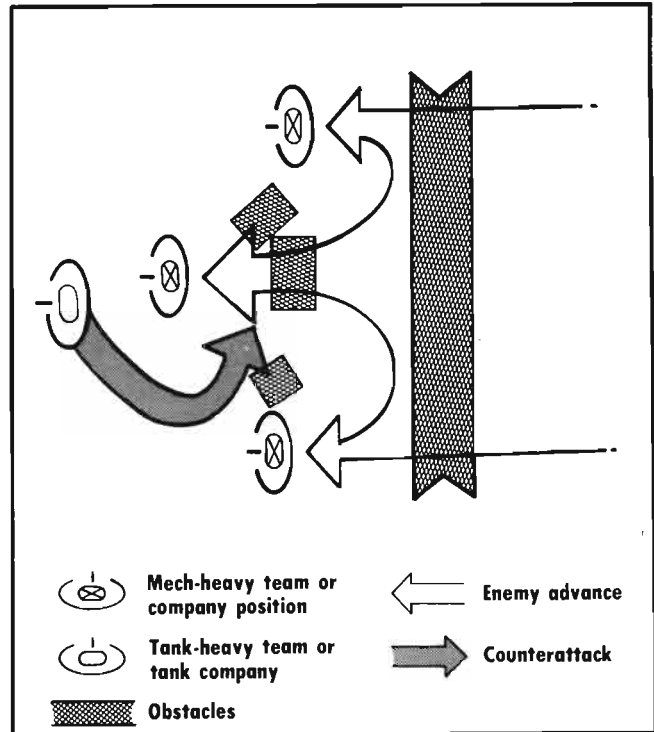
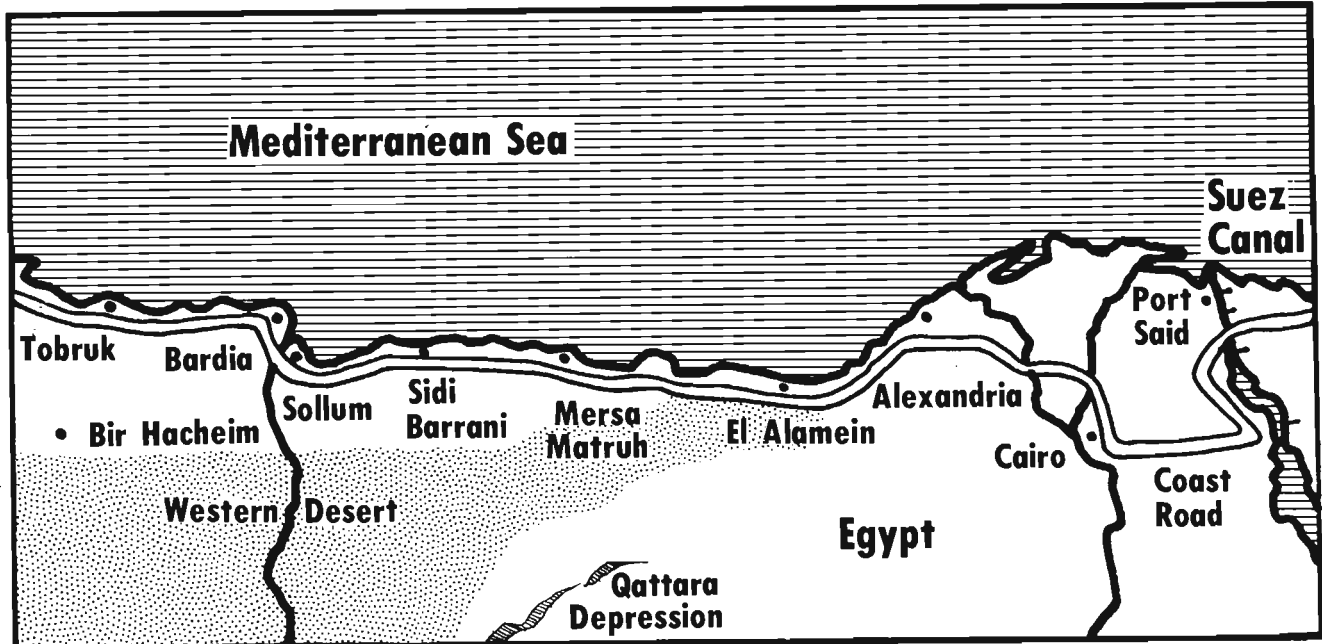


Figure 1.

El Alamein

By autumn 1942, the last great offensive of Rommel's *Panzerarmee Afrika* had run its course. It now stood on the defensive in the narrow strip of ground between the Mediterranean Sea and the Qattara Depression to the south. The list of disadvantages facing Rommel is staggering. The first was numbers—he had about 100,000 men over his 45-mile front, facing an enemy 200,000 strong. Equally important was the composition of the opposing force. A large portion of the Axis army was composed of non-mechanized, immobile Italian infantry. The mobile elements consisted of two German *panzer* divisions and two light and under-armed Italian armored divisions. All were so critically short of fuel that they had only limited mobility. The British had abundant supplies for their mostly mobile force, including 1,300 tanks



to Rommel's 500. The ammunition situation paralleled that of fuel, and the disparity in the number of artillery tubes was overwhelming. Additionally, the British held total control of the air.¹

Rommel had a choice. He could either retreat to a more defensible position and a shorter supply line, or he could dig in. But there were no more defensible positions than those at El Alamein and to retreat without first having embroiled the British armor in a frontal battle would mean losing his slow-moving Italian infantry to swarms of British tanks.²

Rommel dug in. The nature of his El Alamein position offered him his only advantages and he meant to use them. El Alamein was one of the very few spots in the North African theater where the southern flank did not have to be left dangling. The Qattara Depression was completely impassable to fighting vehicles. Any flanking attempt would have to be preceded by a frontal assault aimed at creating a breach, which would allow time for the shifting of reserves. So Rommel manned his line with his dismounted infantry and a thick belt of mines, with the infantry on ridges overlooking the desert. Thus, the disadvantage in mobility would be somewhat offset in the initial stages of the battle by the fact that the British must begin with a frontal assault into the strongly-prepared German and Italian positions. In preparation for possible penetrations, Rommel held the bulk of his mobile forces in reserve³ (figure 2).

The British plan was based on a massive tank and infantry frontal assault supported by equally massive air and artillery preparation. Once successful, the armor would exploit and pursue, after first having destroyed the enemy *panzers* that could be expected to counterattack. Rommel, knowing this, decreed that his positions must be held at all cost and that any penetration would be immediately counterattacked by his mobile forces before it could be extended or defended.⁴

After long days of anticipation and preparation on both sides, the attack began on the night of 23 October 1942. The main assault was delivered against the Axis left center with the 70,000 men and 600 tanks of the British X and XXX Corps against 7,000 men of the Italian Trento Division sited on Kidney and Miteriya Ridges. At the same time, a strong diversionary attack was made on the Axis southern flank. The attacks were preceded by an artillery barrage greater than any since WW I. More than 1,000 guns laid down a barrage on the Axis front lines and then began a creeping barrage to cover the advancing British troops. Because he lacked sufficient ammunition reserves, General Georg Stumme, acting commander of the *Panzerarmee* in Rommel's absence (he was in Germany on sick leave), ordered his artillery to hold its fire⁵ (figure 3).

The British immediate objective was the capture of the Axis-held ridges. But as the British infantry and tanks advanced behind the rolling barrage, they ran into the minefields and were hammered by fire. For two days the British, despite their 10-1 local advantage, groped their way forward with some units reaching the western edge of the minefield but none able to break through. During this period, the stranded units were ripe for counterattack and would surely have received it had Rommel been there. In the meantime, General Stumme had died of a heart attack. Still, the British were on the verge of local defeat. It would be nine days before they would achieve their initial objective. The stiff Axis defense had caused them to temporarily lose the initiative, but in the absence of a strong counterattack they did not completely forfeit it.⁶

Rommel returned on 26 October and ordered a counterattack on Kidney Ridge where the British had set up a defense. Due to the fuel situation and the difficulty in moving units under air bombardment, only the 15th *Panzer* Division and

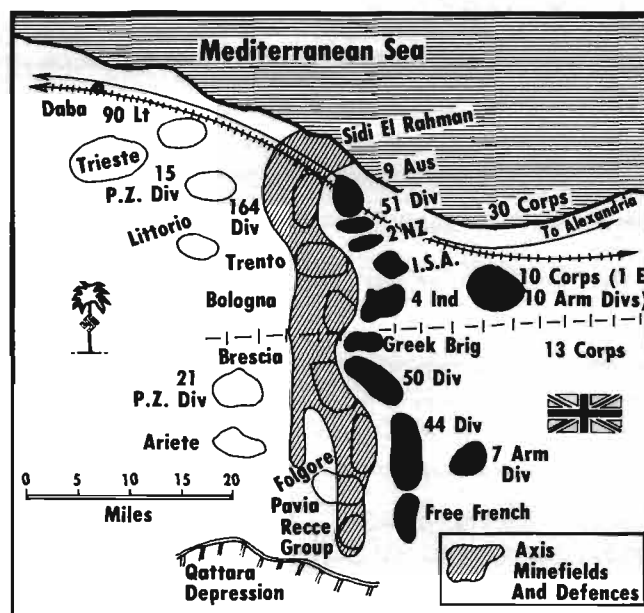


Figure 2.

the Italian Littorio Division took part. Under fire from the air, and from the new British 6-pounder antitank guns, the attack was repulsed with heavy losses. Had the counterattack come earlier, before the British had time to establish a defense, it would have stood a good chance of success. Rommel struck again the same day but the move was broken up by British planes while his forces were still *en route* to their line of departure.

The situation was now critical for both sides. Rommel was almost out of fuel and his ammunition stocks were depleted. He could afford his losses far less than could his foes and his armored forces were dwindling. However, the British, despite their numbers, were also at a crisis. It appeared that they would be unable to break through the stiff defense and they, too, had lost heavily. Two hundred of their tanks were destroyed, three infantry divisions had been mauled, one corps was completely disorganized. At this point, General Montgomery ordered that the attack be shifted in a north-westerly direction, driving out from the salient he had created and cutting off the German units on the extreme northern flank. However, three days of reorganization were required and, meanwhile, the battle ground to a standstill.

A week after the battle had begun, the British, with all their overwhelming advantages, were still struggling to break free. Rommel continually attacked them on Kidney Ridge, but they had their defense set up and he did not have the strength to dislodge them. On the night of 30 October, the new British assault began and by morning their tanks had reached the sea, cutting off much of the German 164th Division. Fortunately for Rommel, he had called up his 21st *Panzer* Division from the south (a calculated risk that left that sector extremely weak) and it, with the 90th Light Division, counterattacked, throwing back the British and rescuing the 164th. However, the Axis forces had now very nearly reached the limit of their endurance and the supply situation was even more critical. Rommel masterfully shifted his forces to relieve pressure from those hardest hit, but although his counterattacks had curbed the enemy's initiative, he had been unable to seize it.⁷

At 0100 on 1 November, the British attacked again with 800 tanks. By dawn of 2 November they had cleared the enemy defense system, but there was to be no chase—yet. By now, Rommel had accepted the hopelessness of his situation and had begun his withdrawal, hoping to retrieve as

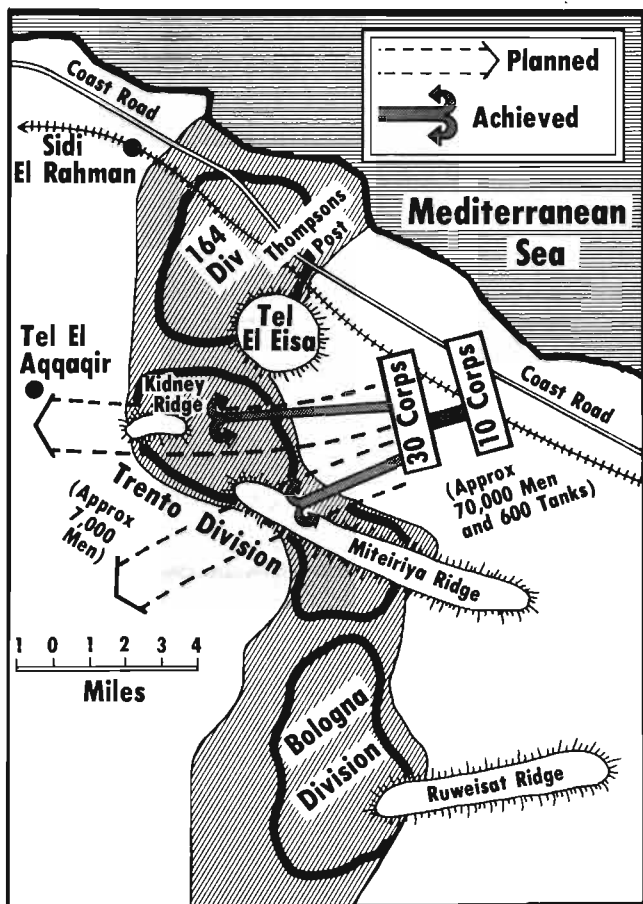


Figure 3.

many of his non-mechanized infantry as possible. Meanwhile, the furious counterattacks of his now pitifully outnumbered armor (he had only 30 tanks left) blunted the enemy's drive. These counterattacks and the resultant British disorganization caused what he termed "astonishing hesitancy and caution"⁸ in the enemy camp and gave him time to slip away while seemingly at their mercy.

Rommel may indeed have pulled off the amazing feat of getting his whole army safely away were it not for an unexpected order from Hitler to stand and fight to "victory or death", an order he received on 3 November. This would have meant death for *Panzerarmee Afrika*. The order was rescinded the next day, but a valuable day had been lost. Even so, the greater part of his army did manage to escape the enemy.

Rommel later described the battle as follows: "In these circumstances (gross inadequacy of supplies, vast numerical inferiority, and enemy control of the air), there was never any chance of the army achieving success at El Alamein."⁹ Yet in a battle that should have been annihilation, he managed to hold off the enemy for twelve days and escaped to fight again. This was achieved through bitter resistance and timely counterattacks. Montgomery's Eighth Army, like that of the Soviets, operated according to strict plans. When they were unable to carry them out, or faced an unexpected situation, chaos ensued. The terrible price paid in the assault, coupled with the fury of the German counterattacks, stole a large part of the initiative that sheer numbers should have given the British and timid pursuit denied them the complete victory that should have been theirs.

Had Rommel the ammunition to expend, or the fuel and air cover to shift and concentrate his mobile forces, it is very likely that he would have completely stolen the initiative and overcome his numerical deficiency through the advantages

of his prepared defense and subsequent counterattacks. Throughout the first half of the battle he was forced to keep the much-needed 21st *Panzer* Division in the south because once it came north there was not enough fuel to send it back and the British had not played their reserve. Due to the complete lack of air cover, Rommel (renowned for his ability to concentrate armor) was unable to coordinate decisive counterattacks and, due to the ammunition shortage, he was unable to bring down his full volume of fire. Still, the skillful use he made of a strong defense and vicious counterattacks allowed him to salvage the situation and achieve the seemingly impossible. He provided a brilliant example of how to deal with a vastly stronger enemy.

The only real hope such an outnumbered army has is to forcibly take the initiative away from the enemy. The defender must be the one to dictate the course of events and force his adversary to waste his strength. The enemy must be faced with situations that are the most costly to him, and be struck at places and time where he is weak or unwary. Confusion has lost many a battle and it must be consciously inflicted upon the enemy.

It may be argued that such a defense would be playing into the Soviets' hands. Their doctrine includes using first echelon units to pin down the defenders while other units follow to sweep around them or to break through. However, much will rely on the ability to counterattack, and the advantages of the counterattack, quite opposed to the disadvantage of the attack, have already been mentioned. Also, much will rely on the strength of the defense and where major thrusts are identified, reinforcements may be necessary. These reinforcements may have to come from less-threatened portions of the front and their movement requires taking calculated risks and the use of considerable skill. However, as weapons become more lethal, they increase the strength of the prepared defense.

Fighting to overcome superior numbers in this manner will be hard, but it will be an even harder fight for the attacker. At any rate, this tactic is far superior to that of simply giving ground. Most importantly, it will allow a chance to steal the initiative.

In the final analysis, that is what will tell; he who can possess and hold the initiative will win.

Footnotes

- 1 Barnett, Corelli, *The Desert Generals*. Viking Press, Inc., N.Y., 1960, pp. 258-9.
- 2 Rommel, Erwin, *The Rommel Papers*, ed. by B.H. Liddell Hart. Harcourt, Brace & Co., N.Y., 1953, pp. 331-2.
- 3 *Ibid*, pp. 297-8.
- 4 *Ibid*, pp. 298-9.
- 5 Barnett, pp. 260-1.
- 6 *Ibid*, pp. 260-2.
- 7 *Ibid*, pp. 264-9.
- 8 *Ibid*, p. 270.
- 9 Rommel, p. 333.

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was commissioned in armor as a distinguished military graduate from the University of Michigan in 1982. He attended the AOBC and served as an M1 tank platoon leader. He is currently a platoon leader in the M3 *Bradley* scout platoon in the 3d Battalion, 66th Armor, 2nd Armored Division, Fort Hood, Texas.



Tactical Smoke Increases Survivability

by Dr. Gerald C. Holst

"It is inconceivable in modern war that tanks should not make use of smoke as fully as is practicable. Aside from the smoke produced on general areas by supporting artillery or aircraft, tanks should have smoke immediately available to them for neutralizing hostile antitank guns and OPs covering their withdrawal and maneuver against hostile armored vehicles, and for many other purposes. This requirement for smoke within tank organization immediately brings up the question as to how it should be produced. Obviously, the simplest way would be to provide smoke shells for the tank cannon. However, the small caliber of the cannon and the limited amount of available ammunition precludes the possibility of developing an adequate volume of smoke by this means. Another method, which has received considerable attention experimentally, is to provide the tank with a smoke-producing apparatus which can be turned on and off at will.

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Traditional approaches to countering the antiarmor threat and thereby improving vehicle and crew survivability have taken the form of better armor, higher mobility, lower profile, and improved fire control. New tactical screening smoke systems offer additional approaches to improving survivability¹ (table 1).

Appropriately deployed, smoke can reduce the probability of being hit and can also further reduce the probability of being hit in a vulnerable area. But to be effective, the smoke system must be highly efficient, well placed, and rapidly deployed. Thus, with new tactics, smoke can counter antitank guided missiles (ATGM) and defeat other advanced electro-optical fire control systems.

Smoke tactics as well as the smoke itself are combat multipliers that may reduce the modern battle to an armored vehicle-vs-armored vehicle fight. On the other hand, improved vehicles will be equipped with sophisticated electro-optical systems that can

Table 1.
Increasing Armored Vehicle Survivability

Traditional Approaches

- Low silhouette
- Camouflage paints
- Quieter engines
- Tactics
- Higher maneuverability
- Shoot-on-the-move fire control
- New armor

Complementary Approaches

- Large area smoke screens
- Decoy smoke
- Rapid smoke grenades
- Vehicle engine exhaust smoke system

operate effectively in currently-fielded smokes.

The Soviets have acknowledged the use and value of smoke with this assessment:

"Now, when the effectiveness of all types of weapons is significantly growing, screening with smoke plays an even more important role in safeguarding the combat operations of troops. It makes observation, aimed fire, and control [of tactical units] difficult and does not permit the use of infrared, television, laser, and other (viewing) equipment."²

Based on C. N. Donnelly's analysis³ of Soviet tactics, the ATGM is probably considered to be their best weapon for supporting the entry of the second echelon into the battle, and smoke is seen by the Soviets as the best way of reducing the effectiveness of NATO long-range antitank weapons. Whenever cover is not available, large quantities of smoke will be used to screen the Soviet attackers and to blind NATO defenders. In fact, the Soviets consider that employing smoke to blind defensive positions will reduce the effectiveness of the defenders' weapons by approximately 10 times.

Actually, the contribution of smoke as a combat multiplier depends upon the effectiveness of friendly as well as Threat electro-optical systems and the tactics used in a smoke environment. Commanders must be fully aware of their own and the Threat weapon's capability in the smoke environment, and they must be ready to exploit opportunities as they occur.

Computerized wargaming⁴ has shown that the use of smoke can reduce friendly losses by 25 percent and slow the enemy rate of advance by 50 percent. Furthermore, tactics and systems used today are derived and improved upon from lessons learned in yesterday's battles.

Smoke Uses

Smoke can be used to:

- Deny the enemy information.
- Reduce the effectiveness of enemy target acquisition systems.
- Disrupt enemy movement, operation, and command and control.
- Restrict nap-of-the-earth and contour approaches for aircraft.
- Create conditions to surprise the enemy.
- Deceive the enemy.⁵

There are four general applications for smoke on the battlefield: obscuration, screening, deception, and identification and signaling.

Obscuration smoke is applied on or directly in front of the enemy to pre-

vent his observation of friendly maneuvers, to degrade the effectiveness of enemy electro-optical systems (including ATGMs), and to adversely affect the movement of advancing units by causing confusion and by forcing the enemy to deviate from his original plan.

Screening smokes are usually placed on friendly positions or between friendly and enemy positions.

They allow vehicles to approach long-range antitank and tank weapons unhindered and allow antitank ditches and minefields to be breached.

Deception smoke is used to deceive and confuse the enemy.

Normally one or more deceptive smoke screens are used in conjunction with an obscuration smoke to deceive the enemy as to friendly force intentions.

As the name implies, identification and signaling smokes are used for these purposes.

Historical Perspective

Although smoke has been used since ancient times, it was not employed systematically until World War I⁶ when screening and deception to protect the movement of infantry reserves and river crossings from enemy observation were its paramount uses. Notably, in 1917, the British used smoke to screen tanks at the Battle of the Scarpe.

Early WW I smokes, which were black, proved unreliable and unstable and were subsequently replaced by white phosphorus (WP). Although the introduction of WP was an innovation in smoke technology, it was used primarily as an incendiary. Concurrent with the introduction of WP, Captain Berger of the French Army developed a pyrotechnic mixture in which carbon tetrachloride and zinc metal reacted to produce a dense white smoke. This mixture was not used either by the U.S. or the United Kingdom (UK) during that war, but it was modified at the beginning of WW II to create the well known hexachlorethane (HC) smoke.⁷

As tactics changed during WW II, smoke became an asset that could be used offensively. After the war, the Chemical Warfare Board studied smoke effectiveness and noted that whenever it was used, there were fewer personnel and materiel losses. However, the use of smoke had its drawbacks in that it changed the appearance of natural and artificial terrain and can pinpoint its source as a potential target. The same is true today.

In WW II, it also became apparent that effective smoke deployment depended upon knowledge of terrain, circumstances, geography, wind direc-

tion, and meteorological conditions. For example, at the Anzio beachhead, meteorologists provided weather data every hour to ensure that the smoke generators were properly emplaced during the 6 consecutive months that the beach operations were smoked in. This is perhaps the best known and longest smoke screen in history, and it permitted 3,500 tons of supplies to be landed every day to support the defensive operations and the eventual breakout.

Elsewhere in Europe, smoke was used extensively for obscuration and deception at river crossings at Arnaville on the Moselle, over the Saar and Roer rivers and at Mainz on the Rhine. In 1944, in the Vysouhuho region, a unit of the Soviet tank army used smoke to hide the true site of the San River crossing.

WW II clearly demonstrated that smoke was very effective in denying enemy observation, thereby degrading the enemy's direct and indirect firepower. In other applications, dummy and deceptive smoke screens caused the enemy to expend large amounts of ammunition against unprofitable targets.

Tacticians also learned that the most effectively generated smoke screen was useless if either misplaced (insufficient time to deploy, wrong wind direction, etc.) or mishandled (insufficient planning, inexperienced operators, poor training, etc.).

During the Korean war, smoke was rarely used, probably due to the terrain and to the fact that our troops were usually on the offensive. In Vietnam, smoke was used primarily for signaling and marking locations.

Then, with the advent of advanced weapons systems, smoke began to play a more vital role. During the October 1973 Arab-Israeli war, Soviet-made ATGMs destroyed over 130 Israeli tanks of the 190th Israeli Armored Brigade in 2 hours. The Israelis had failed to anticipate the lethality of the AT-3 *Sagger* in the hands of the Egyptian infantry and nearly lost the battle for the Sinai and Suez Canal with obsolete tactics. However, it was quickly realized that a smoke screen was excellent for blinding ATGM gunners. Once the Israelis began to support their armor with infantry and started using smoke they began to overcome the *Sagger*.

From WW II until the 1973 conflict, screening agents received minimal emphasis. However, the lessons learned in the latter conflict forced NATO nations to reconsider smoke as a combat multiplier.

The desired smoke agent characteristics, methods of development, and

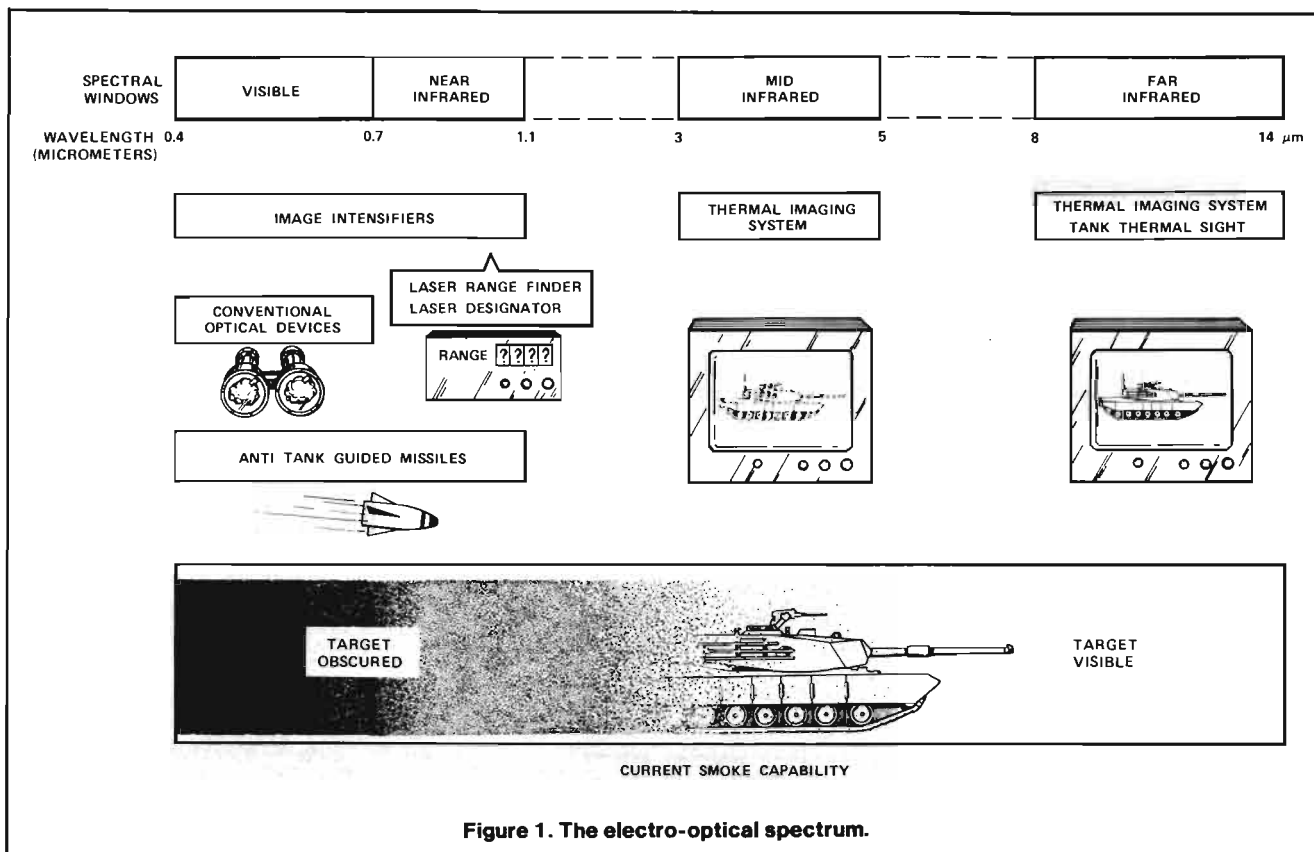


Figure 1. The electro-optical spectrum.

tactics depend upon fully realizing the current capabilities of friendly and Threat electro-optical systems operating in the smoke environment.

Electro-Optical Systems

U.S. and Threat forces are introducing new high technology weapons and observation devices that operate beyond the visible portion of the electromagnetic spectrum.

Figure 1 shows the relationship between wavelength, atmosphere transmission bands, and operating regions of typical electro-optical systems. The transmission bands of interest are the visible 0.4 - 0.7 μm , near-infrared (0.7 - 1.1 μm), mid-infrared (3 - 5 μm), and far-infrared (8 - 14 μm). As shown, WW II-technology smokes (fog oil, HC, red phosphorus (RP), and (WP) can seriously degrade optical systems operating in the visible and near infrared bands. These systems include ATGMs, visual sighting devices, and the neodymium laser, a type used extensively in rangefinders and target designators.

The tank thermal sight (TTS) can operate through fog oil, HC, WP, and RP smoke as long as the target has a heat source to create the required temperature differential between target and background. However, if the accompanying laser rangefinder is a neodymium laser, then the rangefinder can be significantly degraded by smoke. Thus the target is accurately "seen" by the

thermal imaging system, but not by the laser rangefinder.

Several defeat mechanisms are possible with smoke. The particular mechanism available depends upon the type of electro-optical system involved, smoke cloud characteristics, ambient sunlight, and target-background contrast. When smoke is used to defeat a typical ATGM, the smoke may:

- Block the gunner's image of the target.
- Scatter ambient light so that the image cannot be distinguished through the cloud.
- Attenuate light from the tracking flare to the point that the missile tracker in the guidance system can no longer track the missile.

Smoke can also effectively defeat or severely degrade laser guidance systems in which the target is normally designated with a laser spot from a laser designator operated by the gunner or an outside observer. A seeker in the nose of the missile, bomb, or artillery projectile senses the laser spot and guides the ordnance to the target.

Smoke affects these systems by (figure 3):

- Blocking the laser designator operator's image of the target.
- Attenuating either the primary or reflected laser energy to a level that the seeker cannot detect.
- Reflecting the laser spot and making it appear to the seeker to be the

target. The weapon is then guided to the leading edge of the cloud rather than to the target.

The Antitank Threat

The Threat's antitank capability includes the *RPG-7* grenade launcher used by infantry squads, the *SPG-9* 73-mm recoilless rifle used by motorized rifle and airborne battalions, and the *T-12A* 100-mm gun used by the motorized rifle division. These weapons require the firer to see the target in the visible light spectrum and visually aim the weapon at the target.⁸

Antitank weapons of Threat mechanized units include the *ASU-85* self-propelled 85-mm gun and the *BMD* vehicle that mounts a *Sagger* ATGM. These vehicles, as well as the second generation replacements, have ATGMs that are similar to the *TOW* and *DRAGON* in that they are tube-launched, optically-tracked, and wire-guided. Current generation Threat missiles operate in the near infrared band, while future generation ATGMs may operate in the mid-infrared, or far-infrared bands.

Some of these advanced weapons can also be mounted on the *HIND* helicopter and the *T-64* and *T-72* main battle tanks. The *HIND-D* mounts an *AT-2 Swatter* radio-controlled ATGM with a range of 2,500 meters and increased ranging capability is possible with the use of a laser rangefinder.

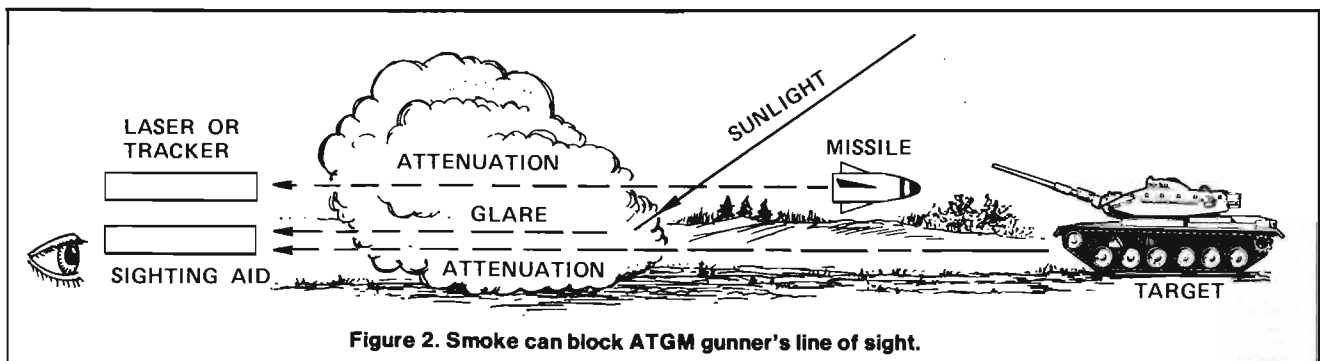


Figure 2. Smoke can block ATGM gunner's line of sight.

With this array, the Threat forces may have a ratio of 25 antitank weapons per 1,000 meters of front.

Smoke Protection Systems

When the analysis of the October 1973 Arab-Israeli conflict revealed the obvious need for the U.S. Army to upgrade its smoke capability, formal smoke research, exploratory development, and advanced development programs were established in 1975. Concurrently, a Project Manager's office for Smokes and Obscurants (PM Smoke) was established to act as the single Army focal point for smokes and obscurants and to provide direction and coordination of all Army smoke programs, including procurement.

The initial thrust of the program was to field systems that could defeat the then-current generation of ATGMs and all electro-optical sighting devices operating in the visible part of the spectrum.

Since 1977, the Army has been fielding a family of smoke grenade launchers to provide self-protection for armored vehicles. These launchers are of two basic types: a 12-tube launcher presently used on the heavier tank-type vehicles, and an 8-tube launcher for lighter weight vehicles such as the M113 family. Both use the UK L8A1/L8A3 RP smoke grenades. This family of smoke grenade launchers was followed in 1979 by a vehicle engine exhaust smoke system (VEESS). These systems, either singularly or in

combination, offer a rapid means to conceal a vehicle from enemy gunners and also provide an opportunity to evade enemy fire. The characteristics of these systems are listed in tables 2 and 3 and illustrated in figure 4.

Although these systems are based on WW II smoke technology, they provide rapid battlefield response and give the desired protection against ATGMs. For example, the Sagger can travel 1,000 meters in six seconds. The rapid smoke system provides screening within three seconds and thus can sever the missile's optical link in mid-flight. Nevertheless, the tank commander must quickly move his vehicle to prevent being hit.

Future Smoke Systems

Electro-optical systems now in development will probably operate in the mid-infrared or far-infrared bands. Therefore, their effectiveness must be countered if we are to retain the significant increase in survivability that our smoke systems now provide. This has been recognized, and programs are underway to devise new munitions that provide protection in all wavelength bands.

Simultaneously with the creation of PM Smoke, the NATO Conference of National Armaments Directors (CNAD) instructed the NATO Army Armaments Group (NAAG) to undertake a study of the antiarmor threat that faced the alliance in the post-1980 timeframe. A special working group of the NAAG prepared a report in which

Table 2. Grenade Rapid Smoke System

Number of grenades	12
Location	6 on each side
Type of grenade	red phosphorus
Cloud height	13 M
Cloud width	38 M
Distance from tank	20-50 M
Firing arc	110 degrees
Time to form effective screen	2-3 seconds
Cloud duration	1-3 minutes
Vehicles	M48A5, M60-Series, AVLB, M88, M1

Table 3. Vehicle Engine Exhaust Smoke System

Type of smoke	Vaporized diesel fuel
Cloud height	10 M
Cloud width	8 M
Time to form effective screen	5 seconds
Cloud duration	Operator determined, Intermittent or continuous
Vehicles	M48A5, M60-Series, AVLB, M88, M1

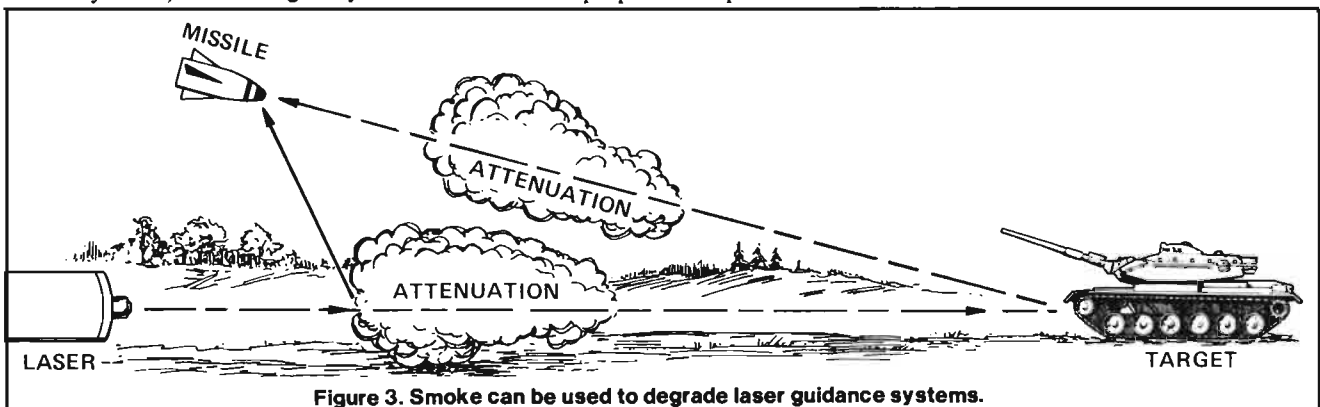
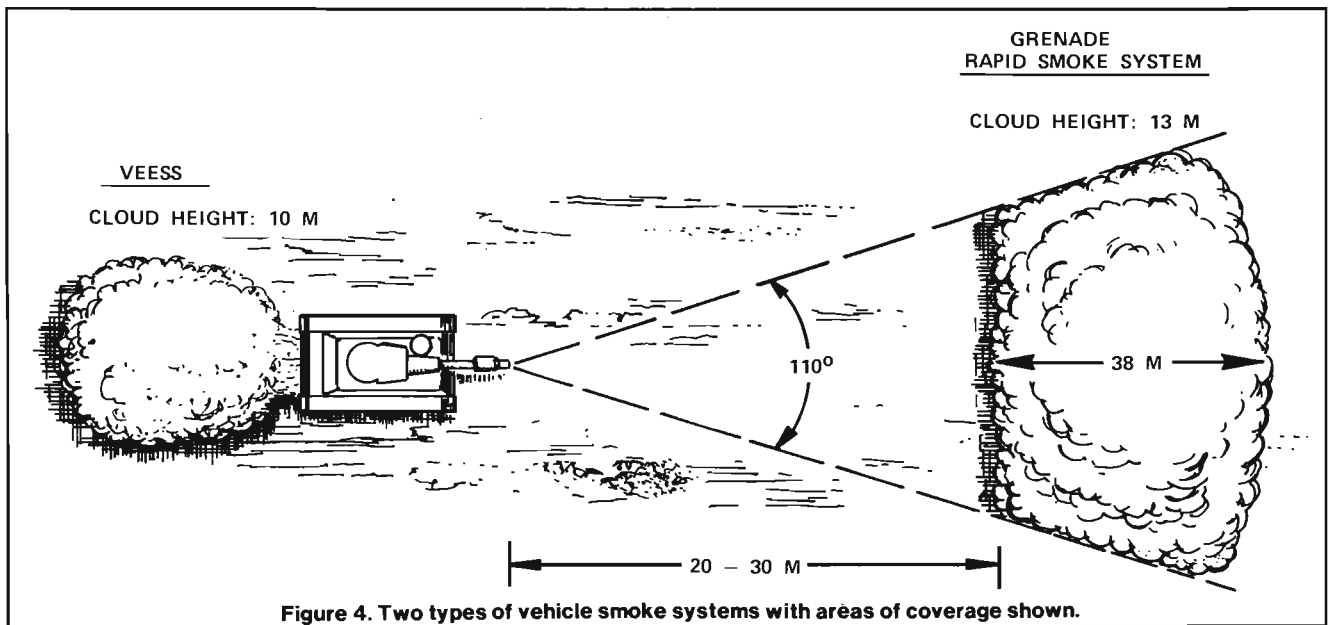


Figure 3. Smoke can be used to degrade laser guidance systems.



some 26 separate tasks within eight general areas of endeavor were identified. Within the general area of countermobility, the subject of anti-infrared smoke was cited and the NAAG agreed to the formation of Project Group (PG) 16 to investigate the subject.

According to PG 16's Terms of Reference, the anti-infrared smoke should be an armored vehicle self-protection system with the capability to defeat enemy surveillance and sighting devices operating during day or night. In addition, the system must have the capability to produce a screen that satisfies the requirements given in table 4. These criteria are similar to the desired operating characteristics of the U.S. infrared screening grenade *XM76* as specified in the "Requirements Document MN(ED) *XMI* Tank." These requirements are also consistent with the RP grenade system now fielded (table 2). The difference is that the *XM76* provides protection at all wavelength bands whereas the RP is primarily effective only in the visible and near-infrared bands.

This six-nation effort (Belgium,

France, Federal Republic of Germany, Netherlands, Norway and the U.S.) conducted two sets of trials, referred to as Summer Trials and Winter Trials. The Summer Trials were conducted in a setting of green foliage at Bourges, France during September 1982 and the Winter Trials were conducted in a snowy, winter landscape at Raufoss, Norway, during February 1983.

These trials were similar to the various annual field trials (Smoke Weeks) hosted by PM Smoke in that state-of-the-art electro-optical system performance was determined in the smoke environment. Likewise, since Soviet smokes are comparable to standard U.S. smokes it is possible to obtain a relative comparison of U.S. electro-optical equipment against the postulated Soviet smoke-induced environment.

As with the Smoke Weeks, the PG 16 trials were designed to:

- Simulate realistic battlefield operational conditions commensurate with the acquisition of meaningful data.
- Minimize any variational effect due to major meteorological parameters.

The quantitative data produces a data base from which:

- Future smokes can be referenced.
- The effectiveness of the smoke for other applications (e.g., mortar, artillery, and pots) can be estimated.
- The effectiveness of the smoke in defeating future electro-optical systems can be estimated.

During the PG 16 trials, eight smoke candidates, plus a reference standard (the UK-manufactured *L8A3* red phosphorus grenade), were tested in 14 trials during the summer and 11 trials during the winter. Thus each system

was tested 25 times and, since each system consisted of 8 or 12 individual munitions, over 2,500 individual grenades were expended. This large number of firings covered a variety of meteorological conditions and permitted statistical interpretation of smoke performance.

At the PG 16 trials, the U.S. presented two different concepts based upon the infrared screening *XM76* grenade. The *XM76* provided excellent screening in the visible, near-infrared, mid-infrared, and far-infrared bands. All candidates tested at the trials had a limited capability to defeat enemy passive surveillance and sighting devices operating in the visible and infrared wavelengths.

Two significant facts emerged from the trials:

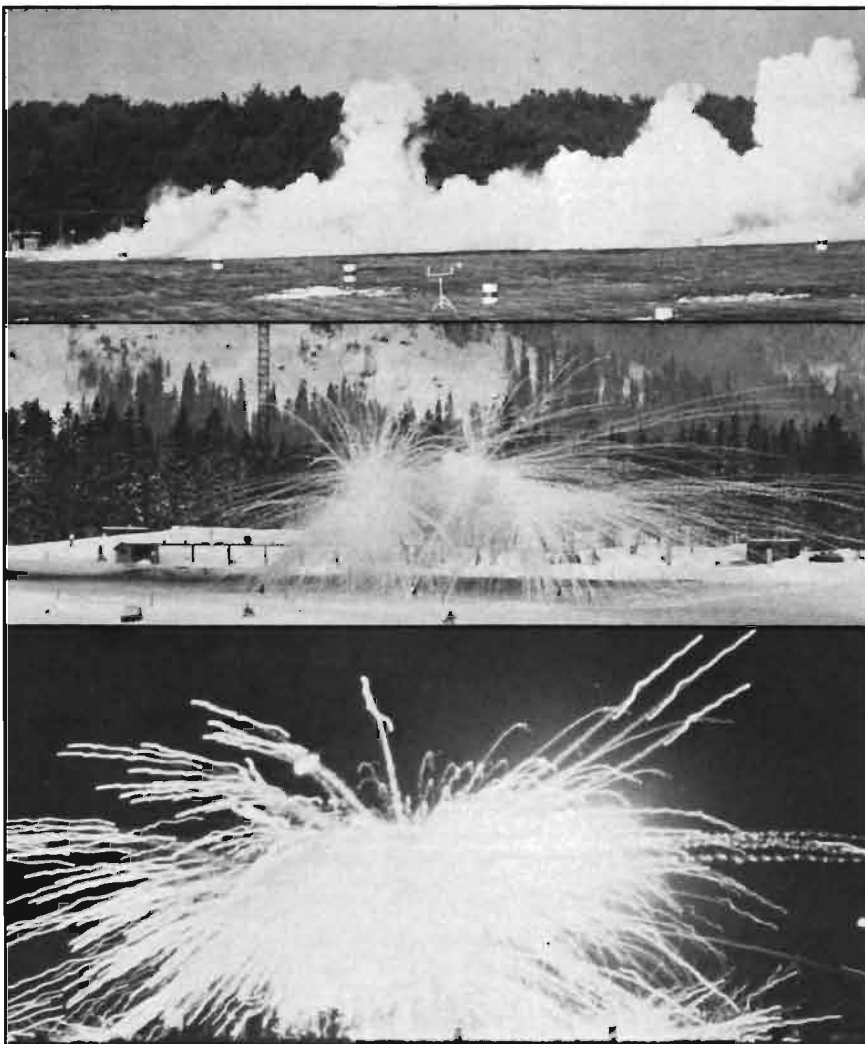
- A comparison of the summer and winter trials data clearly showed that the mean obscuration time for phosphorus-based smokes (RP) (WP), is drastically lower in the winter environment. This is presumably due to the heavier burning phosphorus particles dropping into the deep snow and being extinguished.

- Obscurants disseminated by ground-level burning pots generally did not do as well in the winter as in the summer. The hot pots would melt the snow and the munition would sink. The resultant hole acted as a chimney and changed the dispersal characteristics of the munition.

The trials also indicated that airburst systems such as the *L8A3* and *XM76* grenades rapidly drift away from a static target. This emphasizes the need for new tactics in which the armored vehicle moves with the screening cloud until natural cover is found.

Table 4. Desired Operating Characteristics of NATO Smokes

Angular coverage . . .	110° to 180° arc
Distance from vehicle	30 to 70 m
Height	7 to 12 m
Maximum time to smoke production	3 seconds
Smoke screening time	1 minute



A smoke screen is created by rapid smoke grenades at NATO field trials, top. Center photo shows initial burst of IR screening grenade while photo above shows same grenade in use at night.

These new generation smokes, including the XM76 will soon be fielded and will provide protection against enemy infrared surveillance systems.

Conclusions

Current smoke systems can provide protection against enemy ATGMs and sighting devices operating in the visible through near-infrared and are combat multipliers when appropriately handled and placed. However, if he is to achieve maximum protection, the commander must be fully aware of both friendly and Threat weapon effectiveness in the

smoke environment as well as the effects that climate, wind speed, wind direction, time of day, and terrain have on smoke systems.

To maintain readiness, training in a smoke environment is essential. The National Training Center (NTC) provides such training by:

- Conducting tough, realistic combined arms training at battalion task force level, using live fire and opposing forces in realistic scenarios often in a smoke environment.
- Compiling a data source for training, doctrine, and systems improve-

References

- 1 J. F. O'Bryon, AMSAA, private communication.
- 2 "Under Smoke Conditions," by I. Grabovoy, *Military Herald*, October 1975.
- 3 "Soviet Tactics for Overcoming NATO Anti-tank Defenses," by C. N. Donnelly, *International Defense Review*, August 1979, pg. 1099.
- 4 "Smoke Scenarios and Tactics," by R. J. Washer and LTG Flack. Presented at the Smoke/ Obscurant Symposium IV, April 1982.

- 5 "Employment of Smoke," TRADOC Pamphlet 525-3, 26 September 1980.
- 6 "Smoke Screens: An Historical Perspective," by J. R. Rivello, AMSAA Interim Note 6-48, Aberdeen Proving Ground, MD, August 1977.
- 7 "Smoke Screening," by P. St. Pierre in *Artificial Aerosols*, Naval Research Laboratory Memorandum Report 4197, 11 April 1983.
- 8 "Tank Self-Screening Smoke Systems," Training Circular 17-15-9, 1 December 1981.

ment through lessons-learned documents.

The NTC also has the instrumentation capability to objectively assess casualties and vehicle kills during training exercises.

Elsewhere, NATO smoke/obscurants programs are developing a variety of smoke and obscurant materials that will increase battlefield capabilities by:

- Providing a combat multiplier.
- Countering new high-technology Threat weapons that are being fielded.
- Extending smoke/obscurant technology into the realm of large-area screening rear area operations.

Since there is evidence that smoke can severely degrade the effectiveness of the guidance and control systems of modern weapons, some authors believe that smoke is more effective than high explosives or other suppressive fires in limiting the effectiveness of these systems. A few hundred dollars worth of smoke munitions can prevent a sophisticated missile worth thousands of dollars from hitting its target. Likewise, a few hundred dollars worth of smoke munitions can increase the survivability of our high-technology, high-mobility, armored vehicles.



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The sight of OPFOR smoke hanging heavy in the valleys is a familiar one at the NTC. At right, soldiers of the 194th Armored Brigade begin their rotation, wiring, camouflaging, and preparing tank obstacles. Photos for this NTC package are by Captain Stewart Joslin and Sergeant First Class Dale Butler of the 194th PAO.



Fighting Smart at the National Training

by Captain Michael D. Furlong

(In a relatively short period, the National Training Center (NTC) at Fort Irwin, CA, has become a proving ground for the Army's newest training and tactics and a place to learn. Many soldiers returning from the NTC call it the most realistic training they've ever received in the Army. This month, in two articles, ARMOR presents some of the lessons of the NTC.)

The first is by Captain Michael D. Furlong, who commands one of the motorized rifle battalions that make up the realistic opposing force (OPFOR) at Fort Irwin.

The second article reflects the experience, know-how and wit of Sergeant First Class (P) Richard Wagner, former battalion master gunner for the OPFOR's 1-73 Armor.

Every unit that comes to the National Training Center at Fort Irwin, California, meets essentially the same problems and defeats as do other units. And while this article does not presume to teach the basic tactics of the deliberate attack and the defense, it will, hopefully, point out those problems so that when *your* unit comes to the NTC you will not fall prey to the usual misconceptions about some points of U.S. doctrine that have trapped others.

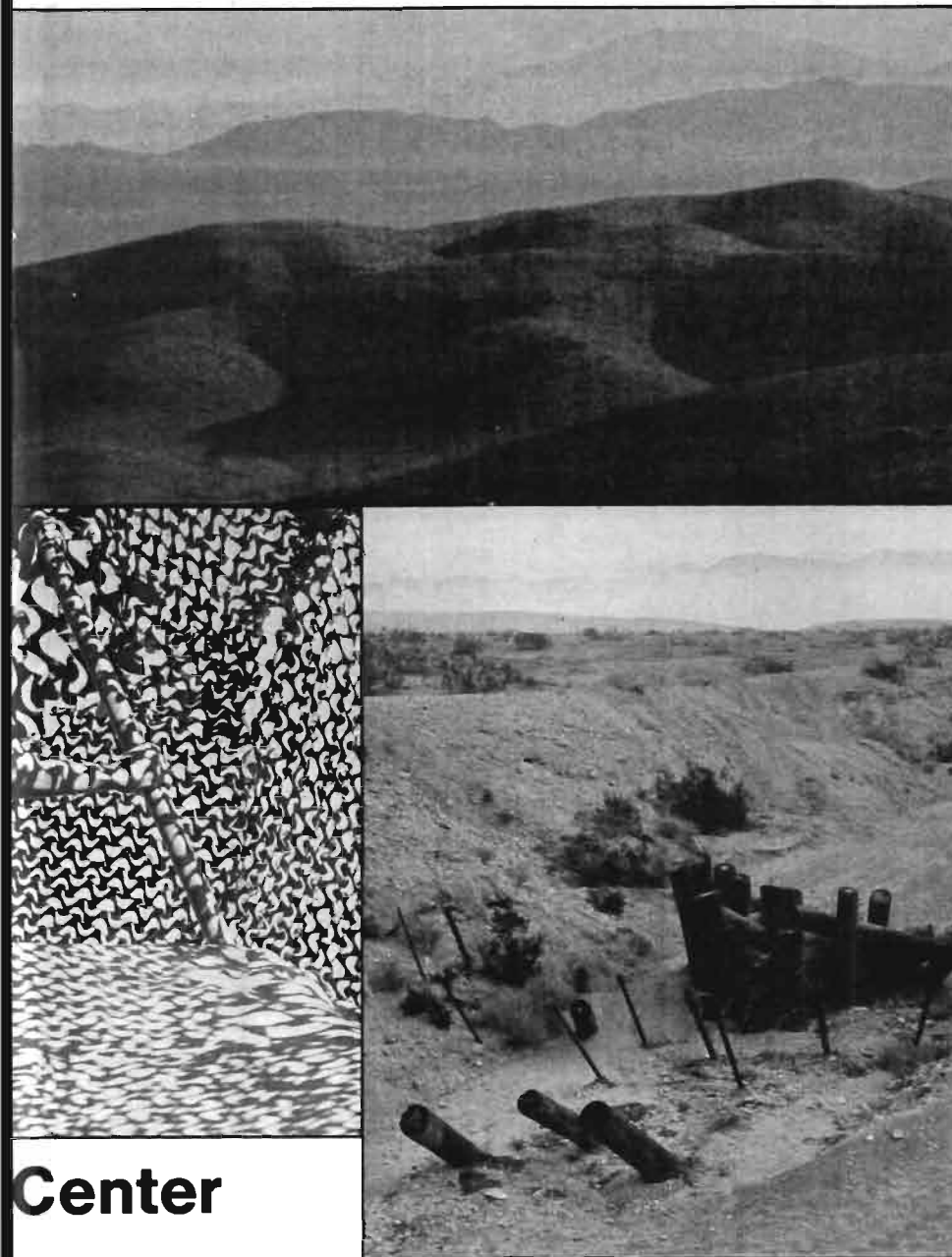
Included here are some training tidbits that highlight tactics that have worked at the NTC — and some that haven't worked. However, it must be noted that these items represent only

“a” way — not necessarily “the” way. Also, the information is based mostly on desert fighting tactics and techniques.

Planning the Deliberate Attack

Reconnaissance. One of the major errors noticed in training units at the NTC is that of *not seeing the battlefield*. Some commanders depend too much upon the intelligence picture as developed by higher headquarters. *It is vitally important that the commander conduct a detailed reconnaissance of his objective prior to initiating a deliberate attack.*

U.S. doctrine states that we attack an enemy's known weaknesses, not his strength. To do this, you *must* conduct



Center

a ground reconnaissance to determine the enemy's strengths, dispositions, orientation, boundaries, economy of force areas, obstacles and other things.

During this detailed reconnaissance, make each company reconnoiter its own tentative route to the objective. Also, look for approach routes for close air support and hide and attack positions for attack helicopters.

The reconnaissance unit should use binoculars, night observation devices and thermal sights to increase its effectiveness. The unit should identify individual tank and *BMP* positions on a large sketch map.

It is also wise to maintain the flexibility of your reconnaissance patrol by

task-organizing it for a combat reconnaissance contingency mission. This combat patrol could breach lanes through obstacles during limited visibility conditions and even leave stay-behind tank hunter-killer teams. These teams could destroy enemy units or smoke his fields of fire at critical moments during your attack.

Doctrine says that we will conduct frontal attacks as a *last* resort. Therefore, based upon the detailed reconnaissance information you have received, you can isolate the bulk of the enemy's strongholds and concentrate your combat power on an economy of force area, a boundary, or a weak flank, to obtain at least a 6:1 force ratio. Your

plan should allow you to attack an enemy platoon with two reinforced companies while suppressing the rest of their defense with a small fixing force, large volumes of smoke, and artillery. You may add attack helicopter fires or close air support fires to the fix force as well.

Planning Time. Your companies need time to obtain this detailed reconnaissance information. This is why it is imperative for task force commanders to give their subordinates about two-thirds of the available planning time. It takes a lot of time to draw up a sound plan. However, General George S. Patton once said, "A good plan today is better than a perfect plan tomorrow."

Another misconception in the planning process is that you must accept all orders and graphics from higher headquarters without question. Higher headquarters can make mistakes, and it never hurts to ask for a clarification or a change to the order or graphics.

Because of the real-world succession of command problems on the MILES battlefield at NTC, it is important for leaders down to squad level to be fully briefed about your attack. A picture is worth a thousand words to any young noncommissioned officer, so make sure that the graphics are on every map down to squad leader level.

Planning Considerations. Because of the extremely long attack routes across the desert at the NTC, be certain you plan your attack in phases. Use key and critical terrain for intermediate objectives because it is vital that you control the key/critical terrain features within your boundaries and along your axis of advance.

Your tactical formation for a deliberate attack needs to be flexible enough to enable your task force to quickly mass its combat power. If you let an OPFOR motorized rifle company in prepared defensive positions engage and destroy your lead elements before you can mass your total combat power, you will be destroyed piecemeal. This happens quite frequently.

In the deliberate attack, the task force will usually attack a company. Attacking with 3:1 odds ensures success only if you use your ingenuity to achieve 6:1 odds for short periods of time at a critical place. Also, you must avoid being piecemealed into engagement areas. The key is to *know where your enemy is* and to know exactly at what point on the ground you will have to muster every asset in your combined arms team to overpower him.

Fire Support. In planning fire support for your scheme of maneuver, you will make much better use of your indirect

fire assets if you direct them to conduct specific missions. Giving them strictly general support (GS) or direct support (DS) missions makes them less prepared to support specific preplanned missions such as smoking the objective. Decide which unit is best suited for the mission, assign it to that unit and they can stockpile the right assets to do the job well.

Another way to improve fire support responsiveness is to develop a list of Target Reference Points (TRP) that you can use to track the task force or company's forward movement. You call your support artillery or mortar unit and give it the TRP just ahead of you. The indirect fire unit will then set the data on its guns. While you are under the influence of that TRP, and if you receive enemy fire, the response time of the indirect fire support is only the time of flight of the munitions.

While the maneuver units continue to call TRPs ahead of them as they move, the indirect fire unit 'dry fires' the support of the maneuver unit until contact is made. If needed, immediate suppression can be quickly laid on and can be easily adjusted.

Synchronize all your combined arms assets. After the intelligence data are analyzed, determine where and how you will mass the power of your direct-fire weapons, attack helicopters, close air support, smoke and electronic warfare assets simultaneously. If you know your enemy, then synchronization of your attacking team is easier to achieve.

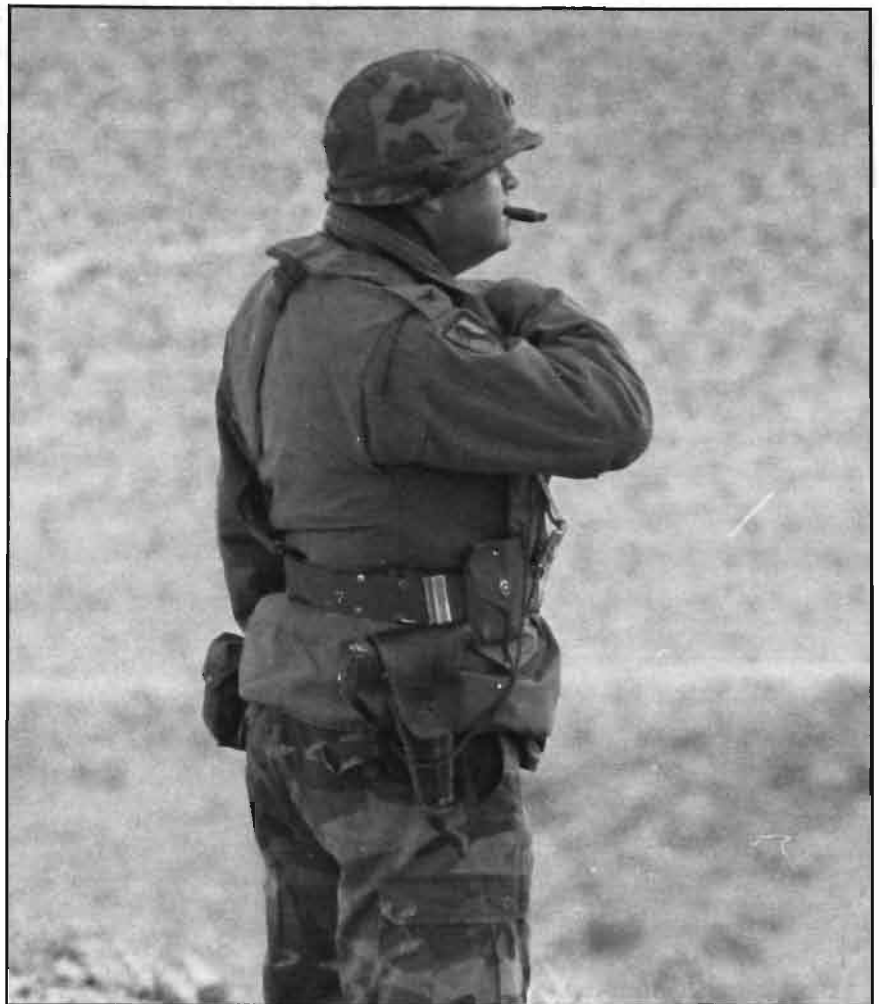
Executing the Deliberate Attack

Battle Drills. The best way to achieve smooth execution is to formulate and rehearse battle drills. Coming to the NTC without detailed and rehearsed battle drills is like going to the Super Bowl and making up your plays in the huddles.

As a minimum, companies and battalions need to formulate and repeatedly practice the following offensive battle drills:

Breaching obstacles; immediate action drills against direct fire, indirect fire, air attack and NBC attack; changing from tank lead to infantry lead; massing units on line; conducting fire concentrations or fire distribution and, fire and movement.

Your battle drills need to be very explicit. For example, each man in every armored personnel carrier (APC) should know what his exact role will be during a breaching operation. The drill should pinpoint who will suppress the far side of the obstacle, who will throw the smoke (or call for it), who will breach with grappling hooks,



and who will secure the far side of the obstacle. These SOPs must be rehearsed until they become instinctive drills.

Elaborate materials are not needed to clear lanes through most obstacles. At the NTC, it has been repeatedly proven that a handful of infantrymen with D-handle shovels can breach a first-rate tank ditch in a matter of minutes. They don't fill it in, they simply cave in the approach and exit walls so that tanks can ease into the ditch and power out.

Make sure that every APC carries a few shovels and grappling hooks. If you give them a smoke pot or two, they will be able to handle almost any breaching operation.

The NTC is predominantly tank lead country. But when you are receiving effective antitank fires, run into restrictive terrain, get stopped by an obstacle, or are operating during limited visibility, doctrine says the infantry takes the lead. You must be able to switch your lead *without stopping* your attack.

A Typical Scenario

A typical scenario of an attacking task force at the NTC follows:

The task force attacks with two teams abreast and one back. The two lead teams are usually about 2,000 meters ahead of the trail team. The scouts are screening a flank and the GS *TOWs* are in overwatch without their tracker heads up. The lead companies come under fire and quickly lose the bulk of their lead tank platoons. Everyone runs for a gully, stops, or backs up. Incomplete reports are sent back to the task force tactical operations center (TOC). Eventually, the mounted infantry are called forward to estimate the situation. They move around the dead lead vehicles and are also killed. A shocked lull follows and then more vehicles are ordered forward. They are also destroyed and the OPFOR security platoon then withdraws to the main defense belt. After a long lull, the frag order to continue the attack is given and the task force (now definitely minus) begins to move forward. This time, the OPFOR waits until the lead vehicles reach the *T-72* trigger line and they open up throughout the depth of the task force's formation. All but a few vehicles are killed. After some reporting and reorganization, the handful of sur-



An OPFOR motorized rifle battalion races across the desert as the attack begins. Colonel Arthur T. Carey, at left, the 194th Armored Brigade's deputy commander watches his men react. One of the Brigade's M60's, right, moves up with all eyes scanning the landscape.



living vehicles make one final cavalry charge. They die.

Lessons Learned

There are proven ways to prevent all this happening to your task force.

First, you must look again at the fundamentals of the offense. You can use many different techniques, but you very rarely are able to violate the fundamentals and remain successful.

If you don't use every intelligence asset available when developing your plan, then you are violating the first fundamental — *see the battlefield*. A problem well-defined is a problem half-solved. So, get an accurate picture of the enemy on your objective, then you will have a better start in knowing just how to take that objective.

Seeing the battlefield is a continuous and ongoing process. It *begins* with your initial reconnaissance and *continues during the battle* with accurate, timely and complete reports from your scouts and other lead elements. You must be able to continuously account for all the enemy's subunits in order to outmaneuver him. On the NTC battlefield, outmaneuvering the OPFOR is a big part of the battle.

See the battlefield with respect to *key and critical terrain*. Control this terrain and you control the battle area.

Some other vital observations regarding NTC training include:

- Lead units must do a better job at giving complete and accurate spot reports. The quality of your frag orders during your attack will be directly proportional to the quality and quantity of the intelligence information you receive during the battle.

- Your unit should never be surprised during a deliberate attack. You should know where every enemy unit is and when to expect contact. If you have this information, you will ultimately be prepared to overpower the OPFOR at the critical point and time.

- Use weapons systems to their best advantage and *concentrate overwhelming combat power*. These things are easier said than done.

Long, slow formations that don't provide you the ability to quickly mass your combat arms assets are doomed to failure. You must be in the optimum formation that can concentrate and distribute fires at 3:1 or even greater ratios. If your formations call for long co-

lumns that can achieve only 1:1 ratios against prepared defenses, then you need to reexamine your way of doing business.

Your reconnaissance efforts should give you a good idea of when to expect contact. Your scout elements should confirm your expectations. Then the companies and the task force can move into the right formation immediately prior to contact.

- Don't forget to prepare the battle area with smoke to assist your high speed assault. The idea is to take away the OPFOR's fields of fire while you close on the OPFOR faster than they can combat you at close range.

- Remember, the *M113* APC is nothing more than an armored taxi. It was designed to get the infantryman to the objective quickly and ready for the ultimate mop-up at the objective. The APC is not a true fighting vehicle. The *M2 Bradley* is another thing altogether.

This APC misconception is costing a lot of casualties in the units training at the NTC. If several of the lead tanks are getting killed at the front of your formation, then you are probably re-

ceiving effective antitank fire. Doctrine says to send the infantry forward. But, if your tanks are getting killed, then your APCs will surely get killed as they bolt forward. So, dismount your infantry, along with dismounted *TOWs*, *Dragons*, *Vipers* and small arms. Move them forward quickly, using covered and concealed routes, to root out the OPFOR from their prepared positions.

This does not stall your momentum if you've been held up. You can't stall what you never had. Momentum is firing and maneuvering on the enemy and gaining ground. If you are dying without gaining ground, you never had momentum to start with.

Once the infantry gets the enemy moving out of his positions, your *TOWs* and tanks can start picking him off. Synchronize the use of *TOWs*, tanks, artillery, mortars, attack helicopters, close air support, jammers, smoke, etc., during the lull created by the dismounted operation. Conduct a swift assault on a flank or other weak spot when everyone is ready. Penetrate this area and begin to roll up the OPFOR's flank.

By penetrating his flank and getting some depth into his rear, you begin to win his entire initial position by maneuver alone. The OPFOR units out in front are not in contact and are endangered by being cut off or flanked.

- If you run into small pockets of resistance, think about fixing them and then by-passing them with the bulk of your forces. This will aid you in gaining, and keeping, momentum. That pocket of resistance may then have to withdraw. However, such a bypassed force can be troublesome and you should have some tank and *TOW* assets at the rear of your attack formation moving their tubes over their rear decks to prevent being shot from behind.

- Once you get the OPFOR on the run, *pursue him relentlessly*. You can run forward faster than he can run backward. If you stay tight on him, you can follow him through his own passage points and use his safe lanes to get through his obstacles. Don't give him an opportunity to set up in any of his hasty positions. Use two-thirds of your force to keep the pressure on him while the other one-third stops and takes well-aimed shots at the running enemy.

Gunnery Skills. Finally, gunnery is the basis for all success. All of the fancy tactics in the world won't help the unit that can't shoot.

The good units at NTC have first-class gunnery skills.

Defensive Lessons

Aside from being commander of the 1st Motorized Rifle Battalion in the OPFOR at the National Training Center I am also a mechanized infantry rifle company commander when not portraying the OPFOR.

My company conducted its Blue ARTEP over the same type of terrain that rotating battalions used during their training. We were evaluated on the movement-to-contact, hasty attack, deliberate attack, and the defense. When our company teams negotiated the ARTEP, we were opposed by a motorized rifle battalion from the OPFOR regiment and were evaluated by the same observer-controllers who observe units rotating through the NTC.

In our company team defense, we learned that a company can stop a motorized rifle battalion with a 16.5-to-1 kill ratio and remain totally combat effective in the process.

The following tips and comments are based on the most frequently observed shortcomings of battalions that train at Ft. Irwin during defensive operations.

Mission Understanding

Many of the commanders and staff officers of the battalions that rotate through the National Training Center do not understand their missions. It is not uncommon to see a unit receive a *defend in sector* mission only to see them execute a *retain the terrain* mission.

Begin by understanding the terminology of current doctrine:

Defend in Sector means to attrit the enemy as far forward as possible, using a maneuver style defense, without becoming decisively engaged (not losing its ability to maneuver). It is implied that the battalion retain its rear boundary. This means accepting decisive engagement and stacking the enemy up in your protective wire if necessary.

Delay in Sector for the battalion means to conduct a defensive operation which attrits and slows the enemy — by trading space for the time — while the battalion preserves its combat power. The headquarters issuing the order should specify whether or not the battalion will conduct a high-risk or low-risk delay. In a high-risk delay, the battalion is more concerned with holding specified terrain for a specified period of time than it is with the preservation of its force. A low-risk delay is more concerned with preserving the combat power of the unit than it is with holding terrain.

In any case, the idea is to attrit the

enemy while trading terrain for time. If the battalion loses all of its combat power well forward in the sector, then it has failed its mission. The battalion has to be able to mass its combat power (mainly tanks and *TOWs*) in the initial engagement areas to inflict maximum casualties on the enemy quickly, then disengage under pressure before losing any of its combat power. Artillery, smoke, CAS, attack helicopters, and a good countermobility plan will ensure a successful engagement.

If you can't get the higher headquarters to articulate the type of delay they envision, then conduct a low-risk delay forward and a high-risk delay as you near the rear boundary.

Retain the Terrain can be a specified mission or an implied mission. As previously stated, when defending in sector, the implied mission is to retain your rear boundary. When preparing to retain terrain, you must plan to accept decisive engagement and the resulting dismounted assault. Your obstacle plan must, therefore, support the possibility of a dismounted assault. Moreover, your indirect fire plan should feature registered final protective fires (FPF) so that you can bring to bear all combined arms assets at the critical place and time to stop the enemy in front of your rear boundary.

A strongpoint defense is a heavily fortified defense which is the classic retain-the-terrain mission. Granted that all retain missions won't be strongpoints but, the unit must prepare to retain terrain in that kind of detail.

Fire-from defensive positions are usually battle positions which support small subunits of the battalion or company while they fire a specified number of well-aimed shots at the enemy. The shots will be at the maximum weapon standoff. These long and medium-range weapon systems will fire from one to three shots and leave immediately, not stay and fight or accept decisive engagement.

A fire-from battle position is useful when you have a small piece of dominant terrain that affords the defender an opportunity to inflict heavy casualties on the attack early without paying any price in combat power. A fire-from position is not too much different than a glorified ambush position.

The reason you don't defend from a fire-from position is because you may not have an optimum withdrawal route or it may be a piece of terrain that doesn't have good mutual support from other positions. These positions can support a few well aimed shots and withdrawal, but they cannot support a prolonged defensive posture.



A favorite OPFOR trick is to occupy the tank ditches intended to keep them out. Here, two T-72 VISMODs seek hull defilade.

Analyzing the Mission

The battalion commander and his staff must first analyze their assigned sector from well in front of the FEBA, from the flanks, and throughout the long axis of the sector discerning possible avenues of approach.

Next, they must know the enemy's organization and capabilities. Judging from the maneuver space available, you then determine the size of enemy force that can maneuver on the particular avenue of approach. Knowing the enemy's organization will assist you in determining the number of medium and long range weapons systems (tanks and *Saggers*) that you are likely to fight.

Analyzing the mission will define the exact type of defense. If it is a retain-terrain mission, you will organize your assets to kill in one major engagement area. If it is a defend-in-sector mission, you will look for several engagement areas in depth along the avenues of approach into your sector.

Once you have determined where the enemy is likely to come from, in what numbers, and how you are ordered to stop him, you select engagement areas that dominate the avenues of approach.

You then must determine how you can achieve at least a 1:3 force ratio in each engagement area. This force ratio is calculated by counting the number of tanks and *TOWs* that you have to stop the enemy's expected number of tanks and *Saggers*.

Build your defense around the tanks

and *TOWs* first. These medium and long range weapon systems get first priority for siting on key critical terrain. Then you build battle positions around these tanks and *TOWs* with your infantry assets.

You plan these battle positions in depth with the intent of maneuvering and attriting the enemy in your sector until you whittle him down to a size where you can defeat him by direct fire or counterattack him successfully.

The next phase of planning the defense is to analyze where obstacles will be placed. You may need to reinforce terrain to channelize the enemy into kill zones. Obstacles may also be used to hold the enemy within your engagement areas, thus multiplying your combat power. These obstacles will also afford you a mobility advantage when disengaging.

Skillful use of tank ditches and similar delaying obstacles also bring *Dragon* and *LAW* weapon systems into the battle.

Finally, adding other combined arms assets such as artillery, attack helicopters and close air support must be planned to bring maximum fires on the enemy at the key places and times.

Controlling Defensive Fires

In order to conduct an efficient defense you must plan and control fires to prevent overkill in some areas and no killing in other areas. Divide engagement areas with markers on the

ground. Controlling fires also involves selecting limited visibility firing positions for night defenses or for use against heavy smoke. You must have a contingency plan in case the enemy smokes your fields of fire.

All of the above items must be considered and articulated into a well written and graphed order. Since a picture is worth a thousand words, you need detailed graphics (overlays) to clearly portray your wishes. These overlays should become more detailed at each echelon below battalion. Squad leaders and above should have these graphics on their maps.

A significant item in the orders packet for team commanders is the execution matrix, which will assist commanders in the control and execution of their fires. A typical matrix is seen in figure 1.

Extracting Team A's instructions from this matrix will yield this mission. Team A will defend initially from battle position 7 with a primary engagement area of 40 and an alternate engagement area of 41. Team A's subsequent battle positions are 71 and 75 with primary engagement areas of 48 and 30 respectively. The alternate engagement areas are 49 and 31 respectively. Team A will emplace obstacle B on the operations overlay.

Obviously, the overlay must include all battle positions and engagement areas.

Understanding the mission, analyzing the mission and terrain, and articu-

Defensive Execution Matrix

	Occupy	Prepare	Recon	Remarks
Team A	BP 7/ea 40,41	BP 71/ea 48,49	BP 75/ea 30,31	Emplace Obstacle B
Team B	BP 8/ea 80,81	BP 83/ea 42,43	BP 84/ea 32,33	Emplace Obstacle D
Team C	BP 9/ea 90,91	BP 92/ea 60,66	BP 95/ea 35,36	Emplace Obstacle G
AT Plt (-)	BP 5/ea 40,41	BP 57/ea 42,43	BP 96/ea 31,30	Fire from BP 1/ea 11,13
AT Plt (-)	BP 2/ea 90,91	BP 29/ea 66,60	BP 97/ea 33,32	- - -

The defensive execution matrix pinpoints each subunit's defensive responsibilities, listing battle positions and primary and alternate engagement areas to be occupied, prepared, and reconnoitered. Team A, for example, is to occupy battle position 7 with primary responsibility for engagement area 40 and secondary responsibility for engagement area 41

Figure 1.

lating that plan are not enough to ensure success in the defense. You must vigorously supervise the preparation and execution of the plan. This critical execution phase is where most battalions falter at the National Training Center.

On numerous occasions, battalion commanders come to after-action reviews (AARs) only to find that their well laid plans were not executed as they intended. For example, a team may not have emplaced a key obstacle because the bulldozer didn't show up or a team commander was misoriented and occupied the wrong battle position. Mistakes like these can cause big holes in the defense.

That is why nothing can replace trooping the line to make sure every weapon system is located in its assigned battle position and that it is firing into the intended engagement area. Moreover, the commanders and S3 must supervise the efficient use of attached assets like the engineers.

The engineer platoon leader must be given a priority of work for counter-mobility and survivability positions. There should be a contact on the ground to make sure each obstacle and survivability position is to the specifications intended. If possible, two crew shifts should be assigned to each bulldozer and bucket loader so that these key assets can work around the clock.

Supervisors must ensure that each obstacle is in fact a *working* obstacle. All too often obstacles are not adequately constructed to really stop the enemy's vehicles.

Tank ditches need to be at least 10 feet across and five feet deep. Concerti-

na obstacles should be at least three rolls deep and two rolls in height in the center and be staked down. If the obstacles don't meet these minimum standards then the OPFOR will just run through them.

If you want to multiply your combat power with obstacles, then you must cover the obstacles by fire. If the obstacle can be bypassed, then make sure that you cover the bypass route by fire. Don't forget to plot priority artillery targets at your obstacles.

Almost every rotating unit underestimates the speed and maneuverability of the OPFOR. Once the OPFOR reaches its combat line formations its speed can reach up to 20 miles per hour. About one-third of the massed vehicles will fire from the short halt. The other two-thirds will continue to close on your position at 20 miles per hour. That kind of speed translates into a battlefield minute that covers over 500 meters.

Because of this speed, you must have a countermobility plan to slow the OPFOR down in your kill zone so that he can be killed in great numbers prior to your disengagement. It is essential that your subunits recon routes of withdrawal to their subsequent battle positions. These withdrawals must be overwatched and timed so that you can calculate when you must disengage.

U.S. Army forces do NOT get DIP (Die in Place) missions. It is not part of our doctrine.

During withdrawals in daylight, TOWs disengage first, followed by infantry, then tanks.

In withdrawals during limited visibility, TOWs leave first, followed by

tanks and then infantry.

One last point in controlling the execution of the defense involves communications. Radio nets are too cluttered. You must establish wire communications for responsive command and control.



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Lessons from the OPFOR

by Sergeant First Class (P) Richard Wagner

The OPFOR rules the roost at the NTC.

This is the hard fact of life learned by all units that make the training pilgrimage to the high desert wastelands of Fort Irwin, California. Not even those units that have been through force-on-force with OPFOR two, three, four or more times can decisively defeat them *every time*. The answer to this somewhat sobering situation lies in the fact that OPFOR trains both ways—as a viable U.S. combat arms force and as the OPFOR that trains according to Soviet concepts, tactics and doctrine. Their vehicles are either genuine Threat vehicles or U.S. vehicles modified to re-

semble Threat vehicles (VISMODS). The OPFOR also has a very thorough and detailed knowledge of terrain in the Fort Irwin maneuver training area, which adds considerably to their battle successes over the visiting units.

However, OPFOR was not organized and trained for the sole purpose of defeating the rotational units. Far from it. Everything that OPFOR knows is yours for the asking. The whole setup is a training scheme and you are expected to make some mistakes. You are also expected to learn from your mistakes because there will be no forgiveness when the steel flies in earnest.

The following covers many, but not

all, of the OPFOR lessons you can learn at Fort Irwin. It is suggested that the OPFOR tactics, etc., given here be carefully studied beforehand in relation to your own unit's training program so that you will be better prepared when you go to the NTC. Learn all the nitty-gritty details and make your men learn them as well.

Targets. OPFOR has found in its own training cycles that using live fire range targets that *do not go down when hit* not only forces the TC to keep track of what he has shot at, but it also keeps him aware of the necessity to keep track of those "hit" targets when he moves to a new firing position. This is



hard to do in the smoke and dust and turmoil of the life-like, make-believe battles at the NTC. It will be much harder in real life.

When the OPFOR trains as an "American" unit, its targets are set up in a Threat motorized rifle regiment array with the target lines about 500 meters apart. The "American" unit goes into combat at about 3,000 meters and the rows of targets periodically fall in unison and new, closer, rows pop up, simulating an advancing enemy force and teaching the TCs to keep track of the "hit" targets. When your TCs lose track of the "hit" targets, they not only re-shoot them, they needlessly expose themselves to "live" targets when moving to new fighting positions. Close examination often shows some targets with as many as 15-20 shot holes while others nearby were hitless.

OPFOR's average rounds-per-kill, while firing the live-fire exercise as an "American" force, now stands at about 5.85, and the average rounds-per-kill ratio for rotational units is from 16.3 to 30+. So, keep track of what you've shot!

Communications. Talk between tanks is vital to survival on the battlefield and OPFOR crews are drilled in this tech-

nique —especially between a firing tank and its sensing wingman tank that is also shooting. They take turns sensing each other's rounds.

This isn't as difficult nor as time consuming as it seems. Your crews should learn to recognize each other's voices on the radio and calls can be short and to the point. OPFOR has developed an *ad hoc* radio code that doesn't follow standard operating procedures as taught in gunnery communications. But it works.

For example: A tank fires at a target. If the wingman reports "target," a hit has been made. Overs and shorts are similarly reported in simple direct words and phrases. If the shot is sensed to have gone over or short of the target by one target dimension then "just over" or "just short" is radioed. More than one target dimension over or short brings the call "over" or "short." If the shot is sensed as having badly missed the target by two or more dimensions, "way over" or "way short" tells the firing tank how much it has missed.

OPFOR's talk-between-tanks philosophy is simple: *Make your crews talk to each other!* Keep it simple and get off the net. Crews have "died" at the NTC because they didn't talk to each other.

Movement to Contact. The movement to contact must be carefully planned. Danger areas along the route must be identified and contingencies planned and discussed with your staff. Danger areas, among other things, are any area where the task force becomes more vulnerable to OPFOR fires and areas of suspected OPFOR occupation. *Read your map*—study and familiarize yourself with the terrain you are going to cross.

Establish control measures for your movement to contact, to include checkpoints, intermediate objectives and phase lines. Remember that the terrain will affect your task force disposition. Most tasks forces at the NTC lead with their scouts and give them a route reconnaissance mission along the avenues of approach. In open terrain, such as that at the NTC, one task force tried a different tactic. The commander selected several OP locations overwatching the avenues of approach. This worked well and is worth considering when your turn comes.

Using scouts as a forward screen provides security for the task force. However, you have to give your scouts enough advance time so that they can use proven movement/reconnaissance techniques which they *must* use if they



are to do their job and survive. Your scouts *must* cross the LD *well ahead of your lead elements*. If you don't give them the time and distance they need, your scouts will not be able to use good movement/reconnaissance techniques and still stay far enough ahead of your lead elements that are, or should be, traveling in overwatch.

Reconnaissance. The most important platoon in your whole battalion is your scout platoon. Period. That's it. If you don't know where the enemy is, or what he is doing, you are in trouble from the start. Good pre-movement reconnaissance is the key. OPFOR scouts reconnoiter every move their units make. And they do it in detailed, trained and pre-planned drills. OPFOR scouts will find your obstacles and will breach them if they can. They will locate your prepared positions and will set up routes around them. They will get into your rear areas and mark out (on their maps) ambush sites. An OPFOR motorcycle scout will often be "attached" to each of your maneuver companies and he will stick with that company like he belongs to it. When the company moves, he moves. When it reaches a new position, he's right there with his radio reporting on you. One evening, an OPFOR battalion scout, on a Soviet *VISMOD BMP* and wearing distinctive uniform, made his way through all the defensive obstacles into a rotational unit's rear area and asked directions to the battalion TOC. He was led to the TOC by an unsuspecting soldier. Imagine the surprise in that TOC when his main gun tube came poking through the tent flap.

Kill the OPFOR scouts. OPFOR scouts are just that — scouts. Their mission is to discover where you are, what you are doing and report it. They are not fighting forces, *per se*, but if

they're cornered they will fight to the death. OPFOR scout kill rates run to about 6-1.

If you insist on using your scouts as a fighting force, you are going to get them killed and you will be hurting. Fighting units take casualties and dead scouts are no good to you. However, if you force your scouts to fight, at least give them something to fight with. Give them a FIST NCO forward observer, give them at least two 4.2 mortars, attach at least two tanks to them. Give them GSR and back them up with extra PRC 77s. However, you will be better off in the long run if you *don't fight your scouts*.

OPFOR scouts are by no means unbeatable. They are just thoroughly trained. But that doesn't always save them. One rotation unit assigned two tanks to its scout platoon and massacred the OPFOR scouts the first time they met.

Good scouting can lead to a quick kill. "American" scouts spotted an OPFOR battalion moving to contact. They called up two companies, set up a "v" ambush, and ruined that OPFOR battalion!

Your S2 must realize that the OPFOR is as dangerous as a real, live enemy and not just a part of his own unit play-acting. The OPFOR trains and fights to win and must be treated very seriously. Your scouting reports must be quickly collated and the information passed on — up and down the chain, as fast as possible. OPFOR units habitually move at a speed of 3 kilometers per minute which leaves little time for pondering over your scout's reports. Your S2 must act quickly and decisively.

Mutual support. Never allow your units to become so separated that they cannot mutually support each other.

Conversely, don't bunch up. The terrain will be the determining factor in deciding how far apart your elements can operate. It is difficult to maintain mutual support as well as proper dispersion, but it must be done if your lead elements are to survive their initial contact with OPFOR.

Train for it. You should maintain sufficient distance from your lead elements so that only they will come under OPFOR fire on contact. But, you must be close enough to support them.

When moving in bounding overwatch, keep your FIST FO with the

"...OPFOR scouts are by no means unbeatable. They are just thoroughly trained. But that doesn't always save them..."

bounding element. If he is up front where he can see what is going on, he can call down suppressive fires.

Rearrange your priority targets with your artillery and mortars. With target data established from the map, they can lay down quick fire on demand. Priority targets are automatically shifted forward as your task force advances.

Search and Traverse. In short, *look around*. Don't keep everybody's head up and locked. *Every* vehicle must have one man, preferably the loader on a tank, or the gunner in other vehicles, as an air guard, whether you are on the move or stopped. OPFOR has noted that few training units do this and it often makes their (OPFOR's) approach much easier.

Each vehicle must have an assigned area of search. Center vehicles orient to the front, flank vehicles to their flanks



and the rear. Main guns and/or .50 caliber machineguns must be oriented on the vehicle's search sector.

Such constant searching is tiring, but it must be done. OPFOR rewards searchers for initial sightings. Do the same for your troops.

Watch your rear! Always have the rearmost vehicle travel with its tube over its rear deck. You will likely avoid an OPFOR ATGM through your grill doors.

Another point. Make your searching soldiers use optics. Eyeballing won't do it.

And, at the same time, train your soldiers to keep the crew junk off their turrets. Maps, binoculars, etc., are reflectors and can be seen for miles, and OPFOR looks for them. Look at it this way. Your men are in BDUs and your tank is camouflaged to blend with the desert terrain. But you've got a two-

foot square, shiny white map board hanging on the turret telling the whole world where you are.

“. . . Passing through an obstacle is as important a maneuver as passing through a chokepoint. Don't bunch up. . . .”

Chokepoints. OPFOR loves 'em! Training units tend to bunch up at chokepoints and OPFOR watches over chokepoints like you wouldn't believe. Get your ATGM teams out and crack down on your all around search procedures. Don't bunch up at a chokepoint or you won't have anything left.

If you run into a chokepoint, get the word out — fast, so that your trailing

units won't bunch up, but can halt and deploy.

Obstacles. These are crucial elements in the defense and OPFOR knows it. Some American units don't. Obstacles must be as complex as time will allow — and they must be defended! Breaching and moving through an obstacle must be done quickly. And you have to overrun the obstacle and establish your security lines on the far side before you can be certain that the obstacle is overrun.

Passing through an obstacle is as important a maneuver as passing through a chokepoint. *Don't bunch up.*

Don't abandon your obstacle breaching teams to their fate. Your security forces *must* protect them. Multiple breaches should be made if possible. A team of soldiers with shovels can quickly collapse the walls of an antitank ditch enough so that tracked vehicles can get through. But don't fill the ditch in; that wastes time.

Remember. If you put up obstacles, you *know* the OPFOR is going to try to breach them. If they can't do it in daylight, they'll be back that night. OPFOR operates with a persistence that can be demoralizing. You must not, *ever*, lower your guard.

The placement of your obstacles is of prime importance to your defense. Most rotational units put their obstacles perpendicular to the line of approach. OPFOR puts theirs at oblique angles to the line of approach. This makes the obstacles harder to find and they enjoy mutual covering fires. Don't place your obstacles too far forward. Site them close enough to your main battle positions so they can be defended.

When OPFOR breaches your obstacles, call down your artillery family of scatterable mines (FASCAM) to close the lanes.

Battle Positions. Select battle positions with a background not silhouetted against the sky. OPFOR does, and more often than not their vehicles aren't seen until it's too late.

Try to select positions over rocks and vegetation to keep the dust down when firing. And don't forget — an open field of fire, visible to the attacker, will be covered by him.

Past experience has shown that rotational units have to rehearse, again and again and again, the techniques of getting into and out of battle positions.

OPFOR's primary requisite for selecting a battle position is to ensure a *good way out*. OPFOR insists that its crews select battle positions that can be backed out of *unseen by the attacking force*. Training units have learned the hard way that too many crews are killed



by a flank shot when they back out of their positions.

Battle positions must be occupied from the rear and while your leaders select the positions, your other vehicles stay in hide. Battle positions should be surveyed from the front. If you can see it, so can OPFOR. Every TC must practice moving into and out of his battle position. Don't forget your flanks.

Approve all troop positions before they are dug. Nothing makes soldiers madder than having to dig new foxholes. Also, on the subject of digging, OPFOR has noted that most training unit foxholes are too shallow, too wide and *too obvious*. OPFOR has also noted that rotational units often fail to site their machineguns so as to lay down final protective fires across the platoon front. Instead, they select straight-ahead fire sectors. Like most other weapons, machineguns are most effective when firing from flank positions.

Train your crews to stay off the top of the terrain or every OPFOR weapon in sight will shoot at them. OPFOR crews are trained to deploy in depth, at different elevations and positions, and they always work with a 2-tank team, or a tank-BMP team. A lone tank is a dead duck! Everytime!

Movement means survival. Do you want a highly 'school-trained' crew that can sit in one spot, fire ten rounds and kill 10 vehicles and then die in their tracks, or do you want a crew that can *move*, shoot up its basic load, kill ten or eleven OPFOR vehicles, and show up

at its next fighting position — yelling for more ammo?

Flank fires. Your flanks are your most vulnerable points. OPFOR observers report that more than 60 percent of their kills come from flank fires. It is not at all unusual for one or two OPFOR tanks or ATGMs on a flank to ruin an entire attacking unit. But, this works both ways too. A rotation unit's TOW platoon once severely mauled an OPFOR regiment with flank fire.

If you can set up flank fires from both flanks, you've got the battle almost won. This forces the OPFOR to orient in three directions, a practical impossibility. But, never forget that this is also a favorite OPFOR tactic.

OPFOR has long noted that attacking units habitually position their weapons to cover long-range frontal fire zones. Weapons positioned in front of an approaching enemy are easy to acquire and kill, but flank weapons are harder to find and engage, and often enjoy the advantage of reverse slope cover; i.e., fire, reverse down the slope, pop up and fire again, etc.

Shooting. When you train in gunnery go back to the basics. *Use that telescope!* You won't always have your sophisticated electronic sighting equipment. The telescope is quicker and accurate enough for force-on-force shooting. The telescope, combined with TRPs at known ranges, is deadly.

What do you shoot first when the OPFOR attacks? His T-72s. They represent only 30 percent of his total force,

but they account for 65 percent of the kills the OPFOR inflicts.

Practice section, platoon, and company fire control and distribution.

MILES foxholes. OPFOR flatly states that hastily dug, uncamouflaged fighting positions, the so-called MILES foxholes, are *not* fighting positions—they are *dying* positions. They are easy to spot because of the light colored earth thrown up. OPFOR gunners look for these piles of freshly turned earth and they lock onto them. When one of your vehicles moves into such a position — zap!

Besides, the MILES foxhole berm wouldn't really stop an APFSDS round on its way to — and through, your tank anyway!

Many rotational units bring too many bulldozers with them. OPFOR regards this as ridiculous — and they should know. All you need, says OPFOR, are the two 'dozers that your brigade is authorized. *You don't need eight or ten of them.*

Attack. OPFOR has noted that many of the rotational unit attacks have failed because they get stopped or slowed at an obstacle with most of the unit's vehicles and men exposed to fire. This is precisely what obstacles are for. Training units rarely look for, and breach, obstacles *before* they attack. OPFOR always does.

Training unit maneuvering in the attack often leads to a frontal attack of one company against an OPFOR battalion. This is murder, pure and simple.

OPFOR attacks with a *regiment* against a *company*. On the other hand, one training unit engaged an attacking OPFOR force with long-range frontal fire from one company, sent the other companies out to the flanks and destroyed that OPFOR unit.

Rotational units have learned the hard way, time and again, that OPFOR destroys AT weapons *before* it attacks. The preferred tactic is the destruction of AT weapons by long-range AT fire. *Approximate* kill ranges for typical OPFOR MILES AT weapons run from 1,680 meters for the T-72's 125-mm main gun to 3,000 meters for a *Sagger* or *BMP*. The *M60* MILES, however, can kill out to 3,100 meters and the *TOW* is lethal to 3,200 meters.

Smoke and Night. If you plan a night attack, you can confuse the OPFOR as to your exact intentions by moving a lot of vehicles around your sector. It is hard to pinpoint vehicles by sound alone. Also, excessive vehicular movement in your sector will keep the OPFOR in a high state of alert, and that tires out his troops.

When your attack is under way, your mounted force should be positioned to fire from a different angle (flank) than your dismounted force. This is a standard OPFOR tactic.

Smoke really obscures at night but, during daylight, smoke can hide you or *give you away*. Not even heavy smoke presents any real problems to a highly-experienced OPFOR attack. OPFOR has a viable limited visibility contingency plan and uses it.

OPFOR experience has shown that whenever "American" units come under smoke, they usually stop. Rarely has a limited visibility plan been used by these units. The prime rule when you're under smoke is — *do something*.

OPFOR rarely uses defensive smoke. Offensive smoke, and plenty of it, is the name of their game. If OPFOR smokes you, do something! Pull back, go upwind, or move forward. Any movement is better than none because if you stop when smoked, OPFOR knows exactly where you are.

OPFOR considers the smoke generating button the most dangerous button in any vehicle. Self-generated smoke pinpoints you exactly to the OPFOR gunners, and tank crews who indiscriminately use their smoke generating buttons usually die for it.

Remember, the use of smoke requires a knowledge of the terrain, wind and weather and whether or not the tactical situation really calls for smoke. OPFOR has learned that a temperature inversion layer in the atmosphere (a common occurrence in that part of California) will hold smoke tight

against the ground. Your weather people can predict an inversion layer for you.

One more smoke point. If your movement will take you through a valley, *be assured* that OPFOR will smoke you. OPFOR habitually smokes valleys. They aren't trying to hide from you, they're just confusing you.

At nighttime, you should use chem-lights to mark your target reference points (TRPs). But, beware! Tank battalion OPFOR scouts will destroy them, steal them, or move them around if they can. One good way to prevent this is to break open the chem-light and pour the contents on a rock.

If you use blackout markers, you are setting yourself up for a kill because OPFOR scouts can see them 8-9 kilometers away. OPFOR *never* uses blackout markers or interior dome lights (they shine through the vision blocks like beacons) or flashlights. They are trained to function *in the dark*. OPFOR scouts will sit out, night after night, just looking for your lights.

Delay/Defend in Sector. In order to effectively delay/defend in sector you *must* have a mobility advantage over the OPFOR. This involves a combination of obstacles throughout your sector, improvement of your movement routes and the reconnaissance and rehearsals of routes and subsequent battle positions by your leaders. The delay/defense in sector mission requires a lot of preparation time, something always in short supply.

If you plan a delay action you *must* have a backup force ready to take up the fight. Many such disengagements are begun too late; the OPFOR is practically on their heels. If the OPFOR is within 2,000 meters, your battalion TOC cannot get the word to the forward units in time to disengage. And if your vehicles begin their movements when the OPFOR is within 1,000 meters, they're dead. As one OPFOR observer put it, "Put out the lights, boys. The party is over."

Permission to disengage must be prearranged so that the forward units will automatically pull back when the OPFOR reaches a predetermined line.

When you are disengaging, all your guns must be laid to the rear — all the way back to your next position. Also, crews must learn instant vehicle recognition. Not so much on a vehicle-type basis as on a "theirs" or "ours" basis.

Finally. You have to pull out your infantry first. If you lose your infantry, your armor will soon be helpless.

Other tactics and drills. If you persist in moving through a "kill zone" that is littered with "dead" American veh-

icles, you will get killed as sure as the others. If you accidentally run into a kill zone — get out of it — fast. Don't try to bull your way through. OPFOR will simply sit back and kill everything you send in.

Train your crews to reload their turrets when they withdraw from a battle position. A fighting vehicle that arrives at its new battle position with empty turret ammo racks doesn't hack it.

Misfires are a fact of life and have to be dealt with. The TC must announce "misfire" on the radio, then pull back and clear it. When he leaves his battle position, his flank tanks must engage his close-in targets. As soon as the misfire is cleared, he pulls back up into position and resumes fire.

Reloading vehicles while parked on a grade is hard to do, but it must be practiced. A lot of units at the NTC have been caught short by OPFOR in precisely this situation.

Summary. Intensive training in every phase of armored warfare *before* you get to the NTC is your key to survival. Train to more difficult standards than you ever have before. OPFOR does. And never forget - - -

The battle is the payoff.



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Strengthening the Armor FIST

by Captain Mark E. Vinson

The concept of the armor FIST, a Field Artillery team attached to provide fast, accurate fire support for armor units, clearly doesn't work.

Part of the problem is training emphasis and inadequately trained manpower, and part of the problem is organizational. But as the man at the other end of the radio — the artillery officer — will tell you, the present armor FIST cannot provide adequate artillery support now, much less in the future as we implement new doctrine and train to use new weapons.

In this article, I hope to explain why this problem has developed and how it might be rectified but, first, let me explain that I didn't always feel this way. It was only after I arrived at the Field Artillery Officer Advanced Course that I heard serious criticism of the armor FIST concept. I then realized that my earlier, hopeful, opinion was based on ignorance — of fire support and how it should be used, and of the armor unit's responsibilities to the system.

The history of the armor FIST is short. Developed in 1975 as a result of the recommendations of the Close Support Study Group (CSSG), the intent was to optimize fire support for maneuver forces.¹ From this concept came the team itself, but the organization of fire support teams differs in various types of units.

The armor FIST, for example, consists of only four personnel mounted in a tracked carrier. In contrast, the infantry FIST adds three additional forward observer (FO) teams, one for each platoon.²

One serious weakness of the armor FIST concept is this lack of forward observer teams. In their place, the armor unit's forward observers are the platoon leaders and platoon sergeants.

It is the forward observer's job to do the majority of the calls for fire on targets of opportunity, exactly the type of targets you're likely to encounter in an AirLand Battle-style war of movement.

But remember the typical work load of an armor platoon leader or platoon sergeant is leading their platoons and fighting their own tanks. Add to these duties the tasks, knowledges and skills of a forward observer, which include:

- Calls for fire.
- Adjustments of fire.
- Calls for and adjustment of illumination and smoke.
- Calls for suppression and immediate suppressive fires.
- Knowledge of ammunition and fuze capabilities.
- Understanding of registration.
- Final protective fires.
- Coordination of close air support and naval gunfire.

In addition to these, the FO must keep abreast of the general fire support



Fire Support Team Vehicle (FIST-V)

situation while keeping the FIST updated on what his platoon is doing.

I'm sure that most FOs are not totally proficient in all of these areas. But more important is the realization that *what they cannot do proficiently must be done by the FIST*, complicating what is already a difficult FIST assignment.

The armor FIST is composed of a FIST chief (1st Lt), a fire support sergeant (E-6), a fire support specialist-driver (E-4) and a radio-telephone operator (RTO), an E-3. The team's primary jobs are to keep the armor

company commander advised on fire support matters, to coordinate calls for fire support from their subunits, to help integrate indirect fire support in the maneuver battle plan, and to call for, adjust, and direct the fire itself.³

The FIST is tasked to stay close to the unit commander and to rely on the armor company forward observers — the platoon leaders and sergeants — to see the battlefield.

To nutshell the two problems, the platoon leaders and sergeants are already too busy to perform these additional duties adequately and if the duties are assumed by the FIST, their normal jobs of coordinating and integrating fire support won't be done well, either.

It is my experience — and the experience of the field artillery officers I've discussed this with — that both problems actually develop all too often.

To determine how serious the problems were, I conducted a survey of all FA officers then attending the two FA advanced courses at Fort Sill.

The survey included 40 officers, three-quarters of them with experience in Europe. More than 80 percent felt that the average tank platoon leader or platoon sergeant was not proficient as a forward observer.

Then they were asked to rate the "average" tank platoon leader or platoon sergeant on each of the duties mentioned earlier. (The tasks were taken from FM 6-30, The Field Artillery Observer.)

The majority of artillery officers rated the average platoon leader or platoon sergeant as satisfactorily, although marginally proficient, in only two tasks, the call for fire and the call for immediate suppression. The remaining essential tasks were rated unsatisfactory by the majority.

Asked why they thought the armor leaders were not proficient in the tasks, most said they didn't think there was enough formal training of the tasks and that there was also a lack of reinforcement training in the units.

After obtaining copies of the programs of instruction (POIs) for the ANCOC, AOBC, and AOAC courses at the Armor School, an analysis indicated that they were pretty thorough. The ANCOC POI called for 4 hours of instruction in field artillery, 3 hours on the call for fire, with a 4-hour practical exercise on an observed fire trainer and an exam.

Similarly, the AOBC POI includes 2 hours of instruction on the field artillery, with 4 hours of instruction on the call for fire, a 4-hour practical exercise

on an observed fire trainer, and a 3-hour, performance-oriented exam on the observed fire trainer.

The use of an observed fire trainer is to the school's credit as it will reinforce the training and aid in retention of the instruction. The AOBC POI has been definitely improved since 1978, when most of the instruction was in the classroom, as opposed to performance-oriented training.

But in my case, as I'm sure is the case with most armor officers, there was little reinforcement training once I reported to an armor battalion. To be exact, I observed just two classes on forward observer procedures in 3 years. One class taught the illumination call for fire just prior to a night tank gunnery exercise, and the second class was given prior to a Tank Table IX, to teach platoon leaders the call for fire on a preplanned target.

I remember thinking at the time that I should know these procedures already, but that I had forgotten how to properly request *any* indirect fire support.

Without command emphasis and the constant need to use these procedures, I had lost my proficiency. I had become what is known in Field Artillery circles as an "untrained observer". I could call for fire, but not quickly or properly, and therefore not very effectively. Improper calls for fire require more time to process in the fire direction center (FDC), and this means reduced responsiveness and effectiveness.

I never received any formal or informal training from a FIST, although my survey indicated that most of the FISTs were occasionally called upon to give classes to the tankers. This is possibly because most of the FISTs surveyed were only attached to an armor company for field exercises.

But quite beyond the matter of continuing training and practice, the major factor that degrades the platoon leader's ability to act as FO is that he is too busy with other duties.

During contact with the enemy, when he should be performing his duties as forward observer, he is busy fighting his platoon. Is he capable of controlling his platoon fires, maneuvering his platoon, issuing and executing orders, and reporting to his commander, while also taking the time to call for fire and registering the results?⁴ It's very unlikely. He is more likely to ignore his FO duties, especially if he can't call for fire or request immediate suppression properly.

During field exercises, when there are no rewards for properly calling for fire, it is especially naive to expect the platoon leader to perform his FO duties without command emphasis.

Partly as a result of this training inadequacy, the FIST becomes the sole player in the fire support game. Control of calls for fire becomes centralized and inflexible.

According to the field artillery officers surveyed, the FIST chiefs received *all* calls for fire and forwarded them to the battalion fire support officer (FSO). The platoon leader rarely called the FSO or firing battery directly. In fact, the platoon leaders and platoon sergeants rarely sent *any* calls for fire. The FIST usually developed his own, based on a spot report intercepted on the command net.

With trained, full-time FOs, the FIST should have three options for the transmission of calls for fire:

- He can have FOs call for fire directly to any fire support assets available. This method requires well-trained FOs and well-developed SOP's.
- The FIST can also assign a specific fire support asset — 81-mm mortar, 107-mm mortar, field artillery — to each FO.
- The most centralized method requires all FOs to call the FIST first. The FIST then assigns a fire support asset to the FO.⁵
- Under the current armor FIST system, a fourth non-doctrinal method has been established. This method requires the FIST to make all calls for fire personally. It's pretty obvious this is not likely to be very effective in combat. Instead, the FIST has become an ineffective middleman because he's probably not in a position to adjust fires, nor will he be able to do any target damage assessment without calling forward.

The Lessons of 1973

Yet another weakness of the present FIST system is that it is not designed to meet the increasingly effective and proliferating threat of manportable antitank weapons. This weakness goes back to the conclusions of the Close Support Study Group, which discussed a Soviet-bloc-style threat in a European environment. The threat is described as an overwhelming "proliferation of armored, mobile targets; massive enemy indirect fire support; large numbers of enemy fighter aircraft over the battle area; a very effective air defense system; and a complete spectrum of electronic warfare capabilities."⁶ These are all valid considerations, but what is glaringly missing is mention of the proliferation of antitank weapons, which had proven exceedingly effective. One of the prime lessons of the Arab-Israeli War of 1973 was the need for responsive suppression and close support from artillery units.⁷



The study group also addressed the problem of broader frontages, 5-10 kilometers per battalion task force.⁸ But an armored FIST cannot handle all calls for fire from a unit so spread out. It certainly cannot be expected to adjust fires for a whole unit. The armor platoon leader must either act as his own forward observer in such cases or artillery support will be ineffective.

The weakness of our present armor FIST concept will become even more serious as the pace of battle operations increases. The new tactics that call for speed and mobility in both the offense and the defense increase the need for supporting fire to cover such moves and provide suppression.⁹ Again, this points to the need for FOs at the platoon level or leaders to initiate the calls for fire.

Our field artillery assets are scarce and must be used at all times to take maximum advantage of what we have.¹⁰ Routing all calls through the FIST employs these assets inefficiently. It would be far better to allow the FIST

to *coordinate* fire support, "a far more complex task than ever before".¹¹

With the introduction of a new family of fire support equipment and maneuver vehicles, the forward observer has become an even more critical link.¹² He is crucial to optimum use of the TACFIRE digitalized gunnery system and to the new family of laser-guided munitions.¹³ The digital message device (DMD) provides forward observers with a way to send fire missions to the supporting field artillery battalion quickly and accurately. TACFIRE is already in use in some units and the DMD is the access into this system. If the platoon leader doesn't use the DMD he cannot interface with TACFIRE. But, I cannot envision a platoon leader having the time to operate a DMD.

Platoon leaders and platoon sergeants also require additional training on the newer varieties of field artillery munitions available. This whole new array of weapons — scatterable mines, cannon-launched guided projectiles,

improved smoke rounds and improved conventional munitions¹⁴ — increase the complexity of the forward observer's task, if he is to do this task properly and gain maximum advantage from the weapons available.

Can he fight his tanks and act as FO with this more complex menu of possibilities available? Again, I doubt it.

At this point, it might be interesting to analyze why the CSSG came to the conclusion that the armor FIST did not need dedicated platoon FOs but that platoon leaders could assume those responsibilities instead.

- The first reason given was that tank platoons already have heavy, close-in immediately available firepower, the main guns on the platoon's tanks.¹⁵ But the tank is primarily a tank killer. I doubt we will have the luxury of shooting main gun ammunition at known or suspected infantry or antitank positions, given the size and composition of the main gun basic load and the expectation of facing a large number of enemy hard targets. Main gun effectiveness is also limited by range: the tank would be at a disadvantage against a *Sagger* team which could engage it at 3,000-meters.

- The second reason given by the CSSG was that there is no place for a forward observer to ride if he accompanies the tank platoon. A separate tracked vehicle was thought impractical because of cost. An FO riding one of the platoon tanks would have to split his time between his tank crew duties and his FO tasks.¹⁶

A separate tracked vehicle would be expensive of course, but how much are we willing to pay for adequate fire support for armor units? As for the objection that the FO would have to divide his time between crew and FO duties, what is the platoon leader being asked to do now? He is tank commander, platoon leader, *and* an FO.

- Another point made in justification in the CSSG is that armor units will typically have infantry attached, with their FOs.¹⁷ But this still doesn't solve the tank platoon leader's problem since the infantry FO is under the control of the infantry platoon leader. While the infantry FO could provide some assistance, the system will only work when infantry and tank units are cross-attached, which is not always the case.

- The CSSG also noted that the platoon leaders and platoon sergeants have AN/VRC-12 radios providing a quick means of calling for fire.¹⁸

However, when the platoon leader calls for fire, he must leave either his platoon or company command net, for quite a while if he is adjusting fire. I do

not think it's a good policy for either the platoon leader or platoon sergeant to leave either of these nets for the period necessary to carry out a fire mission, except in an emergency, like an immediate suppression mission.

Some Solutions

First, if we are to improve the system as it now stands, we must increase and improve training. Realistic indirect fire requirements must be incorporated in FTXs and ARTEPs. They *must* have command emphasis. The battalion commander, the FSO, company commander, and FIST all need to work together to emphasize the active use of indirect fire during any field training. . .

Platoon leaders and platoon sergeants should also get some realistic FO experience on a periodic basis by practicing calls for and adjustment of fire whenever the battalion mortars or the direct support battalion FA are live-firing. Commanders need to coordinate with the FA battalion or the mortar platoon leader and schedule the training. With enough prior coordination, the 14.5-mm FA trainer, which uses sub-caliber ammunition, can be requested from the FA battalion.

Indirect fire requirements can also be worked into live-fire Tank Tables X and XII (section and platoon qualification) more realistically. Too many units force the platoon leader to call for fire on a preplanned target at a set time from a FA battery or mortar platoon already laid on the target. This may be safe, but is much too canned and easy, perpetuating the myth that the platoon leader can proficiently call for fire when he needs it.

The platoon leader should be told what fire support is available and then be let alone to use it, *as long as he does use it*. Emphasis should also be placed on the use of smoke and suppressive fires.

The safety officer must clear all calls for fire to insure that no one gets hurt, but other than that, the platoon leader should be free to use his fires as he sees fit. But he should be critiqued afterwards on how well he made his choices.

Another improvement to training might result from permanently attaching FSOs and FISTs to the armor battalions.

Aside from training, some organizational solutions are also possible. I would put a dedicated artillery FO in the loader's position on the platoon leader's tank. It would not take long to train him for his loader's duties. The benefits of having an artillery FO with each platoon will certainly outweigh the disadvantages of splitting his duties between loading and directing fire or

the disadvantages of a platoon leader fighting his tank, leading his platoon and directing fire simultaneously.

Communication will be a problem of course, unless an additional radio is added to the platoon leader's tank. The FO could then use his DMD to call for fire. When the FIST DMD is fielded, the FOs will be able to relay calls for fire through the FIST with great speed. If the FOs are using PRC-77s, the FIST DMD can be used to increase the range of the call for fire, since the FIST has an AN/VRC-46. If the mortars and FA are close enough, fire requests can be sent directly by the FOs. The platoon leader's VRC-12 is available as a backup, but it should be left free so the platoon leader can operate on the platoon and company nets.

Another alternative would be to add one more FO vehicle to each armor FIST, for a total of two FO vehicles. The CSSG found this alternative too expensive.¹⁹ While a highly mobile, less expensive armored vehicle would address that objection, a signature similar to the other company vehicles is vital.

A second FO vehicle would allow the armor FIST to split into two elements, with the FIST chief in one vehicle and the fire support sergeant in the other. In the offense, one vehicle would stay with the lead platoon while the other remains in overwatch. In defense, they could be separated for the widest possible coverage. The FIST chief's vehicle would stay as close as possible to the company commander's vehicle.

These are just a few ideas that could be developed further. The important thing is to realize that a problem does exist and that positive corrective action is needed as quickly as possible. Training in units should be upgraded immediately.

In conclusion, if you are an armor commander and you do not think you have a problem with your fire support training, then you are either truly exceptional or you have not taken a good, hard look at your platoon leaders' and platoon sergeants' capabilities as forward observers and the overall effectiveness of your FIST.

Bibliography

- Close Support Study Group. *Close Support Study, Final Report*. Unpublished report, U.S. Army Field Artillery Center, 1975.
- Elazar, David LTG (Ret). "The Yom Kippur War". In *Military Aspects of the Israeli-Arab Conflict*. Ed. Louis Williams. Tel Aviv: University Publishing Projects, 1975.
- U.S. Army Armor Center. *The Abrams Battalion*. TRADOC TT 71-1/2. Fort Knox, Kentucky: USA TRADOC, 1982.
- U.S. Army Field Artillery School. *Combined Arms Team, Field Artillery Tactics and Techniques*. Unpublished student text, T CA DD, April 1982.

U.S. Department of the Army. *Fire for Effect*. Training Circular 6-40-4. Washington, D.C.: U.S. Government Printing Office, 1978.

U.S. Department of the Army. *Fire Support Operations in Brigade-Size Units*. Training Circular 6-20-3. Washington, D.C.: U.S. Government Printing Office, 1981.

Footnotes

- ¹ Close Support Study Group, *Close Support Study, Final Report*, (Unpublished report, U.S. Army Field Artillery Center, 1975), p. 1.
- ² U.S. Department of the Army, *Fire Support Operations in Brigade-Size Units*, Training Circular 6-20-3 (Washington, D.C.: U.S. Government Printing Office, 1981), pp. 7-9.
- ³ TC 6-20-3, pp. 9-10.
- ⁴ U.S. Army Armor Center, *The Abrams Battalion*. TRADOC TT 71-1/2. Fort Knox, Kentucky: USA TRADOC, 1982, p. IV-1 - IV-5.
- ⁵ U.S. Army Field Artillery School, *Combined Arms Team*, (Unpublished student text, T CA DD, April 1982), pp. 2-5.
- ⁶ CSSG, p. 4.
- ⁷ LTG (RET) David Elazar, "The Yom Kippur War". In *Military Aspects of the Israeli-Arab Conflict*. ed. Louis Williams. (Tel Aviv: University Publishing Projects, 1975), p. 248.
- ⁸ CSSG, p. 4.
- ⁹ CSSG, p. 4.
- ¹⁰ CSSG, p. 5.
- ¹¹ *Ibid.*
- ¹² *Ibid.*
- ¹³ CSSG, p. 6.
- ¹⁴ *Ibid.*
- ¹⁵ CSSG, p. F-1-1.
- ¹⁶ *Ibid.*
- ¹⁷ CSSG, p. F-1-2.
- ¹⁸ *Ibid.*
- ¹⁹ CSSG, p. F-2-3.



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Complete Strategy

In its search for correct strategy, the U.S. Army in the last decade has changed its principles of battle in FM 100-5 several times. This proves our strategy is incomplete. The main points were correct, but something was always missing. This fact was not recognized as each new strategy replaced, rather than improved, the old one. The AirLand Battle strategy is far more correct than any previous approaches, but is still incomplete, or is poorly stated.

Warfare is in a state of constant change. Humans tend to resist change because it creates unknowns. The conflict caused by these two facts can lead to defeat unless you know the one constant in warfare: strategy. Correct strategy is timeless. It is as applicable today as it was thousands of years ago. The main lessons of strategy can be learned by studying the more successful commanders of history:

Sun Tzu (Wu Ch'I)	430-371	BC
Alexander the Great	335-325	BC
Hannibal	218-203	BC
Genghis Khan	1180-1223	AD
George Washington	1776-1781	AD
Napoleon Bonaparte	1795-1815	AD
Robert E. Lee	1861-1865	AD
Paul von Luttow-Vorbeck	1914-1918	AD
Erwin Rommel	1914-1918, 1940-1943	AD
George Patton	1943-1945	AD

While none used all of the following points, they each used some with great success. No point can be singled out and discussed without considering the others. Each balances the whole. These are the principles of war that have stood the test of time:

Teamwork. Teamwork is the employment of all types of weapons and equipment, each to its own advantage, to defeat the enemy. Teamwork, also known as combined arms, is a must for success. No one arm can win alone without suffering heavily; however, victory will depend on the success of one arm more than the other. This arm can be called the *combat force*. It is the arm best able to defeat the enemy with fire and maneuver. All other arms can be called the *combat support forces* and they ensure the success of the combat force.

Know the Enemy. To win, you must foil the enemy's strategy. To do this, you must understand him and the capabilities and limitations of his tactics and equipment to force him to fight at a disadvantage.

Aggressively seek the enemy's disposition and condition because the more information you have, the better you are able to plan your operations. Multiple sources of information help reveal enemy deception plans and operations.

Deception. Operations are planned upon what the facts are believed to be, not necessary what they *really are*. Therefore, if you can fool the enemy to some degree, you can thwart his planning and operations. If the enemy knows your strength, location and condition, he is able to plan his operations to great effect.

Adapt to the Situation. You cannot respond to all situations in the same manner and expect to win. Each situation requires a different response. Look for conditions which will enhance the probability of victory, or create the conditions for victory. Try not to fight under unfavorable conditions.

Take *calculated* risks, not needless risks.

Know the Terrain. Terrain can provide concealment, cover, a barrier to hem-in or keep out the enemy. Terrain can prevent the enemy from using his numerical advantages against you. Terrain has no value if it is hard to defend or offers no tactical advantage. Understand how changing weather conditions affect the terrain.

Act, Do Not React. If you must constantly react to enemy actions you are employing your troops in wasteful and undesirable ways. Retain your freedom of action by maintaining your ability to gain or break contact. Force the enemy to react to *your* decisions and actions.

Use of Firepower. Firepower has three uses: destruction, suppression and harassment. The choice of which to use is determined by planning the situation at hand. In each case, try to engage at your longest effective range to retain the maximum maneuver space and time for yourself. Firepower must be used in conjunction with maneuver to destroy the enemy.

Key on the Enemy. Key your operations to the effects you intend them to have on the enemy. Keep him under strain. Wear him down. Master him.

Maneuver. Invincibility lies with the defense, but victory can only be attained by attack. Attack at unlikely or unprepared points. Traveling by unexpected routes may take more time, but fewer losses and a higher chance of success make this worthwhile.

Use both a fixing and a maneuver force. They can be interchanged at any time as the situation changes.

Timing. Good timing outpaces the enemy's planning and operations cycle. Losses can be reduced and chances of success increased by disrupting the enemy's timetable. The intensity of operations must be weighed against the loss of effectiveness of troops and equipment from strain.

Mass. Numbers alone give no advantage, but they are necessary to guarantee success.

Leave a Way Out. Troops, like wild animals, will fight to the death when cornered. Unless you are prepared to suffer the resulting losses in your force, it is best to leave the enemy a path to acceptable surrender. Troops will surrender when they are isolated and if they believe that they will be treated well. If you mercilessly press an enemy at bay, he will strike back furiously.

Know Technology. Technology must be constantly studied for its effects on tactics. Tactics are driven by the available technology. Advances in technology force a change in tactics which, in turn, makes new demands on technology. Look for new ways to use and improve upon current technology.

Command. The U.S. principles of leadership are very close to being totally correct. Only a few word changes and some deletions are necessary to make them fit with the other 13 points of strategy.

The three purposes of command are to tie the previous 13 principles together, motivate the troops to accomplish the mission and promote a uniform level of valor. The following principles accomplish this task:

- Know yourself and seek self-improvement.
- Seek responsibility and take responsibility for your

actions. Command gives you the authority to carry out your responsibilities. Authority is a by-product of responsibility.

- Make timely and sound decisions.
 - Set the example.
 - Know your people and look out for their welfare. Do not waste them.
 - Keep your people informed.
 - Develop a sense of responsibility in your subordinates.
- Only under the most severe circumstances should you interfere in their job performance. Allow subordinates latitude in carrying out assigned missions.
- Ensure that the task is understood, supervised and accomplished, but be ready to step in before, or if, failure occurs. Because humans are imperfect, nothing can be expected to work perfectly all the time.
 - Employ your unit in accordance with its capabilities. Recognize that some things cannot be accomplished under existing circumstances.
 - Instill in your troops the *reasons why* they are fighting.

One battlefield variable not part of strategy but which can work for either side is luck. You have very little control over its influence, so don't depend upon it for your success or to bail you out, but use it when it rolls your way.

None of these points are new. Only their presentation here together and in this way is new. This strategy, as presented, applies to conventional and unconventional warfare, to all levels of command and does not change with technology or conditions. Our current and past strategies cannot make this claim. You will notice the similarities of the AirLand Battle strategy with others because, as I have said, our strategy has always been correct, but incomplete.

Should the U.S. Army change its strategy every time conditions change, as it had been doing; or should a single strategy that has stood the test of time be adopted?

The time to decide is now.

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Closing the Air Defense Gap

"Rules of engagement do not prohibit a unit . . . from shooting at an aircraft that is attacking it—the RIGHT OF SELF-DEFENSE IS NEVER DENIED."

FM 44-23, U.S. Army Air
Defense Employment (Redeye)

The *Redeye* air defense missile was fielded in the 1960s with the primary goal of providing combat units a simple, effective, *organic* means of defense against enemy air attack. *Redeye* appeared to be the perfect answer. It is small and manportable, simple to operate, and is virtually maintenance free (unlike other air defense systems with their sophisticated radars or voracious ammunition appetites). Even though it is a "tailpipe" system more suitable for revenge than defense, it provides the combat soldier with the confidence that he can at least fight back against the most advanced aircraft.

This confidence may soon disappear, however. During the past several years a disturbing trend in air defense artillery (ADA) doctrine and employment has developed. In their haste to develop the division air defense artillery (DIVADA) organization and integrate weapons capabilities, the ADA community has aggressively sought to consolidate all air defense systems, including the manportable ones (*MANPADS*). These weapons would then be allocated based upon an overall air defense plan with no assurance that a unit would receive any specific assets. Judging from the direction that force structuring is heading, it is possible that artillery and maneuver battalions may find themselves with the right, but not the *means*, to defend against air attack.

Many arguments have been proffered to support consolidation of the *MANPADS*. These include the amassing of ADA fires at the area of greatest perceived threat, expanding the role of *MANPADS* from self-defense to an attrition mission, and improved training of air defense skills. While some of these arguments have merit, they also create potential deficiencies.

Air defense is exactly that—*defense*. Unlike tactical fighter aircraft which can seek out their foe and react with comparable mobility, ground ADA systems must wait until the enemy aircraft are within range and then engage. They can only react. The mobility differential between ground ADA systems and enemy aircraft requires that the threat must be anticipated by careful positioning of weapons, detected by sophisticated radars, and coordinated by complex electronics.

Perfect placements of weapons presumes perfect knowledge of enemy intentions, i.e., perfect intelligence. This is highly unlikely. Should an air attack occur other than as anticipated, it is too late to shift ground assets to counter it, and we must live (or die) with what is in place. As for the sophisticated electronics, poor availability rates and enemy suppression can be expected to eliminate a sizable portion of that capability. The result is that many of the bubbles drawn on situation maps to portray the "impermeable" ADA umbrella are certain to burst once the battle is engaged. At that time, the concept of area air defense becomes bankrupt, and those units not fortunate enough to be allocated mobile air defense assets become extremely vulnerable.

The air defense tacticians point out that those maneuver units not allocated ADA assets still have the capability of massing small arms fire. Consider the odds, however. Compared with their WW II counterparts, modern high-performance warplanes carry 30 times more ordnance, fly several times faster, and can linger on station four times longer. Both rotary wing and high performance aircraft now deliver guided or *smart* ordnance that allows them to attack from comfortable standoff positions.

The new *M1 Abrams* tank, on the other hand, sports the *M2 .50* caliber heavy machinegun of WW I vintage as its primary air defense capability. Compare and contrast! Massing small arms fires is difficult with dispersed formations and could result only in disclosing positions of the weapons. One is reminded of the German lieutenant in Guy Sajer's book,

The Forgotten Soldier, who encouraged his men to use their small arms against attacking Russian aircraft and then valiantly led by example. His soldiers displayed more discretion, however, and maintained a passive low profile defense. The lieutenant was the only casualty.

The maneuver battalions deserve a more adequate solution. They need an air defense weapon that will assure at least minimal effective protection for *all* units, not just those that happen to fit the area ADA plan. This weapon should be small and lightweight, relatively easy to employ, simple to maintain, and can preferably defeat or discourage the enemy before he has inflicted considerable damage. In other words, the battalions need a *Stinger* MANPADS section manned by air defense soldiers. If it is not employed organically, then the section should be consolidated for training and support only. Each battalion should be doctrinally assured of having their team reattached for combat.

As part of a combat maneuver organization, the *Stinger* teams should be mounted on something more substantial than the current vulnerable jeep and trailer. A more suitable mount would be the *M113*, particularly as they are made available by the fielding of the *M2* and *M3* infantry and cavalry fighting vehicles. The *M113* would still only require a team of two soldiers, could carry as many as 16 encased *Stingers* (to ease resupply demands), would afford a relatively quick firing capability through the top hatch or rear ramp, and would provide sufficient mobility and armor protection to accomplish the mission.

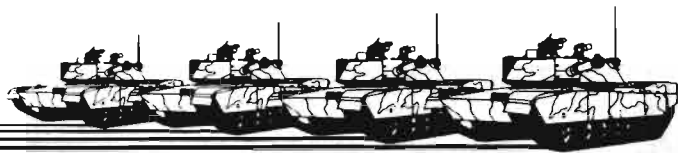
Since the *Stinger* is considerably more effective than the *Redeye*, the Air Defense Artillery is unlikely to willingly relinquish these assets now that they have been successfully consolidated. If this proves to be the case, there is another

less satisfactory alternative—retain the *Redeye* (less teams) in the maneuver units. Although a poor substitute for the *Stinger*, it is much more effective than trying to re-enact David versus Goliath with small arms.

The *Redeyes* could be dispersed throughout the battalion and carried within the combat vehicles until needed. They would be used for *self-defense only*, i.e., maintained under a permanent “weapons hold” status. The training of non-ADA soldiers to fire the weapons should not prove difficult due to the *Redeye*’s relatively simple design. Extensive aircraft identification and complex command coordination would not be required. If the *Redeye* is to be used against only those aircraft actually shooting at you, aircraft identification becomes academic and you already have the authority to shoot back.

Our Army is always striving to make the optimum use of each weapon, hence the trend towards consolidation. Efficiency should not be at the expense of a unit’s self-defense capabilities, however. Each soldier is provided a personal firearm for security against dismounted troops. The *LAW* and other man portable anti-tank weapons are simple-to-use weapons designed to provide a unit with last resort antiarmor protection. These weapons are not the primary means of defeating the enemy; rather they are provided as a minimal means of *self-defense*. Likewise, *MANPADS* appear to be the best last line of self-defense against the aerial threat. Removing this capability from the control of the combat battalions is akin to denying them the right of self-defense.

JOHN R. DREBUS
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Improving Quarterly Services

When I took over as battalion maintenance officer of an M60A1-equipped armor unit, 70 percent of the maintenance being done was unscheduled and 30 percent was scheduled, instead of the other way around. After a closer analysis revealed that inadequate quarterly services were a major contributing factor, we set out to change things. This article describes how and includes a useful master parts list developed to simplify the process.

Our initial analysis identified three major reasons for inadequate quarterly services. Mechanics and crewmen took the attitude that “if it works, don’t fix it.” Second, they didn’t look too hard with only five working days to complete the quarterly services, knowing they’d be working nights and weekends to fix anything they found. And finally, there was a shortage of replacement parts on hand, causing mechanics and crews to make do with old parts or skip some checks and services entirely.

The first two inadequacies were tackled by the battalion as a whole. The last one was a problem faced by the maintenance staff, which addressed the problem by compiling a list of parts necessary to perform an adequate quarterly servicing.

Close examination of TM 9-2350-215-20 and TM 9-2350-257-20 reveals that much more is required to pull an adequate Q than just replacing filters. Carefully, tediously, the

four hull manuals and the parts manuals were cross-referenced and a parts list was drawn up.

Anyone involved in a supervisory position should take the short time necessary to read Section III of Chapter 3 in the TM 20-1-1 applicable to his tanks. You’ll probably find much that isn’t currently being done. For example, we discovered that many lockwashers and self-locking nuts are to be used just once. We also discovered that many steps were being skipped because the mechanic referred only to the 20-1-1 even when that manual referred him to the 1-2, 1-3, and 1-4 for additional steps.

The second manual also includes a section entitled “supplies,” which lists the lockwashers, locknuts, gaskets, filters, and other parts necessary to complete the step. We decided that we needed a master list because the parts are listed by a part number, not the NSN, and because all of the parts necessary to complete the Q are not listed in one place.

Once the master parts list was compiled, companies and battalion maintenance were ordered to stock all of these items. Many were not used on every tank, but were needed often enough to warrant being stocked. As mechanics and crews became aware of what was available, they started using them and performing more checks and services. The items were stored in separate bins which were labeled with the TM item number, NSN, name, and—if applicable—how many

were needed for that step. As parts arrived, the PLL clerk knew exactly which bin they went in. When a mechanic started a step that required parts, he simply pulled out what he needed from the bins marked with that item number.

As a side benefit, many of these parts were used during unscheduled maintenance. A good example occurred when a platoon leader came to battalion maintenance looking for

new final drive mounting nuts. The lieutenant had remembered from his last Q service that these mounting nuts were to be used only once.

This system may not be a panacea, but it may help cure many of your Q-service problems. While the list is usable only by M60A1-equipped units, the concepts behind it are applicable to any maintenance operation.

M60A1 Q SERVICE PARTS LIST

NOTE 1: Quantities marked with an asterisk may not be required on all tanks. For example, it may be a filter that is only replaced if damaged or excessively dirty. The number listed is the quantity that will be used if replacement is needed. The asterisk is also used to denote a locknut or lockwasher that is replaced only if it is found loose. In this case, the number shown is the quantity that our battalion used.

NOTE 2: The first TM number listed is from TM 9-2350-215-20-1-1. The number in parenthesis is from TM 9-2350-257-20-1-1.

NOTE 3: At this time data for most turret parts was unavailable. The only NSN listed is the stab hydraulic filter replacement kit. The NSN is not listed yet in the 20P's.

NOTE 4: Q1s and Q3s end with step 166 (152). If a Q2 or Q4 is being done, skip 145 (130) thru 165 (151).

NOTE 5: Step 7 of items 187 (173) thru 196 (182) deal with discharging fixed fire extinguishers. Check to see if you have permission to do this.

NOTE 6: NSN, figure number, item number, and page are out of TM 9-2350-257-20P-1 unless otherwise noted.

TM Item No.	Description	Quantity
19 (19)	Roadwheel arm assembly mounting screw lockwashers Washer, lock 5310-00-926-5884 Fig 112, item 21, pg 216	10*
37 (37)	Hub to final drive nuts and bushings Nut, self-locking 5310-00-930-3447 Fig 118, item 4, pg 226 Bushings, tapered 5340-00-519-5382 Fig 118, item 3, pg 226 Note: this is the same nut used in item 168 (154).	4* 4* 236 (220)
40 (40)	Sprocket Mounting bolts, bushings, and nuts Bolt 5306-00-799-7722 Fig 118, item 6, pg 226 Bushing 5340-00-799-7721 Fig 118, item 6, pg 226 Nut 5310-00-198-7565 Fig 118, item 7, pg 226	10* 10* 10*
88 (73)	Screws on final drive U-joint Bolt 5306-00-270-7374 Fig 104, item 4, pg 201	10*
131-134 (116-119)	Battery clamps and cover Adapter 5940-00-549-6583 Fig 76, item 5, pg 143 Boot 2590-00-999-9867 Fig 76, item 6, pg 143 Adapter 5940-00-549-6581 Fig 76, item 7, pg 143	2* 3* 2*
143 (128)	Air intake screen gaskets Gasket 5330-00-930-1624 Fig 19, item 33, pg 38 Gasket 1940-00-678-1851	2* 2*

Fig 19, item 26, pg 38 Gasket 5330-00-678-3489 Fig 19, item 32, pg 38	1*
Final drive mounting nuts Nut 5310-00-930-3447 Fig 118, item 2, pg 226 Note: Same as nut in item 37 (37).	5*
Final drive air pressure relief valve Valve 4820-00-537-8931 Fig 103, item 1, pg 200 Note: 20-1-1 says replace but 20-1-2 says replace only if defective.	1*
Fire extinguisher seals Seal 5340-00-903-0426 Fig 160, item 1, pg 308	8
Fuel-water separator Parts kit 2910-00-801-1152 Fig 31, pg 60 Lockwasher 5310-00-582-5965 Fig 31, item 4, pg 60 Note: On Q4s, do item 282 (266) at the same time.	1 8
Primary fuel filter element replacement 2A engines: Parts kit 2815-00-808-2407 TM 9-2300-378-20P/1 Fig 3-21, item 2, pg 142 2D series: Parts kit 2910-00-410-1964 Fig 31, pg 60	1 1
Replace oil filter Note: Normally done only under orders from AOAP lab. 2D series: Parts kit 2940-00-397-3404 Fig 4, pg 10 Nut, self-locking 5310-00-982-4908 Fig 4, item 18, pg 10 2A engine main filter: Gasket 5330-00-678-3278 TM 9-2300-378-20P/1 Fig 01-4, item 22, pg 86 Nut, self-locking 5310-00-982-4912 Fig 01-4, item 20, pg 86 Filter, assy 2940-00-884-1981 Fig 01-4, item 23, pg 86 2A engine aux filter: Gasket 5330-00-678-3277 Fig 01-4, item 5A, pg 85 Filter 2940-00-436-3223 Fig 01-4, item 10, pg 85 Nut, self-locking 5310-00-982-4912 Fig 01-4, item 20, pg 86	1 10 1 8 1* 1 1* 6

	Note: Nuts are same for main and aux filters.								
237 (221)	Manifold heaters fuel filter Filter 2910-00-203-3322 Fig 30, item 21, pg 58 Packing, preformed 5330-00-265-1089 Fig 30, item 24, pg 58 Washer, lock 5310-00-045-3296 Fig 30, item 24, pg 58	1*							
238 (222)	Service and inspect manifold heater spray needle Filter, disk 4330-00-487-2773 Fig 35, item 12, pg 70 (3 for each bank)	6	261 (245)	Replacing cover on brake control housing TM 9-2350-257-34P/1 Gasket 5330-00-888-9403 Fig 85, item 16, pg 153 Washer, lock 5310-00-582-5965 Fig 85, item 18, pg 153	2				2*
247 (231)	Transmission main oil filter replacement Gasket 5330-00-770-7232 Fig 100, item 27, pg 194 Washer, lock 5310-00-261-7340 Fig 100, item 19, pg 194 Filter 2520-00-407-6752 Fig 100, item 24, pg 94	1	262 (246)	Primer pump filter service Packing 5330-00-265-1089 Fig 32, item 3, pg 62 Filter, element 2910-00-203-3322 Fig 32, item 4, pg 62	10				1*
248 (232)	Transmission side oil strainer assembly service Gasket 5330-00-102-3651 Fig 100, item 12, pg 195 Packing 2520-00-799-4930 Fig 100, item 15, pg 195 Washer, seal 5310-00-290-1435 Fig 100, item 16, pg 194 Washer, lock 5310-00-010-3320 Fig 100, item 11, pg 194	3	282 (266)	Service water separator and replace final filter Note: Do this on Q4s only. Do this at the same time as 233 (217). Filter, fluid 2815-00-808-2421 Fig 31, item 7, pg 60	2*				1
			Turret	Replace stab hydraulic filter Kit, filter bowl 1015-01-031-0538 Note: This is a new NSN not in the parts manual. It includes the filter and packing.					1

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The Real Meaning of Loyalty

Loyalty - The act of being loyal.

Just what does this word, loyalty, mean? What is its importance to a military organization? A review of present and past officer and enlisted rating forms shows that loyalty is a quality that deserves evaluation and comment. As a newly commissioned lieutenant, I never paid any particular attention to the "loyalty block." Loyalty was one of those military "givens." Only when one experiences disloyalty does he begin to realize the wisdom of the people who designed the Army's evaluation reports.

If one were to ask a commander what qualities he seeks in his subordinates, he might list tactical proficiency, writing skills, and other technical qualities. However, if he does not have the loyalty of his subordinates, no amount of expertise will replace this bond that welds a unit together and gives it the strength that is necessary to survive the stress of a combat or peacetime environment.

To be truly professional soldiers, we must be loyal to our nation, subordinates, superiors, and peers. But where does loyalty stop? Do we forego loyalty only when our boss requires something unethical? It often falls to subordinates to carry out the task of enforcing policies instituted by their superiors in which they themselves do not personally believe. Is it the duty of a subordinate to carry out the orders of his commander as though they were his own? Do we give credit where credit is due for those decisions that are bound to be unpopular? For example, when announcing a disagreeable policy, do we say, "This is the battalion commander's policy with which I don't agree, but which I will enforce." The subordinate that does this surrenders his loyalty, and does not deserve the trust and confidence of his superiors.

The proper way to disagree is to do it in private, behind closed doors. Once a decision is made it is your job to support the decision as though it were your own. Is that tough to do? You bet. But it comes with the job.

Loyalty is a professional ethic about which we think little, but must practice daily. Few persons would admit to being disloyal. Such an admission would be tantamount to admitting that training, readiness, and maintenance are not our top goals. Yet upon close examination of a unit, it is not uncommon to find training omitted from the unit's top five goals, as evidenced by its proficiency in job related evaluations. Do we have this same problem with loyalty in the Army today?

The Army is a reflection of the society in which we are living. The "Me Generation" attitude is manifested throughout the junior leadership of the Army. Service for the common good, dedicated to ideals, and, indeed, loyalty are not the trademarks being stamped on newly commissioned officers. The competition to succeed—promotions, schools, and command—tears at the fabric of loyalty that should pervade our daily lives. Loyalty to nation and subordinates can become trampled in our all-consuming, self-serving goal of "mission accomplishment." Tell me, who gains from mission accomplishment at any cost? The unit? The Army? Or the individual who gets the credit? A lack of true loyalty to the boss and its subsequent "yes man" mentality is a disease that threatens to infect the officer corps. However, the future is not hopeless. Each leader can make a difference for we all have more impact than we realize. Our actions touch the lives of many soldiers during our careers. Resolve today to examine where you stand on loyalty. Listen

to your subordinates and what they say. We all are player-coaches. Assume nothing. Ask questions; discuss; instruct! It's our Army. The future is in our ability to command the loyalty of those with whom we serve.

Loyalty also translates into other words like trust and confidence. A unit without loyalty up and down the chain of command is worthless. Loyalty is a two-way street. One must first be loyal before he can demand or expect the loyalty of others. The conflict of who deserves your loyalty and who doesn't is at times dependent on the situation. Many would argue that your boss always comes first, while others would declare themselves, first and foremost, loyal to their subordinates. To ascribe to either of these views is totally wrong. The problem of choosing whom to be loyal to often presents itself when we receive an order with which we personally disagree. What then is the loyal thing to do? First, it is to approach your superior and make your thoughts known to him. In doing so you are being loyal to your men and to your commander. As alluded to earlier, it is the "yes man," looking to curry favor with the boss, who is truly

disloyal without even saying a word. Perhaps you will be able to change your commander's mind. Failing that, it becomes your mission to implement the orders given you. Many an unpleasant task has been predestined to failure by the negative way in which it was presented. Look for a way to accomplish the mission that preserves the loyalty to your subordinates and yet provides the commander with the desired results. Being innovative may be the solution to not having to take sides on a loyalty issue.

In the end, perhaps the best guide for the individual is to be true to himself. Loyalty to one's ideals and feelings leads to honesty in dealing with others. In turn, this promotes loyalty within the organization. For loyalty is a professional attribute the importance of which separates the military community from that of the civilian world at large. It is an ideal that must permeate our personal and professional lives.

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HHC, IAD



Confusion—a Winner and a Loser

There seem to be several extremely vital adjuncts to combat that are seldom mentioned in any of the professional journals. Among these is the effect of battlefield confusion upon enemy and friendly forces. A battle can be won or lost from the effects of confusion. But there are two types of confusion and both must be understood. One must be put to use—the other overcome.

The *confusion of winning* comes about when your troops break the crust of the enemy's FEBA and pour into his rear areas. All previous battle plans go awry. Junior leaders take the battle into their own hands, pursuing individual tactical courses presented to them by the disintegrating defenses. A surge of adrenalin enters into your men as they fight more vigorously for the victory they sense is close. In these battlefield circumstances, reports are often ignored in the heady exhilaration of winning and you, the commander, must cope as best you can in the absence of complete information.

Conversely, should *your* FEBA be pierced, then your troops will be fighting a wildly defensive battle and every casualty to man or machine will add to the overwhelming *confusion of defeat*. At this stage, as confusion quickly leads to fear, and fear to rout, the enemy has won the battle of confusion.

One who has never been there can't begin to imagine the confusion that prevails in a battle, be it a patrol skirmish or a full-scale combat involving divisions, corps, and armies. It just gets worse as the action expands. And the commander who possesses the clear-headedness—the cold-bloodedness, if you will—to see through the mental fog of confusion, who unerringly makes the right decision and who maneuvers accordingly, will be the winner. He can be a fire team leader or a three-star general. Each must fight and conquer his own sense of inner confusion to sort out the confusion of the battle taking place around him.

Our training programs, excellent as they are, do not inject any *intolerable* confusion into their scenarios to test that mental exercise. Everything is cut and dried. The terrain boards are neat and orderly with clearly defined terrain and

man-made features, complete with neatly arranged arrays of miniature vehicles. Field maneuvers are not always conducted in inclement weather, over unfamiliar terrain, and seldom with raw troops and leaders. Who is to say that our excellent core of officers and NCOs will be around after a few days or weeks of combat? We just cannot depend upon their continued survival on the FEBA. And neither can the enemy depend upon his core of trained officers and NCOs, for good leaders are always at the fore, and their ranks suffer accordingly. Thus, confusion will reign rampant upon the battlefield.

An action of any size is a fearsome thing and since Murphy's No. 1 Law will automatically prevail (If anything *can* go wrong, it *will*. And at the worst possible time.), any sensible leader will know that his most carefully laid plans will be blown away with the first shot.

What good does it do, if your soldiers all fire "possibles" on the small arms or tank ranges where every precaution has been taken to avoid confusion, if they miss with that vital first shot when the air around them is alive with incoming fire? Are we too concerned with range safety to neglect the life-saving benefits that *controlled* confusion can teach us in training? This in no way diminishes common sense requirements for weapons safety precautions, but it does point out the need for training that is more combat-oriented. The kind of training where all the rounds aren't going *down* range—some will be going *cross*-range, and some may even be coming *up*-range, and "Danger Close" becomes the order of the day.

At this point I can hear the horrified gasp of "Think of the casualties!" I *am* thinking about them. And they have never been excessive, nor even substantial, in any live-fire exercise this army has ever conducted. Yet, for every soldier injured by "enemy" fire during an exercise, a hard and valuable lesson was driven home to those around him. They actually saw, with their own eyes, a man hit. And they continued the exercise. And the casualty, himself, learned at first hand the primary rule of battle—*keep down* except when

you *must* move. Don't let the noise and the confusion rattle you into exposing yourself.

Confusion? Casualties? How do they relate? They are irrevocably tied together, for if a man becomes confused under the mental and emotional strain of a live-fire exercise where he *knows* beforehand that nobody is *intentionally* going to shoot him, then he is going to get himself killed in combat where the enemy's intentions are strictly murderous.

The training to which Rangers and paratroopers are exposed perhaps best epitomizes the relationship between casualties and confusion. Dangerous fire and maneuver exercises teach these men to sort out the dangers around them and to concentrate on the mission whether it be scaling a cliff or exiting a plane. Such training has proven its worth in battle and the casualties incurred have taught their lesson to the survivors.

The idea, then, is to know that confusion will prevail upon the battlefield and to train yourself and your troops to put aside its distractions as much as is humanly possible to concentrate upon disrupting the enemy by sowing confusion in *his* ranks.

If you can so disrupt the enemy's attack by sowing confusion in his rear areas and among his FEBA forces, and if you can keep the inevitable confusion in your own command circles down to an acceptable level, then you will win your fight.

And how will you accomplish this when incoming is impacting around you, when the wounded are wailing, and the tanks and AFVs are grinding and shooting and the choppers are overhead adding their raucous quota of noise, and the radios are crackling in a mad cacophony of sound (or are ominously silent), and everybody wants an answer to *his* problem *right now* and when the success or failure of your mission hinges on your answers? You do it by keeping your head. By mentally cutting out the noise and the turmoil and the milling about taking place around you. You don't turn it off, for that could be fatal. You put it into the background and you *concentrate* on the battle's progress, or lack thereof, and you issue those simple and unconfused orders that will determine your success.

Such concentration does not come easily, for few of us have been exposed to the confusion of battle. But such concentration and muting of the "background noise" must be learned and practiced—every day.

Consider the fighter pilot who is aware of what is going on around him in his supersonic dogfight, but who *concentrates* upon his target and shoots it down. Or the bomber pilot who sees his wingmen shot down, sees the flak and the rockets

exploding in his vicinity, but who *concentrates* on holding his plane level for the vital bomb run. Or the platoon leader who sees his men falling, who hears the whiplash of bullets and whose body shudders to the blast of grenades, but who *concentrates* on taking out that pillbox.

If you can keep your head in the nonlethal confusion of a training exercise and keep all extraneous matter in the background of your mind, then you are learning. If you can quickly sort out the mish-mash of a company clerk's squabble with his opposite number in the neighboring company and lay down a fair decision, then you are learning. And when you have mastered that phase of your training (for it *is* training), you can go on with reasonable expectations of sorting out even greater turmoils. You must mentally train yourself to *sort out the extraneous from the vital* and to *concentrate* upon the latter.

But you must never let go of the premise that, as you conquer your own confused world and bring order out of chaos, you must do all in your power to keep your opposite number as totally confused as possible. It is incumbent upon you to sow confusion in his ranks before he can do the same to you.

There are so many ways in which you can accomplish this disruptive and destructive confusion upon the enemy that they cannot all be covered here. Some examples include: attack from unexpected directions, deceptive defensive measures, constant harassment by combat patrols, harassing and interdiction fires, sniping, electronic combat and rear area raids. The list is as long as your imagination. Your application of these measures must be unrelenting.

The power of arms alone does not guarantee victory — as our own doctrine teaches us. But confusion, running rampant in the enemy's ranks, inspired by your own deceptions, may well save the day. Never forget that confusion may just as easily disconcert the experienced three-star general as it does the newly-hatched two stripe corporal.

Train to defeat your own confusion. Train every day and under all circumstances; in the classroom, in the office, in the field, in your home—everywhere. Train to put confusion into the background of your mind. Train to *concentrate* upon the essentials. Train your troops just as you train yourself. Let no man of yours go into the confusion of battle in a confused state of mind.

And, most assuredly, do not be confused yourself.

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Recognition Quiz Answers

1. **M-60P** (Yugoslavia) APC. Crew 3 plus 10 passengers. 45 km/hr maximum road speed, 400 km maximum cross-country range. Armed with 1 x 12.7-mm anti-aircraft machinegun, 1 x 7.92-mm bow gun and may also be fitted with 2 x 82-mm recoilless rifles in anti-tank role. Weighs 11,000 kg (24,255 lbs).

2. **CHIEFTAIN** (UK) MBT. Crew 4. 47 km/hr maximum road speed, 400-500 km maximum road range. Armed with 1 x 120-mm main gun, 1 x 7.62-mm coaxial machinegun and 1 x 7.62-mm anti-aircraft machinegun. Weighs 54,100 kg (119,290 lbs).

3. **LEOPARD 1A2** (FRG) MBT. Crew 4. 72 km/hr maximum road speed, 550 km maximum road range. Armed with 1 x 120-mm main gun, 1 x 7.62-mm coaxial machinegun and 1 x 7.62-mm anti-aircraft machinegun. Weighs 55,150 kg (121,605 lbs).

4. **JAGDPANZER KANONE** JPZ 4-5 (FRG) TD. Crew 4. 70 km/hr maximum road speed, 400 km maximum road range. Armed with 1 x 90-mm main gun, 1 x 7.62-mm coaxial machinegun and 1 x 7.62-mm anti-aircraft machinegun. Armored from 12 to 50-mm. Weighs 27,500 kg (60,637 lbs).

5. **PT-76** (USSR) amphibious light tank. Crew 3. 44 km/hr maximum road speed, 10 km/hr maximum water speed, water jet propelled, 260 km, maximum road range. Armed with 1 x D-56T 76-mm main gun, 1 x 7.62-mm coaxial machinegun. Armored from 10 to 14-mm.

6. **S-TANK** (Sweden) MBT. Crew 3. 50 km/hr maximum road speed, 390 km maximum road range. Armed with 1 x 105-mm main gun, 2 x 7.62-mm coaxial machineguns, 1 x 7.62-mm anti-aircraft machinegun. Main gun fixed; elevated, depressed, traversed by hull movement. Weighs 39,000 kg (85,995 lbs).

ARMOR NEWS



New ROK MBT Under Test

A proposed new battle tank for the Republic of Korea is now undergoing tests at the Materiel Testing Directorate at the Aberdeen Proving Ground, Maryland. It has a 4-man crew, is powered by a 1,200 horsepower diesel engine coupled to an automatic transmission. Suspension is a combination of torsion bar and hydropneumatic units that enable the tank to

"kneel" to further depress its main gun (similar to the Swedish *S-tank* suspension). The tank is armed with a 105-mm *M68E1* main gun and two 7.62-mm *M60* machineguns (one coaxial) and one *M2 .50* caliber machinegun. Its armor protects the crew against antiarmor weapons and other systems protect against chemical, biological and radiological attack.

STARTLE To Track 3 Targets at Once

A new radar system capable of sensing and tracking up to three moving targets at once is under test at the Materiel Testing Directorate that is sponsored by the Army Night Vision and Electro-Optics Laboratory at Fort Belvoir, Virginia. Named the Surveillance and Target Acquisition Radar for Tank Location and Engagement (STARTLE), the radar is mounted on the High Mobility Agility Vehicle (HIMAG) and is being tested under severely limited visibility conditions.

"A video display allows the gunner to see the targets in front of his vehicle," explained a technician at the test center. "Through the use of video graphics, the gunner places the number one priority target into a box projected onto the screen. The gunner then presses the track button and the radar locks onto its first priority target vehicle. If more than one target is in the vicinity, the STARTLE system's processing unit allows the gunner to automatically go into track on the second target after squeezing the trigger to engage the first target. The process is repeated if a third target is in the area."

The STARTLE allows the 75-mm main gun to fire at two second intervals if required.

OPFOR Unit Trains the Hard Way

The 1st Battalion, 73d Armor at Fort Irwin, California, a part of the OPFOR faced by rotational units at the National Training Center, went at its common task training (CTT) requirements in a way that not only tested the

soldier's abilities to perform CCT tasks, but also gave them some extra physical training as well.

The E-1s through E-6s were required to complete a 6.4-mile course on the run through the desert. Ten stations were spaced about three-quarters of a mile apart and at each one the soldiers had to perform a specified CTT task.

Staff Sergeant Roy Calhoun said, "Running from station to station in the desert kind of broke the monotony for the guys. . . I've been here for over three years and this is the first time, that I can recall, that we have conducted CTT in this manner. . . I'd have to say the hardest part of the course is the running—running in the soft sand—coupled with the heat (in the 80s) is a bit difficult," the NCO added.

Armor Unit Added to Regimental System

The 68th Armor Regiment was recently activated in the Army's new Regimental System. The 68th will have two battalions stationed at Fort Carson, Colorado, and two battalions in Europe.

ZIP Change for U.S. Horse Cavalry Address

An incorrect Zip Code was given in the address for the U.S. Horse Cavalry Association in the January-February 1984 issue. The correct address is:

U.S. Horse Cavalry Association
P.O. Box 6253
Fort Bliss, Texas 79906

Reserve Component TC Courses Listed

The National Guard Bureau is sponsoring a Reserve Component TC Course at Gowen Field, Boise, Idaho to include training in maintenance forms, PMCS, armament controls and equipment, TCPC, tactical crew drills, assembly, disassembly, loading and clearing of tank machineguns, range estimation, boresight and systems calibration of the tank, preparation of the tank for firing and use of auxiliary fire controls.

The courses are open to Army National Guard armor and cavalry units. The remaining course schedules are:

Class	Report Date	Close Date	Class Size
4-84	28 Jul	11 Aug	48
5-84	18 Aug	1 Sep	48
6-84	8 Sep	22 Sep	48

Prerequisites include: ARNG E-6, duty MOS 19D30 or 19E30. E-5s may apply if assigned as TC: applicants must meet weight and height specifications as per AR 600-9; pass a PT test within six months and be physically qualified to attend the course; have a minimum of two years service after completion of course.

The host State will fund pay, allowances, travel and per diem for State members.

Individuals desiring to attend should submit NGB Form 64 through channels to the Military Education Branch, ARNG Operating Activity Center, Edgewood Area, Aberdeen Proving Ground, MD 21010 not later than 45 days prior to the start date of the class desired. POC is E.R. Remiscewski, Autovon 584-4789.

U.S./German Tank Ammo Tested

A memorandum of understanding between the U.S. and German governments calls for tests to determine, and achieve, harmony between the U.S. 120-mm high explosive antitank (HEAT) round with the German product to ensure interchangeability in use between the *M1E1 Abrams* and the *Leopard 2* tanks.

"The tests will ensure interchangeability of all ammunition brought into use for the two tanks by the armed forces of both governments," said a spokesperson for the Tank Ammunition Section at the Materiel Testing Directorate.

"Such interchangeability will result in weapon and ammunition systems designed so that any mixture of ammunition can be safely and effectively fired from either tank using the firing data developed for the agreed family of cartridges," the spokesperson added.

The HEAT-MP-T round is a fixed, fin-stabilized, chemical energy multi-purpose round with both anti-armor and antipersonnel capability. It uses a combustible cartridge case which leaves only a stub case to be ejected into the turret.

Sgt Wins \$3,872 for Master Gunner Training Idea

SFC John Hannum, 1st Armd Div, B Co., 1st Bn, 13th Armor at Illenheim, West Germany, recently was awarded \$3,872 for a suggestion that is expected to save the Army \$135,000 this year.

Sergeant Hannum, reviewing the cost of sending tankers to the Master Gunner Course at Fort Knox, KY, realized that the Army was losing money on those who failed the course because it cost as much to send them

to Fort Knox and back to their units as those soldiers who passed the course. He came up with the idea of having those selected for the Master Gunner's Course first take a turret course at a school in Germany. The course is now a prerequisite for all those who are slated for the Master Gunner's Course at Fort Knox.

Mine Clearing Roller Developed for M1

The tank-mounted mine clearing roller developed by the Army's Belvoir Research and Development center, Ft. Belvoir, VA, is being further developed for installation on the *M1 Abrams* tank.

Currently, the track-width roller is mounted on the *M60*-series tank to clear pressure-fuzed antitank or antipersonnel mines. The special kit used to mount it also permits the driver to disconnect the roller from inside the tank when its mine clearing mission has been completed.

Reunions

Big Red One To Hold Reunion

The Society of the First Division will hold its 66th annual reunion at Boston on August 22-26 at the Marriott's new Copley Place Hotel. Division members and veterans should contact Arthur L. Chaitt, Executive Director, Society of the First Division, 5 Montgomery Avenue, Philadelphia, PA 19118.

3d AD Association Reunion Slated

The 3d Armored Division Association will hold its annual reunion at the Marriott Hotel, New Orleans, LA from July 26 through July 28. This is the same period that the New Orleans World Fair is being held. All 3AD Association members are urged to contact their local representatives to make arrangements for the reunion.

65th Division Reunion Slated

The 65th Infantry Division Association will hold its 31st reunion in Hattiesburg, Mississippi on September 13, 14, 15 at the Days Inn and the Howard Johnson Hotel. Highlight of the program will be the dedication of the 65th Division Memorial at Camp Shelby.

For further information write: Mr. Fred J. Cassata, 123 Dorchester Road, Buffalo, N.Y., 14213

704th TD Battalion Vets—Attention!

Veterans of the 704th TD Battalion who served during the following periods; 15 Dec 1941 to 15 Oct 1945; 30 July 1951 to 25 Feb 1953, and 25 Feb 1953 to 1 April 1957 should get in touch with Walter C. Righton, 29 West Wilkins Lane, Plainfield IL, 60544, (815) 436-2907. The 704th has been awarded the French Croix de Guerre with Palm (twice) and the French Fourragere as per GO dated 12 January 1982. Also, the 704th TD Bn is holding a reunion from Oct 12 to 14 at West Point, N.Y. For details contact: R.W. Bowman, 71 Route 25-A, Smithtown, N.Y., 11787.

SOVIET BLITZKRIEG THEORY, by P.H. Vigor. St. Martin's Press, N.Y. 218 pages. \$22.50.

The rapidly growing dialogue on conventional war will be fueled by Vigor's thought-provoking book on the role of the blitzkrieg in Soviet military theory. Vigor examines the two fundamentals (speed and weight of blow) which are the keys to the success of a surprise attack and he analyzes the blitzkrieg in the context of Soviet military doctrine, experience and capabilities.

ARMOR readers will want to consider various factors which might facilitate such an attack, such as the use of *Spetsnaz* (Soviet Special Forces troops) and other special operations assets to attack NATO rear-area C³ and logistics sites, the growing Soviet interest in airborne warfare, employment of chemical warfare, the use of sleeper agents to conduct sabotage against NATO facilities and transportation chokepoints, and the confusion and delay engendered by refugee flow and military dependent evacuation.

The book is highly recommended because of its relevance to improving the readiness of Western armored and mechanized forces to fight in a no-notice, broken-backed, "come as you are war" environment.

JOHN A. HURLEY
Lieutenant Colonel, USAFR
HQ, USAF

THE ROAD TO BERLIN by John Erickson. Westview Press, Inc., Boulder, Co. 877 pages. \$42.50.

This is the second of two volumes on the war between Nazi Germany and Stalinist Russia, as seen by the Russians. It covers the period between the Battle of Stalingrad and the end of the war.

Professor Erickson addresses the military and political history of this struggle in great detail, with some 640 pages of text and a further 202 pages of footnotes and references. He provides a wealth of information and insight on the rarely glimpsed level of the Russian high command which makes the book very valuable for any student of the Eastern Front. But, I believe that it should be read with care for two reasons: First, it is heavily based on Soviet sources. Secondly, Erickson's tone seems to lack some measure of objectivity, being a great deal more sympathetic to the Soviet Union than the facts of their behavior before, during and after the war could justify.

I would recommend this book to those with a serious interest in the war on the Eastern Front and the Red Army in gen-

eral, but do so with reservations that care be taken in believing all that the book says.

RICHARD BYRD
Captain, Armor
Fort Knox, KY

ENCYCLOPEDIA OF AXIS ARMORED VEHICLES by Nicola Pignato. Parma, Italy, 1983. \$17.50. (In Italian)

The second edition of this book is a marked improvement over the first which appeared in 1971. While it does not treat each vehicle as exhaustively as some specialized publications, it is commendable in its scope, thoroughness and layout.

For those who read Italian, this is an excellent basic reference work on Axis armored vehicles. It is especially useful insofar as Italian armored vehicles are concerned and not only covers the more common types such as the *L3* and *M13* tanks, but other interesting vehicles such as the *A.S. 43* armored car and the *Fiat 665 NM* armored truck.

RAPHAEL A. RICCIO
Major, MI
Woodbridge, VA

A HISTORY OF THE ROYAL ARMOURD CORPS 1914-1975 by Kenneth Macksey. Whatley Mills, Beaminster, Dorset, England. 229 pages, \$18.00

This concise, valuable history tells the story of the evolution of the British armored force as it is today. Macksey's book is a compilation of data from official unit diaries, regimental histories and much new material released from government archives.

Especially interesting is the straightforward account of the "marriage of convenience" between the old cavalry regiments and the Royal Tank Corps.

The book details the derivation of the Corps since the introduction to battle of armored cars and tanks in WW I and charts its progress to the present era. It is not a history of individual regiments, nor of the armored fighting vehicle but, rather, the story of the entire Corps, the part it had played in war and peace, and the contribution made to it by individuals, units and machines. A select bibliography and list of Regimental histories is provided for the reader's reference and as a guide to further reading.

MICHAEL CULLINAN
Lieutenant Colonel,
14/20 King's Hussars
British Liaison Officer, Ft. Knox, KY

BRITISH ARMY EQUIPMENT by Peter Gudgin. Arms & Armour Press, London. 88 pages. \$8.95.

This small, soft-bound book contains a wealth of general information on the current equipment used by the British Army, including armored vehicles, artillery, infantry weapons, etc. It is lavishly illustrated and is a good general data recognition guide. The only real difficulty is in the manner in which the tabulated data is presented. However, this not is insoluble.

Those interested in general descriptions of vehicles and weapons, rather than a detailed analysis, will find this book worthwhile.

PHILIP C. GUTZMAN
Major USA (Ret)
Warren, MI

THE UNCERTAIN ALLY: BRITISH DEFENCE POLICY 1960-1990, by Michael Chichester and John Wilkinson. Gower Press, 1982. 264 pages. \$38.00.

"In future, after full consultation with her allies, Britain should give priority to her maritime and air forces and the defence of the United Kingdom island base by air, sea and land. . . (which will mean) a major reduction on the Rhine. . ." These words, from the introduction by Air Marshal Sir Neil Cameron, sum up the basic theme of this book. It is well-detailed, well-seasoned, and shocking.

The authors, a professional writer and a Conservative MP, describe in detail the decline in effectiveness of the British armed forces through a series of both Labour and Conservative governments. The conclusions which they draw are both bleak and accurate.

They enumerate a series of governmental decisions and policies that are expected to lead to the withdrawal of British forces from Germany to points west of the Rhine to protect the air bases and at the same time be significantly reduced. In their place, the British Army would develop a credible intervention and rapid deployment force.

The authors propose a strategic summit of NATO leaders to determine the appropriate role of each member country within the context of total defense.

The proposals are not far-fetched; they are, if anything, somewhat ahead of their time. This book represents a very real alternative. It is not bedtime reading—it is worthy of more serious study.

DONALD C. SNEDEKER
Major, Armor
German Armed Forces Staff College

STEEL ON TARGET



It was only 40 years ago that 28 Sherman tanks of Companies A and B of the 70th Tank Battalion rolled onto Utah Beach, dropped their flotation screens, disengaged their propellers, and fired the first rounds in what was to become an armor sweep across Western Europe. The opening of the Second Front had begun.

For most of our soldiers today, that event is ancient history and perhaps many are unaware of the great gamble that took place on that cold, overcast day in June of 1944. General George Marshall, Chief of Staff of the Army, described the invasion as "an opportunity for a disaster on an unprecedented scale." There are few officers or NCOs still on active duty who participated in the Normandy Invasion, but they, along with many not long retired, can recall in vivid detail the events of that morning. They are living witnesses to what General Dwight Eisenhower called, "The Great Crusade."

The fortunes that day were decided by the efforts and contributions of all branches and services. Armor played a small but critical part in the D-Day assault. For six days at Utah Beach, the 4th Infantry Division and the 82d and the 101st Airborne Divisions called on the 70th and the 746th Tank Battalions for their sole armor support. Wherever they were employed, the actions of the tank battalions were characterized by speed and reduced infantry casualties. They were in great demand and moved from one infantry unit to another in an endless series of tank-infantry team actions.

The worth of armor support to the infantry was evident by the fact that the only regiment to accomplish its D-Day mission on schedule, the 8th Infantry, succeeded with the help of the 70th Armor.

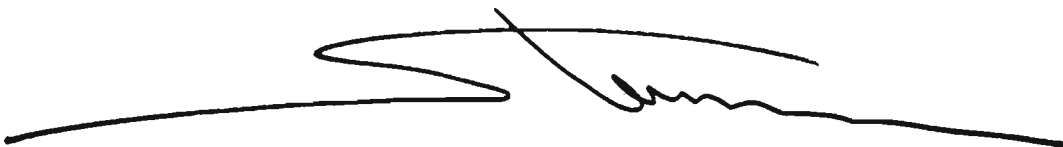
Fortune did not favor armor at Omaha Beach. The 1st Infantry Division went ashore supported by the 741st and 743rd Tank Battalions. But heavy waves swamped and sank all the amphibious Shermans of C Company of the 741st. Only five Shermans in the entire battalion made the shore. The 743rd fared better, losing only eight Shermans to direct hits on the LCTs of Company B. The situation on Omaha Beach remained in doubt and the few tanks employed throughout the day slugged it out with the entrenched enemy and were themselves prime targets for artillery and antitank fire.

The consensus of opinion running through after-action reports of that day and those to follow was the insufficient number of armor battalions committed to fight in the American sector. That shortfall was overcome by the hesitation of the German high command to commit their Panzer reserves in the early hours of the invasion when the assault forces were most vulnerable, and the effective isolation of the battle area by allied air power.

The folks at home were introduced to a new vocabulary as a whole new class of armored vehicles based on the tank appeared sporting names like Crocodiles and Crabs, some of the "Funnies". They were special-purpose vehicles mounting dozer blades to clear obstacles, flails to detonate mines, folding bridges to span ditches, demolition guns to clear roadblocks and pillboxes, rolls of canvas carpeting to bridge areas of soft sand, and flame-throwers. The special-purpose armored vehicle remains today a vital element of the combined arms team.

Winston Churchill said, "Now this is not the end. It is not even the beginning of the end. But, it is, perhaps, the end of the beginning." He was speaking of the invasion but he could as well have said the same for armor.

Good Shooting!





Symbolism

The regiment was organized at Fort Sam Houston, Texas, in 1901 and spent its first two years at that post. The cactus shows the birthplace of the regiment as well as its service on the Mexican border.

The palm branches represent two Presidential Unit Citations awarded for action on Leyte. The sun, adapted from the arms of the Philippines, denotes an award of the Philippine Presidential Unit Citation. The kam-pilan, a weapon of the Moros, is for early tours of duty during the Philippine Insurrection. The war club represents service in New Guinea and the Bismarck Archipelago. The unit's claim that one of its enlisted men was among the first to enter Tokyo is noted by the horseshoe (suggesting cavalry) within the Japanese torii, or temple gateway.

Distinctive Insignia

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

12th Cavalry

Semper Paratus

Lineage and Honors

Constituted 2 February 1901 in the Regular Army as 12th Cavalry. Organized 8 February 1901 at Fort Sam Houston, Texas. Assigned to 2d Cavalry Division March 1923—3 January 1933. Assigned 3 January 1933 to 1st Cavalry Division. Dismounted 28 February 1943 and reorganized 4 December 1943 partly under cavalry and partly under infantry tables of organization and equipment. Reorganized wholly as infantry 20 July 1945 but retained cavalry designations. Inactivated 25 March 1949 at Otawa, Japan, and relieved from assignment to 1st Cavalry Division.

Reorganized 15 February 1957 as a parent regiment under the Combat Arms Regimental System.

Campaign Participation Credit

World War II

New Guinea
Bismarck Archipelago
Leyte (with arrowhead)
Luzon

Vietnam

Defense
Counteroffensive
Counteroffensive, Phase II
Counteroffensive, Phase III
Tet Counteroffensive

Decorations

Presidential Unit Citation (Army), Streamer embroidered ORMOC VALLEY, LEYTE (Headquarters and Headquarters Troop, 12th Cavalry, cited; WD GO 108, 1946)

Presidential Unit Citation (Army), Streamer embroidered CENTRAL RANGE, LEYTE (1st Squadron, reinforced, cited; WD GO 110, 1946)

Presidential Unit Citation (Army), Streamer embroidered PLEIKU PROVINCE (1st and 2d Battalions cited; DA GO 40, 1967)

Philippine Presidential Unit Citation, Streamer embroidered 17 OCTOBER 1944 TO JULY 1945 (12th Cavalry cited; DA GO 47, 1950)

Presidential Unit Citation (Army) Streamer embroidered HOA HOI (1st Battalion cited; DA GO 47, 1968)

Presidential Unit Citation (Army) Streamer embroidered QUANG NAM PROVINCE (2d Battalion Cited; DA GO 42, 1970)

Valorous Unit Award: QUANG PIN PROVINCE (2d Battalion cited; DA GO 39, 1970)

Valorous Unit Award: FISH HOOK (DA GO 43, 1972)

Valorous Unit Award: TAY NINH PROVINCE 1969

Valorous Unit Award: TAY NINH PROVINCE 1971