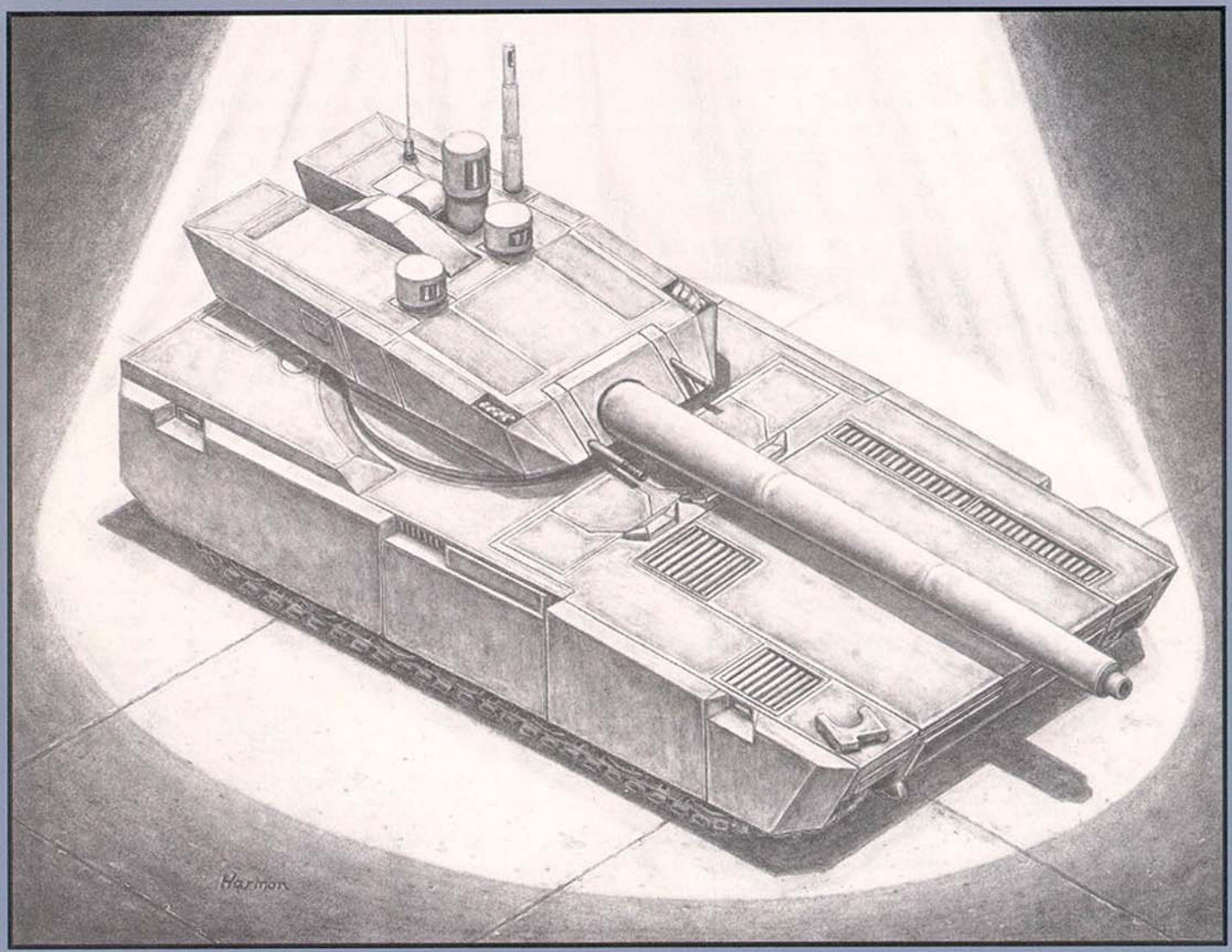
ARMOR

TANK DESIGN CONTEST



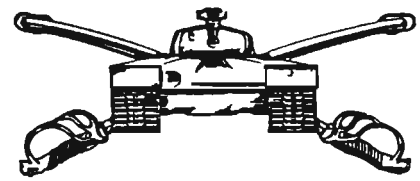
WE HAVE A WINNER!

PB 17-93-4

Approved for public release; distribution is unlimited.

July-August 1993

It's always inspiring for me to discover how many people outside of active duty, national guard, and reservists like to talk tanks. I can be on-post, off-post, or at the post office, and once people find out what I do, they can't wait to share their views on armored warfare or the latest in combat vehicle development. Sometimes their comments lead to a story for *ARMOR,* often times not, but I always come away from the discussion edified. I've been in this job a year now, and I've heard everything from, "We need to up-gun the A1," to "I've got this idea for how to make a tank float on a cushion of air..."



Some of those notions about tank design crystalized recently with our Tank Design Contest, sponsored by *ARMOR* and the U.S. Armor Association. I want to personally thank all those who put time, effort, and a bit of their heart and soul into the many exciting and inventive designs we received (my personal favorite was the three-sectioned, walking tank that resembled a cross between a catepillar and some Legos). Actually, **all** the designs got the participants and the judges to thinking — that was the goal — as I am sure the top two we've published in this issue will get you thinking, too.

If we ever stop looking for a better way to do business, we're in trouble as a branch, as an Army, and as a nation. And it is in the spirit of finding a better way that we feature articles on call for fire, field trains security, and maneuver sketches among others. The historical articles herein provide balance and help us quantify our lessons learned. The overview on Yugoslavia will set the scene for what promises to be a benchmark story coming in the September-October *ARMOR* — an eyewitness to a tank battle in the Balkans.

So, we martial descendants of St. George keep sharpening our sword and polishing our armor as we await the next challenge. And while there is no hunger for battle in the eyes of those who have truly seen it, there is a glint of certainty that it will come nonetheless. Like the medieval knight, who upon slaying the last visible challenger, reluctantly sheathes his sword, we cast our eyes about the rocky landscape and wonder from which cave the next dragon will emerge. Only vigilance will keep us from becoming as Poet McLandburgh Wilson says,

Our hero is a man of peace,
  Preparedness he implores
His sword within its scabbard sleeps,
  But mercy, how it snores!

— J.D. Brewer

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the Secretary of the Army
04322

ARMOR

The Professional Development Bulletin of the Armor Branch PB-17-93-4

Editor-in-Chief
MAJ J. D. BREWER

Managing Editor
JON T. CLEMENS

Commandant
MG PAUL E. FUNK

ARMOR (ISSN 0004-2420) is published bimonthly by the U.S. Army Armor Center, 4401 Vine Grove Road, Fort Knox, KY 40121.

July-August 1993, Vol. CII No. 4

Features

Departments

LETTERS

The "Christie Marine Tank" And the Marines

Dear Sir:

Captain William P. McLaughlin's article, "The Assault Amphibian Vehicle (AAV): Its Past, Present and Future" (March-April issue), was interesting and a welcome feature to *ARMOR*. However, in describing the early developmental history of the AAV, he failed to identify the major historical issues which influenced the Corps' decision-making process in the 1920s, resulting in the rejection of the Christie amphibian. To state that the USMC rejected the Christie marine tank (the 1923 unofficial nomenclature for an AAV) because of "poor water speed and buoyancy" does not do justice in describing the struggle the Marine Corps experienced over its first AAV.

In 1921, a farsighted Marine, Earl H. Ellis, produced "Advanced Base Operations in Micronesia," which outlined the USMC's operational plan for seizing hostile bases in the Pacific. This revolutionary plan became the linchpin of Marine Corps amphibian doctrine in the event of war with Japan. The following year, Major General Commandant John Archer Lejeune received a report of a Christie amphibian that could operate either on its tracks or wheels, and advised that, "the use of this mount seems to be indicated in landing operations of the Advanced Base." Shortly thereafter, General Lejeune instructed Brigadier General Smedley D. Butler, the CG at the Marine Barracks, Quantico, to acquire the Christie marine vehicle for an unofficial test by an assaulting force off of Culebra Island near Puerto Rico. At no cost, J. Walter Christie agreed to loan the vehicle to the Marines, and in February 1924, it was launched by a submarine. However, due to large breaker

DIRECTORY — Points of Contact

(Note: Fort Knox Defense Switch Network (DSN) prefix is 464. Commercial prefix is Area Code 502-624-XXXX).

ARMOR Editorial Offices

Editor-in-Chief	
Major J. D. Brewer	2249
Managing Editor	
Jon T. Clemens	2249
Editorial Assistant	
Vivian Thompson	2610
Production Assistant	
Mary Hager	2610
Contributing Artist	
SPC Jody Harmon	2610

MAILING ADDRESS: ARMOR: ATTN: ATZK-PTD, Fort Knox, KY 40121-5210.

ARTICLE SUBMISSIONS: To improve speed and accuracy in editing, manuscripts should be originals or clear copies, either typed or printed out double-spaced in near-letter-quality printer mode. We also accept stories on 3½ or 5¼-inch floppy disks in MultiMate, WordStar, Microsoft WORD, WordPerfect, XyWrite, and ASCII (please include a double-spaced printout). Please tape captions to any illustrations submitted.

PAID SUBSCRIPTIONS/ST. GEORGE-ST. JOAN AWARDS: Report delivery problems or changes of address to Connie Bright or Tonya Mitchell, P.O. Box 607, Ft. Knox, Ky. 40121 or call (502) 942-8624, FAX (502) 942-6219.

UNIT DISTRIBUTION: Report delivery problems or changes of address to Mary Hager, DSN 464-2610; commercial: (502) 624-2610. Requests to be added to the free distribution list should be in the form of a letter to the Editor-in-Chief.

ARMOR HOTLINE — DSN 464-TANK

(The Armor Hotline is a 24-hour service to provide assistance with questions concerning doctrine, training, organizations, and equipment of the Armor Force.)

U.S. ARMY ARMOR SCHOOL

Commandant	(ATZK-CG)
MG Paul E. Funk	2121
Assistant Commandant	(ATSB-AC)
BG Larry R. Jordan	7555
Chief of Staff, Armor School	(ATSB-DAS)
COL John C. Johnston	1050
Command Sergeant Major	
CSM Richard L. Ross	4952
Armor School Sergeant Major	
CSM Henry F. Hurley	5405
16th Cavalry Regiment	(ATSB-SBZ)
COL Richard W. Rock	7848
1st Armor Training Brigade	(ATSB-BAZ)
COL Henry Hodge	6843
Directorate of Combat Developments	(ATZK-CD)
COL Edward A. Bryla	5050
NCO Academy	(ATZK-NC)
CSM Johnny D. Duncan	5150
Reserve Component Spt Div	(ATZK-PTE)
LTC Billy W. Thomas	5953
TRADOC System Manager for Armored Gun System	(ATZK-TS)
COL Charles F. Moler	7955
Mounted Warfighting Battlespace Lab	(ATZK-MW)
COL David L. Porter	2139
Office of the Chief of Armor	(ATZK-AR)
COL Don Elder	7809
	FAX - 7585

In the photo at left, Marines of 8th Company, 5th Regiment, test the Christie Marine tank's assault capabilities in late February 1924, at Chiriqui Lagoon, Culebra, Puerto Rico.

waves, it proved to be unseaworthy. Eventually, the Christie marine tank ended up in Chiriqui Lagoon, Culebra, where Marines from 8th Company, 5th Regiment, unofficially tested it. Overall, the comments were positive and visionary, because these Marines were convinced that a tracked landing craft in 1924 could revolutionize the expeditionary role of the Corps, provided that continued tests and redesigns were made to enhance the vehicle's assault capabilities.

General Lejeune noted that the Christie marine tank was not yet perfected, "but [was] capable of being developed into a valuable weapon of war." In his annual report to the Secretary of the Navy, the CMC stated that the "special boats" used for landing operations proved to be interesting, but the results were not decisive. The CG of the Marine Corps Expeditionary Force, Brigadier General Eli E. Cole, considered the Christie "tank capable of being developed into an extremely valuable weapon of war, not only in connection with landing operations, but in a war of movement."

A study assessing the Christie marine tank by HQMC, Division of Operations and Training, admitted that the Corps, at the time, would not benefit from the vehicle "except as a means of experiment." By 1925, the Marine Corps valued the Christie as a experiemental marine tank worthy of continued research. However, it was not feasible, because Mr. Christie was asking a premium price for his vehicle.

In addition, General Lejeune's and the USMC's developmental interest was dampened by the fact that only by an Act of Congress could funds be provided for the purchase. Furthermore, it was not the policy of the Marine Corps to adopt weapons that differed from those in use by the Army or Navy. Meanwhile, the Navy was confronted by the naval limitation agreements. At the same time, the Army was unable to develop a tank policy and, like the Marine Corps, was beset by budgetary restraints.

The first USMC experience with a marine tank or assault vehicle reflected the tensions between traditional stability and mechanization. Generals Lejeune, Butler, Cole, and the Marines who tested the Christie attempted to graft the idea of a marine tank to the Corps' perceived assault mission, however, a lack of funds and the halcyon years of the 1920s prevented further expression of experimentation.

The primary sources dealing with Marine Corps' experience with the Christie marine tank are located in the Records of the USMC Adjutant and Inspector's Office, General Correspondence, 1913-1932, Record Group 127, at Suitland, Md. These sources were first used by then Lieutenant Colonel Kenneth J. Clifford and published by the History and Museums Division, HQMC, in 1973, and entitled *Progress and Purpose: A Developmental History of the U.S. Marine Corps 1900-1970.* An in-depth analysis of the Marine Corps experience with its first AAV will be published this fall in Volume III of the Marine Corps University "Perspectives on Warfighting" series.

GEORGE F. HOFMANN, Ph.D
University of Cincinnati
Cincinnati, Ohio

A Call to Arms From Rebel Reenactors

Dear Sir:

I have just read, with great interest, your account of the 1862 Christmas Raid on our geographical area by the men commanded by the "Thunderbolt of the Confederacy," BG John Hunt Morgan. Being a 'Civil War' reenactor, I constantly study that war and, after eight years in this hobby, will be the first to admit that none of us know it all.

Your article has been very well researched and, unlike other more flamboyant writers, you put the Morgan legend into the correct place. Others have written that Morgan was a show-off, a womanizer, and a dandy. These are not the true facts, and your article tells it like it was. Morgan was first a soldier, dedicated to his beloved Southland, and a keeper of orders. Even on his raid into Indiana and Ohio, Morgan was following orders — to draw as many Union troops into the chase as possible.

Thus, he diverted thousands of Union troops from the main war, as well as destroying millions of dollars worth of supplies destined for the Union war effort.

As commander of our reenacting unit, it is my responsibility to see that the men and women of the membership are versed in the history of the Second Regiment Kentucky Infantry, of Orphan Brigade fame. It is also my responsibility to actively recruit new members into our historical unit...

Reenacting is a great hobby, and I'm sure that there are soldiers and their families stationed at Fort Knox who would enjoy being a part of an authentic Civil War unit... A great hobby is here, locally. For those interested in obtaining information, please contact:

COL MIKE HILTON, Cmdg.
2d Regiment Kentucky Infantry
Orphan Brigade, Inc.
4536 Springfield Road
Elizabethtown, Ky. 42701

Tracking the L&N

Dear Sir:

Enjoyed the article, "Morgan's 1862 Christmas Raid." I will have to revisit the area this summer and look it over again. Three comments about the article.

The map on page 27 has an error. The L&N rail line leading to Lebanon was in 1862 known as the Lebanon Branch, as it terminated at Lebanon. These tracks were only extended on to Knoxville after the Civil War. Interestingly, CSX Transportation abandoned the track beyond Lebanon and took the rail up. The track from Lebanon to Boston is now owned by the Kentucky Railroad Museum, and you can ride the line on the weekend.

The second comment concerns Morgan's report, on page 34, that stated he had rendered the L&N "impassable for at least two months." The tracks were opened for rail service from Louisville to Nashville on 1 February 1863. The tracks would have been opened 10 days sooner but a winter storm and flooding caused further damage to the tracks during January 1863. The Lebanon Branch, it is true, was not reopened until 10 February 1863.

The third comment is about the Muldraugh tunnel mentioned in the side bar on page 28. This tunnel no longer exists as the L&N rebuilt its tracks in the area in

1926-27. The tunnel was replaced by a 70-foot deep, 4,600-foot long cut.

General Sherman, during the Atlanta Campaign, states in his memoirs that his experience with cavalry raids on railroads was that cavalry cannot or will not permanently destroy a railroad. It took Infantry to put a railroad out of business.

CHARLES H. BOGART
Frankfort, Ky.

Gender of Soldiers Should Not Be Major Concern

Dear Sir:

I would like to take this opportunity to thank SFC Rost for his open-minded view of female soldiers in combat roles. His letter to the editor in the March-April issue of *ARMOR* was very objective, and well-supported. His letter reminds us that the leadership of today has many challenges to face. The gender of their soldiers is not expected to be one of their greatest concerns. Proper military bearing and professionalism toward other soldiers is necessary, regardless of gender.

As SFC Rost said, the training ratings of combat service support and service support units have not been degraded by the presence of female soldiers. The combat readiness of co-ed units has proven that men and women can work together to successfully accomplish a mission. As the leaders of these units have proven, professionalism and the military code of conduct can be instilled in every soldier. Anything less than that is not tolerated.

With the fluidity of the battlefield today (as seen in Operation DESERT STORM), female soldiers are apt to be in direct contact with enemy forces in any type of unit. Medics, for example, can be brought to forward lines in order to augment short-handed battalion aid stations. Wounded soldiers certainly should not turn down medical attention on the battlefield just because the medic happens to be a female soldier. The battle continues, whether or not the soldier is returned to duty. Every unit's strength is dependent upon healthy soldiers. The enemy's ammunition does not discriminate; direct and indirect fire can strike at any time or place. Life-or-death situations occur everywhere on the battlefield, even in the rear battle area.

Women in the Army is a fact that all must accept. The refusal to allow female soldiers in combat roles reduces the pool from which talented soldiers can be drawn. Even the philosophers of Ancient Greece realized that discrimination such as this prevented perhaps the best from competing. It almost allows standards to be lower, in order to accommodate the need for a specific number of soldiers to be used. Females have proven themselves to be outstanding soldiers in many areas.

Many say we have the best trained Army in the world. Why not improve upon that by adding to the talent pool from which soldiers can be drawn? I recently read an appropriate quote for this argument: "If we do the same thing we've always done, we will get the same results we have always gotten." There is always room for improvement, and there may be soldiers capable of going just that — adding to the capabilities and readiness of the Army as a whole. These soldiers should not be discouraged simply because they are female.

MELISSA JO ZERNICKE
2LT, Medical Service Corps
WI Army National Guard
Madison, Wis.

Forward Deployed Basing Joint Author Sought

Dear Sir:

I am seeking a U.S. Army officer to co-author an article for professional military magazines based on the following premise: Forward deployment of U.S. troops is essential to U.S. and world security. Need U.S. Army perspective of Europe; will write U.S. Marine Corps perspective in Asia.

MIKE GILE
CPT, USMC, Ret.
PSC 557, Box 1356
FPO AP 96379

761st Tank Battalion Monument Memorial Project

Dear Sir:

The 761st Tank Battalion Monument Memorial will recognize and pay tribute to this nation's first armored unit comprised of black soldiers to be sent into combat during World War II. This memorial will signify the intensity of these tanker's training, their work, courage, and dedication. It will be the first of its kind at Fort Hood, Texas, to honor the military service of the 761st Tank Battalion. To break ground, the project must secure $20,000 to cover design, construction, landscaping, and perpetual maintenance of the memorial. Your help will make a difference. It will ensure the dedication of the memorial on September 15, 1994. Contributors will be listed on the printed program.

The 761st Tank Battalion Monument Memorial Project is authorized to raise funds to build the memorial. Contributors should make their checks payable to the 761st Tank Battalion and Allied Vets Association and mail to: 761st Tank Battalion Monument Memorial Project; National Headquarters, Treasurer; 617 Going Street; Pontiac, MI 48053.

We thank you for your contribution to this historic and noble effort.

For more information about the 761st Tank Battalion Monument Memorial Project, please call (817) 287-2832, (817) 287-5956, or (817) 547-4515.

BEVERLY TAYLOR
119 Benjamin Circle
Copperas Cove, Texas 76522

Unintentional Omission of 10th "Amtrac" Battalion

Dear Sir:

I would like to thank you and your staff for their professionalism in assisting me in my pursuit of historical study with the publication of my article, "The Assault Amphibian Vehicle: Its Past, Present, and Future," in the March-April issue.

I have had many favorable comments on it. However, I did discover one error that I wish to correct. Mr. E.P. Guy of Atlanta, Ga., formerly an adjutant and platoon leader in the 10th Amphibian Tractor Battalion, USMC, WWII, wrote and informed me of an omission of this unit in the box on page 11 listing Amphibian Tractor units that made major landings in WWII. This error was unintentional. I proofed the FAX of the article (from your staff) while at Ft. A.P. Hill, Va., during a gunnery requalification exercise and was without benefit of my original manuscript or copy of *Across the Reef.*

I would be grateful if you would publish this letter in order to honor those fine veterans of the 10th "Amtrac" Battalion. As Mr. Guy wrote me, *writing about Amtracs and not mentioning the 10th Amphibian Tractor Battalion, is like "writing about baseball, but not mentioning Babe Ruth."*

The 10th Battalion was formed, equipped, and trained and also embarked within 30 days. They picked up new LVTs in a field in San Diego, embarked them aboard shipping and moved quickly to participate in the landings at Roi-Namur and Kwajalein in the Marshall Islands.

WILLIAM P. MCLAUGHLIN
CPT, USMC
Gulfport, Miss.

MG Paul E. Funk
Commanding General
U.S. Army Armor Center

Armor Conference Set Tone for Future

During the first week of May, Fort Knox and the Armor School hosted another successful Armor Conference where we worked the future of maneuver warfare and Armor's role in shaping the battlefield of the twenty-first century. We heard experienced warfighters tell us how they were successful and we listened to forward-looking presenters outline where and how the next fight is likely to take place. Among the quality displays Armor Conference attendees viewed was equipment that just ten years ago would have been classified as the stuff science fiction dreams are made of — advanced Ground Positioning Systems (GPS) so finely tuned that the user has to *try* to get lost — Battlefield Information Systems that transmit graphics and essential command and control data faster and more reliably than ever before — initiatives in maintenance and vehicle upgrades that make cost-effective improvements in battle-proven weapons systems.

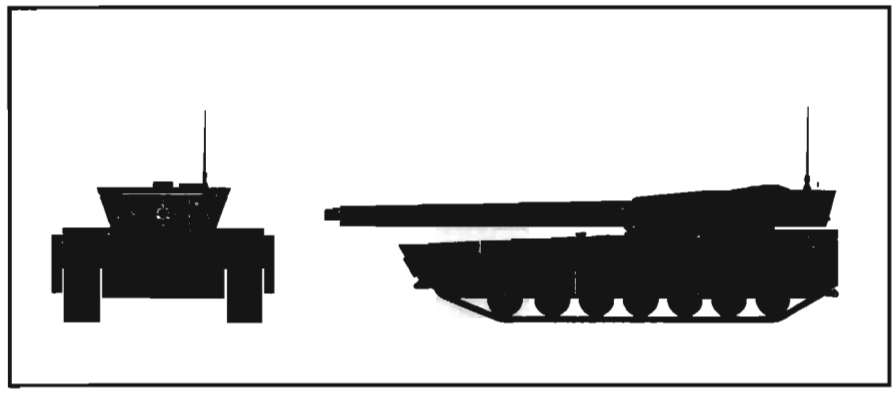
But for all the hardware that impressed the visitors, all the contractors with an idea about a better way to do business, there was one unmistakable element — one common denominator among every lay-out of unit equipment: a competent, intelligent soldier to explain how to operate the gear. General Creighton Abrams said, "Soldiering is an affair of the heart," and listening to these bright, young men and women, with their professional demeanor and thorough understanding of their job, reinforced in my mind the criticality of the human being behind the knobs and buttons and meters. They seemed to have a clear understanding of the unique capabilities of the Armored Force as briefed by visiting lecturers (and there were many excellent ones) at the conference. The soldiers demonstrating the GPS had no trouble grasping the notion of *versatility, mobility,* and *dependability.* Aspiring young tank commanders clearly understood *survivability* and *lethality,* and they were quick to explain to anyone who would listen how they plan to maintain it.

At the Armor Conference, we realized that training soldiers and developing leaders continues to be our benchmark for now and in the future. It is the standard against which we measure all our initiatives both in terms of equipment and personnel. The twenty-first century will demand that we integrate more simulation into our training plans, and take a new approach to training the total force. Active and reserve forces must be full partners on the battlefields of the future. There can be no stepchild mentality if we expect to fight and win. In the face of financial contraints, we must boldly modernize to meet critical requirements in areas such as weapon configuration and vehicle survivability. And we also learned at the conference that the one and only path into the next century is the road of horizontal integration — blending the speed, mobility, and communication of the combined arms. The Army's battle labs have become the mounts we cavalry and armor leaders must ride into the next century.

Whether you attended the Armor Conference or not, I am sure you have ideas about how we move boldly into the next era of modern warfare. I am confident you, like those soldiers I met in Skidgel Hall, know what we need to do to make personnel and equipment equal to the challenges of the future. Just as surely as we learned from the sergeants and specialists and lieutenants at the displays, we can learn from you. I want and need your ideas.

We Have A Winner!

Tank Design Contest Attracts 70 Entries



In December of 1991, former chief of armor Major General Thomas C. Foley urged the U.S. Armor Association and the Directorate of Combat Developments (DCD) at Fort Knox to join forces to conduct a tank design contest. The contest would serve to gather ideas and generate interest in tank system evolution and in armored warfare thought. So the Armor Association offered its services as financial sponsor for prize money, as publicity agent for the contest, and as a conduit for entries to reach the panel of judges. The Directorate of Combat Developments, under direction of its chief, Colonel Edward A. Bryla, set up a distinguished panel of judges and a scoring system to evaluate entries.

From its announcement in the July-August '92 issue of *ARMOR*, to the deadline for entry of January 15, 1993, the contest drew over 70 entries from 24 states and four foreign countries. Each entry was carefully logged by the Armor Association staff, checked to ensure it met contest criteria, and passed along to DCD judges. Ten winners were selected and notified by mail in mid-April of having finished in the top ten. But it was not until the Armor Conference at Fort Knox on 5 May 93 that the winners found out their actual placing within the top ten. In a ceremony conducted during the conference, the top four entrants received cash awards, certificates, and two-year memberships in the Armor Association.

The leaders of the armor community, from pioneers like Christie, Patton, Chaffee, Fuller and others, have long since realized that the technology of the tank cannot stand still. Only by constant improvement of our vehicle and weapon systems, forward-looking

Continued on Page 11

The Winners!

First Place: Western Design Corporation, Irvine, Calif., $500.
Michael Quinn, President
(Mr. Quinn donated his prize money to the Patton Museum)

Second Place: Cadet Clark C. Barrett, $300
United States Military Academy, West Point, N.Y.

Third Place: CPT Russell C. Cloy & MAJ Michael Prevou
$200 (Joint Entry)
Fort Knox, Ky.

Fourth Place: Mr. Steven Perczel, $100
Rock Island Arsenal, Colona, Ill.

The fifth through tenth place winners, who also submitted quality designs for future main battle tanks, were:

Fifth Place: SFC David Malesevich
Gowen Field, Boise, Idaho

Sixth Place: CPT Monroe B. Harden, Jr.
Naval Post Graduate School
Monterey, Calif.

Seventh Place: Jeffery O. Bellinger
University of Wyoming, Wheatland, Wyo.

Eighth Place: 1LT Harold A. Buhl, Jr.
Fort Knox, Ky.

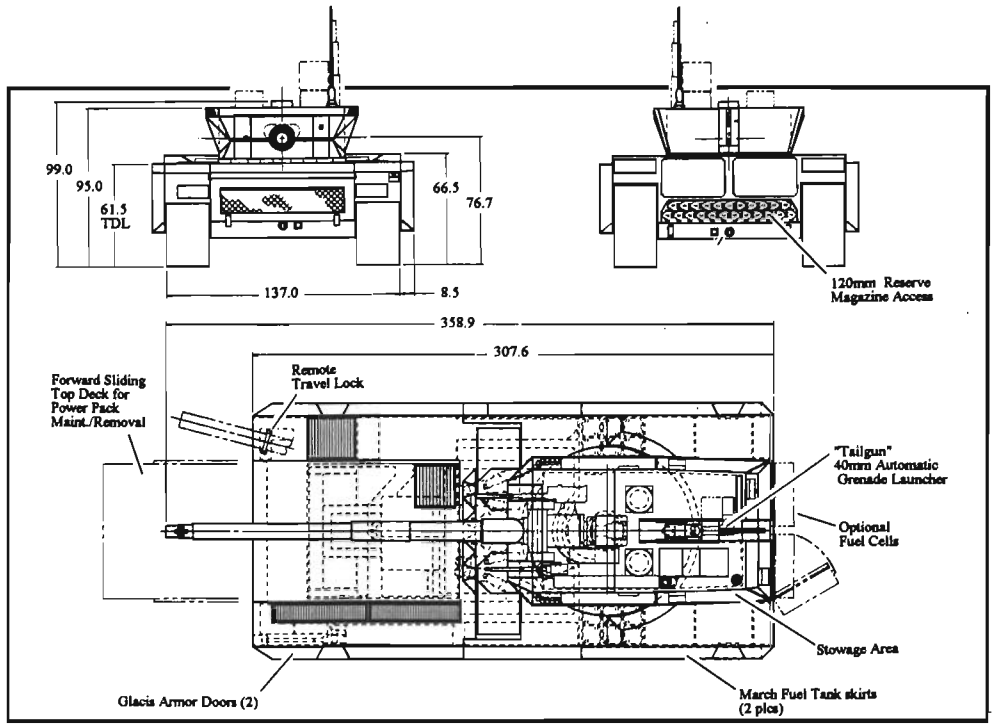
Ninth Place: SFC (Ret.) Steven A Hester, Sr.
Colorado Springs, Colo.

Tenth Place: John W. Rhodes
Space Systems Technology
Colorado Springs, Colo.

1st Place

Western Design Corp.

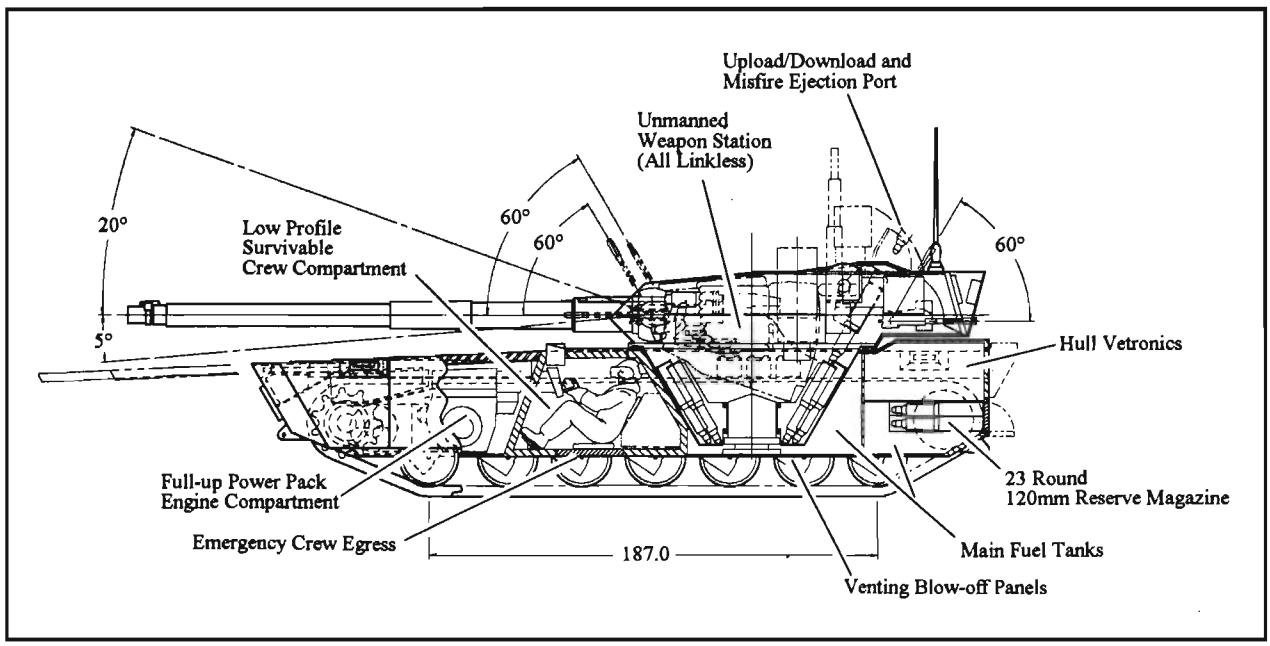
Many of the innovative features of the proposed tank will be obvious from the illustrations on these pages. The more deployable 50-ton weight was made possible by eliminating the manned turret, which accounts for 22 tons of the M1A1's total weight of 69 tons.



Survivability is a major priority of the winning entry. The Western Design concept places all three members of the crew in the hull, below the turret ring. The entire power pack is in the front of the vehicle, acting as part of the crew's frontal protection. The gas turbine engine powers an electrical generator, which drives the vehicle's electric motors. The turret holds the 120-mm main gun and a 40-round autoloading magazine, with the ready rounds stored low in the hull for greater survivability. Blow-off panels would direct any secondary explosions downward. An additional 23 rounds are stored in a reserve magazine low at the rear of the hull.

The tank's armament is relatively conventional, with some innovative twists. In addition to the lengthened (55 calibers) 120-mm main gun, there is a coaxially-mounted 30-mm autocannon and 7.62-mm machine gun, a hull machine gun, and a backward-firing 40-mm grenade launcher "tail gun." Also at the turret rear are seven anti-helicopter/anti-air missiles mounted in vertical-launch tubes.

Weight is estimated at 48-50 tons, depending on armor selected. Use of electric motor drive allows "slaving" a working tank to a disabled one through cables and connectors at hull center rear.

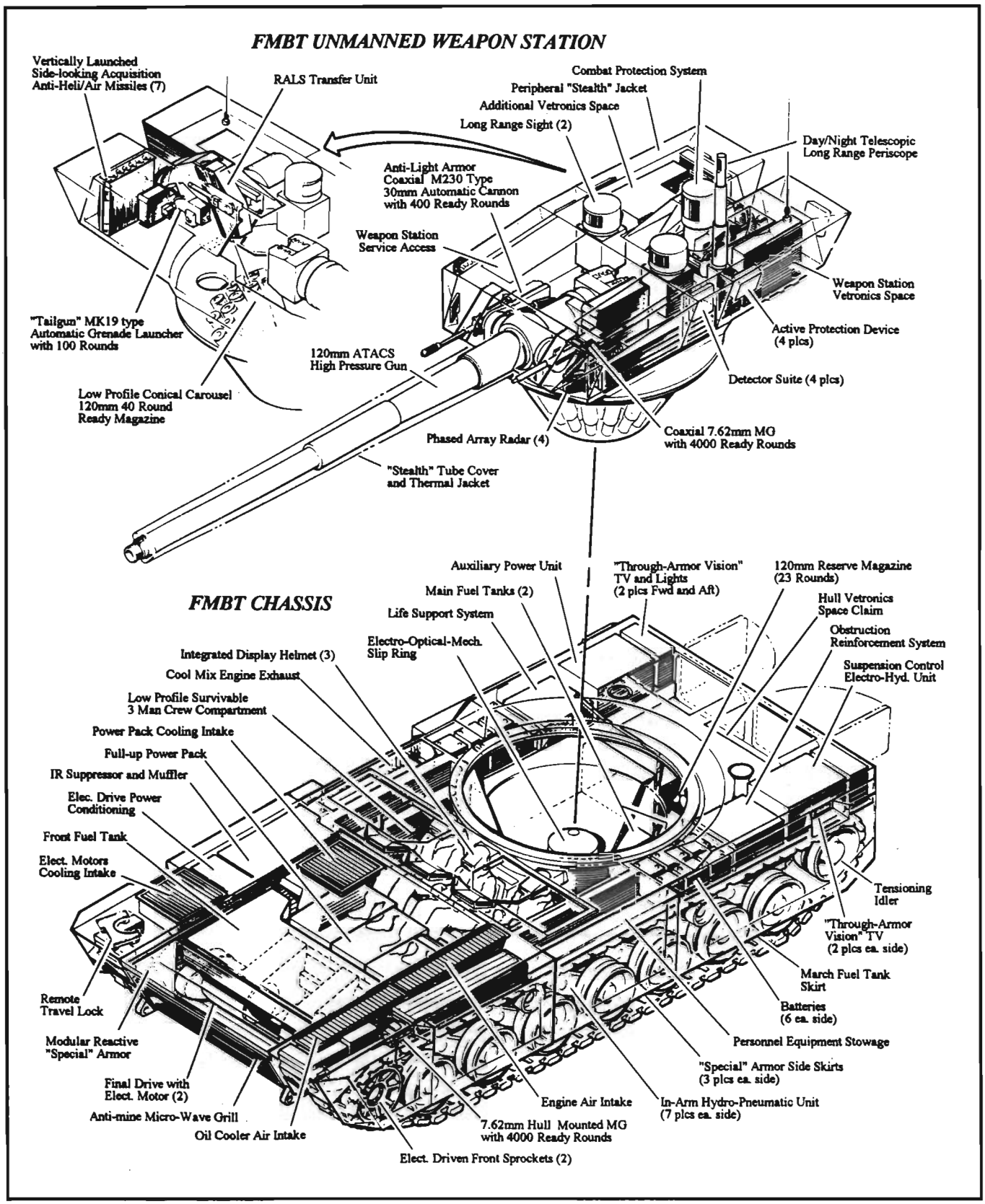


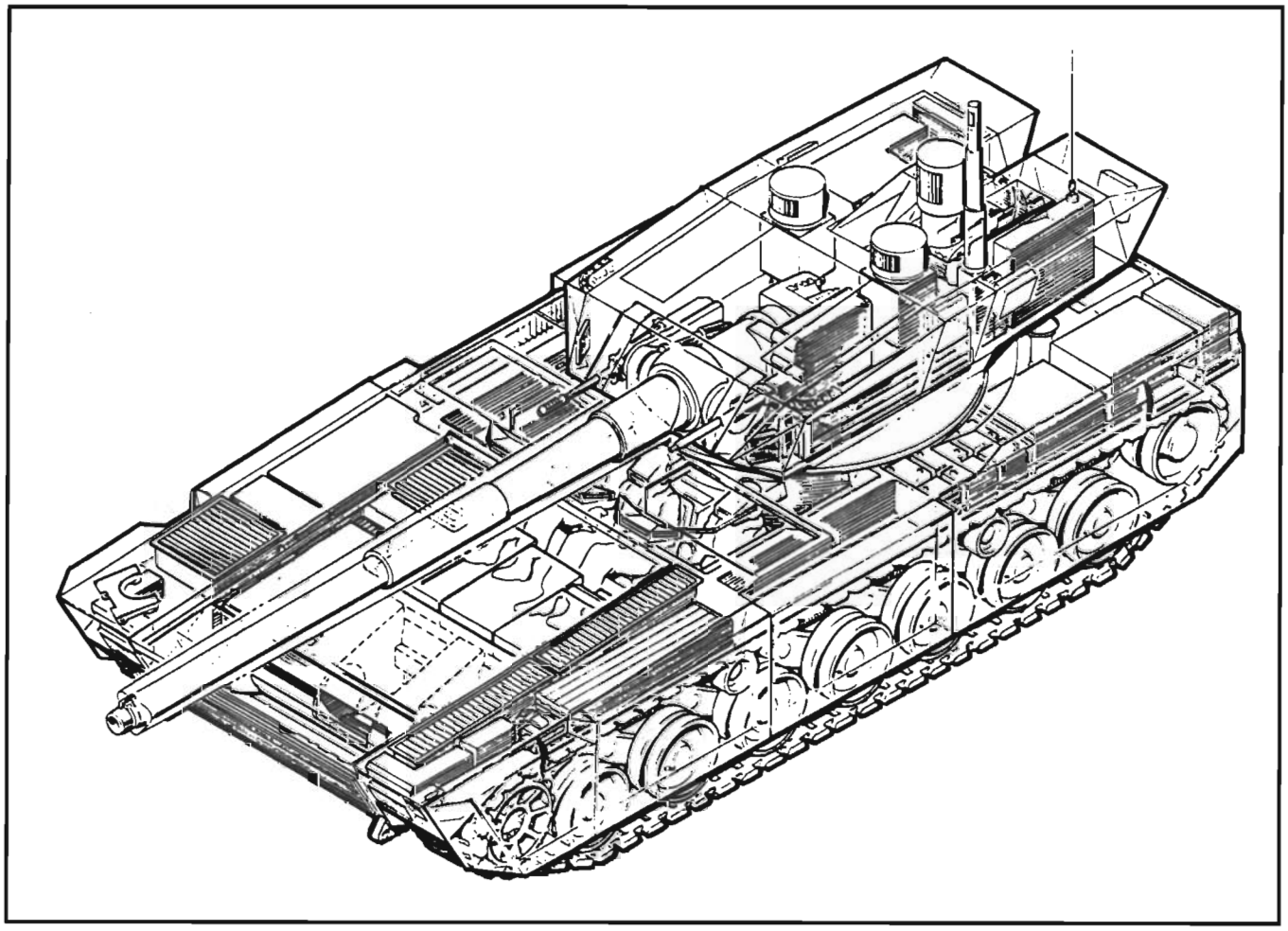
1st Place Winner:

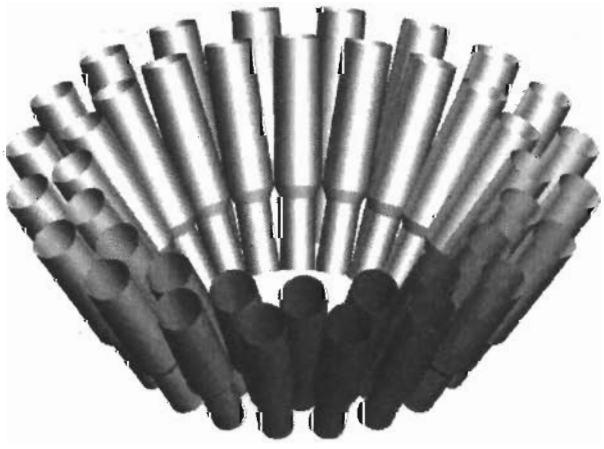
A Look Inside

Ghost views of turret and hull clearly show major subsystems and innovative features. The crew would "see" the outside world through hull-mounted TV cameras.

Integrated display helmets would present outside views to each crewman. Depending on where he turned his head, the crewman could look to sides, front or rear without exposure.

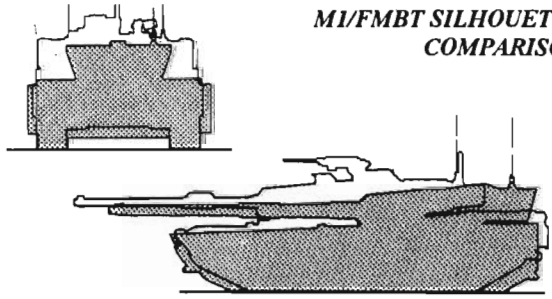






Some Winning Ideas...

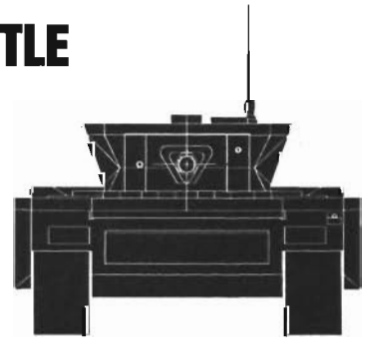
Forty rounds fit in the semi-conical ready round magazine, at left. (The winning design was produced by a company that has specialized in tank autoloaders.) Warheads are pointed downward toward hull floor blow-off panels for safety. Silhouette comparison with the M1 is seen at lower left, showing considerable reduction in height.



M1/FMBT SILHOUETTE COMPARISON

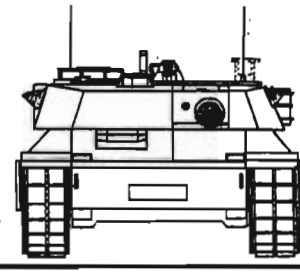
FMBT

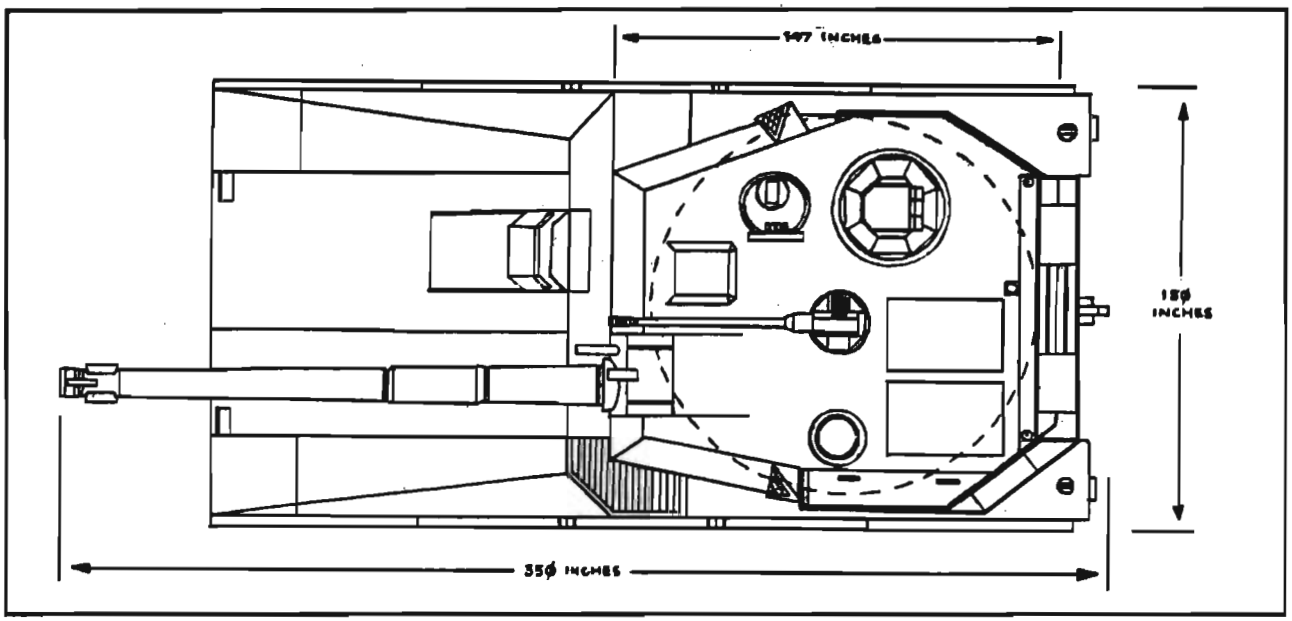
FUTURE MAIN BATTLE TANK

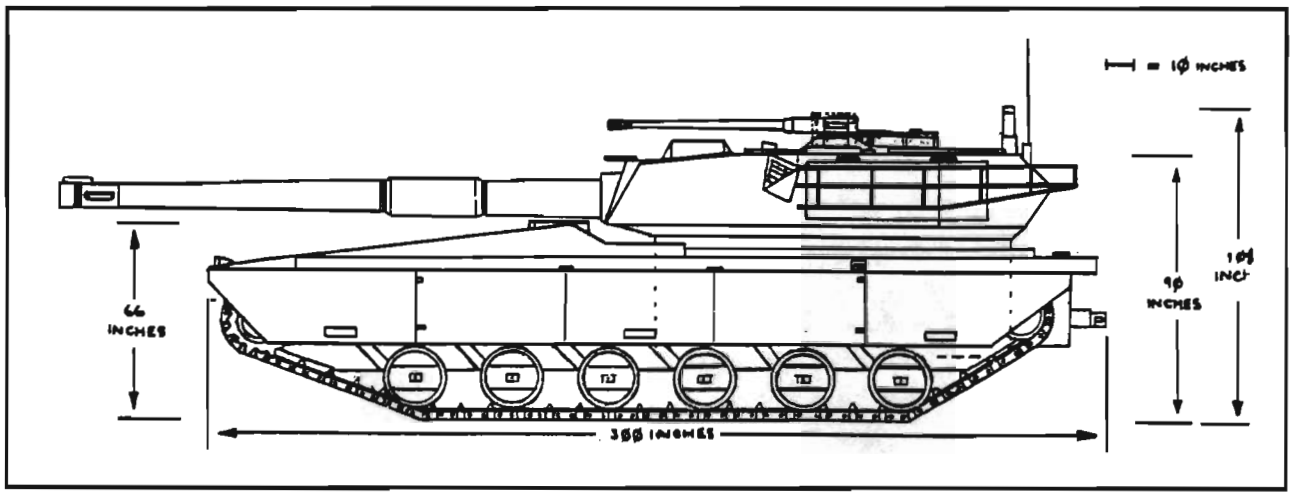


2nd Place Winner

Cadet Clark C. Barrett U.S.M.A.





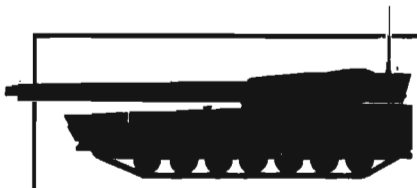


Cadet Clark C. Barrett's approach was intended to meet the needs of a smaller, more austere armored force that is likely to have to deploy quickly and sustain itself more frugally in the early stages of a conflict, yet he was not willing to give up the M1-series lethality and survivability.

He's upgunned to the M280 140-mm cannon as the main gun, with a commander's station M242 25-mm Bushmaster slaved to a helmet mounted sight at the TC station. He retains survivability features of the M1-series, like Chobham armor and depleted uranium armor, fuel and ammunition compartmentation with blow-off panels, and a fire suppression system.

Adding to survivability is the front-mounted engine, allowing rear hull escape hatches. The hatches also simplify rearming and resupply. The hull shape and low height are also survivability enhancements. Estimated weight is 55 tons.

Barrett specifies twice the fuel economy of a turbine engine by adopting a 1500-hp multifuel rotary design with stratified charge ignition. It's been in development by the John Deere Corporation and called the SCORE engine. The transmission is an off-the-shelf German ZF type automatic, with four forward and two reverse speeds. The power train, at this vehicle weight, delivers more than 27 horsepower per ton of vehicle weight.



1st Place Winner

Vehicle Data

CREW	3
LENGTH	359IN
HULL LENGTH	308IN
WIDTH	137IN
WEIGHT	48-50 TONS
HP/WEIGHT RATIO	35-40HP/TON
GROUND PRESSURE	11.22PSI
GROUND CLEARANCE	17-24IN
MAX RANGE	800 KM
MAX ROAD SPEED	80-100KM/HR
X-COUNTRY SPEED	70-80KM/HR
FUEL CAPACITY	1500 LITERS
DROP TANKS	ADD 450 LTRS
GUN ELEVATION	+20°TO -5°

Continued from Page 6

We Have a Winner!

thinking about doctrine and employment, and prototype testing of new equipment, can we expect to remain the dominant nation on the tank battlefield of the future. With a view toward that future, let's take a look at the top two designs.

Western Design's Future Main Battle Tank

Mr. Quinn's entry on behalf of Western Design, a small, defense engineering company located in Irvine, California, brought some experienced design specialists to the task of examining how a main battle tank of the future might look and fight. The two principal design engineers that worked on Western Design's entry were Larry Bacon and Dr. Asher Sharoni, who brought more than forty years combined experience in combat systems development to their task. Mr. Bacon has been with the company since its inception fifteen years ago, and was closely involved in developing the company's Tank Test Bed Autoloader, the AH-64 Apache Area Weapon System, and the Block III Tank Autoloader. Dr. Sharoni is an ex-Israeli tank officer with a Ph.D. in mechanical engineering from MIT. He, too, contributed to the Block III Tank Autoloader.

CLARK C. BARRETT'S M6-Series Assault Tank, The General Bruce C. Clarke

One of the United States Military Academy's top engineering students, Cadet Clark C. Barrett, invested some of his final year at West Point in developing a prototype assault tank to meet the challenges he sees for future Armor warriors.

"The successes of the M1-series Main Battle Tank in the deserts of Southwest Asia confirmed the need for a mailed fist to strike deep and hard," says Cadet Barrett. "The need for a system with greater deployability and sustainability, and the ability to get to the fight quicker and fight longer," were, according to Barrett, some of the principal considerations in his design.

Barrett's selection of Bruce C. Clarke as the namesake for his design is a tip-of-the-hat to the man known as the "Sergeant's General."

"The high regard [General Clarke] placed upon his soldiers made a lasting impression on the Armored Force and the United States Army," says Cadet Barrett. He argues that his design also places the soldier first, providing maximum lethality with minimum risk.

1st Place Winner

Vehicle Specifications

ARMAMENT

The 120-mm main gun, 55 calibers long (ATACS high pressure smoothbore with 16-in recoil), has an automatic loader carrying 40 ready rounds capable of a loading rate of 15-16 rounds/min. An extra 23 rounds are stored non-ready. Tank also would mount a M230 30-mm autocannon and EX-34 type 7.62-mm Chain Gun coaxially, an Mk 19-type automatic grenade launcher at turret rear, a 7.62-mm Chain Gun MG in the hull, and 7 vertically-launched antiair/anti-helo missiles in the turret roof.

POWERPLANT

GE/Textron Lycoming recuperated gas turbine LV100 up-powered to 1750-2000 hp. driving a generator that powers all-electric, front drive track motors. Can power two other tanks via "jumper" cables, or be externally powered by another tank or generator.

CREW PROTECTION

Crew of three seated low and in the hull. In addition to passive "special armor," proof against 120-mm APFSDS at 500 meters across the 90-degree frontal arc, the design would incorporate active "smart" armor triggered by a 360° collective warning and protection system. This system would trigger release of chaff, obscurants or electronic countermeasures, as appropriate, warn the crew of laser ranging, radar presence, and incoming projectiles or missiles. An Identification-Friend-or-Foe (IFF) system includes a retro-reflector. Launchers for visible and infrared screening smoke grenades. Microwave mine detector/eliminator in front slope. Full NBC collective protection system. Ready-round magazine holds rounds with warheads down, venting through blow-off panels in hull floor.

Cavalry Afloat:

The 39th Cavalry Platoon in the Mekong Delta

by Captain Kevin Keaveney

Introduction

At many times throughout history small and unique units are forgotten when viewed as part of a larger conflict. Sometimes these units have important lessons to give and the 39th Cavalry Platoon was such an organization. The men of the 39th operated Air Cushion Vehicles (ACV) whose current descendants are much more efficient and capable, and are already reappearing on today's battlefields. It is important to record the 39th's history so future planners can see how ACV technology was introduced into Army combat operations, and perhaps create or modify future programs.

During the late 1960s, three Army SK-5 ACVs were evaluated as weapon platforms in the Mekong Delta of South Vietnam. The mission of the assigned cavalry crewmen was threefold:

- To evaluate the operational suitability and maintainability of the ACV,
- To determine the ACV's potential capabilities for combat operations,
- To determine the feasibility of employing a larger ACV unit and, as a result, recommend an appropriate organization.

Prior to 1968 there had been only two previous ACV combat experiences. The first took place in March 1965 on Borneo during the Indonesian Confrontation by elements of the British Interservice Hovercraft Trials Unit, equipped with SR.N5s. The second event, which preceded and later ran concurrent with the Army ACV program, was the U.S. Navy PACV Vietnam operations from 1966 to 1969.[1] Patrol Air Cushion Vehicle (PACV) Division 107, later Coastal Division 17, conducted operations with three SK-5s in much the same area as would the Army ACVs.

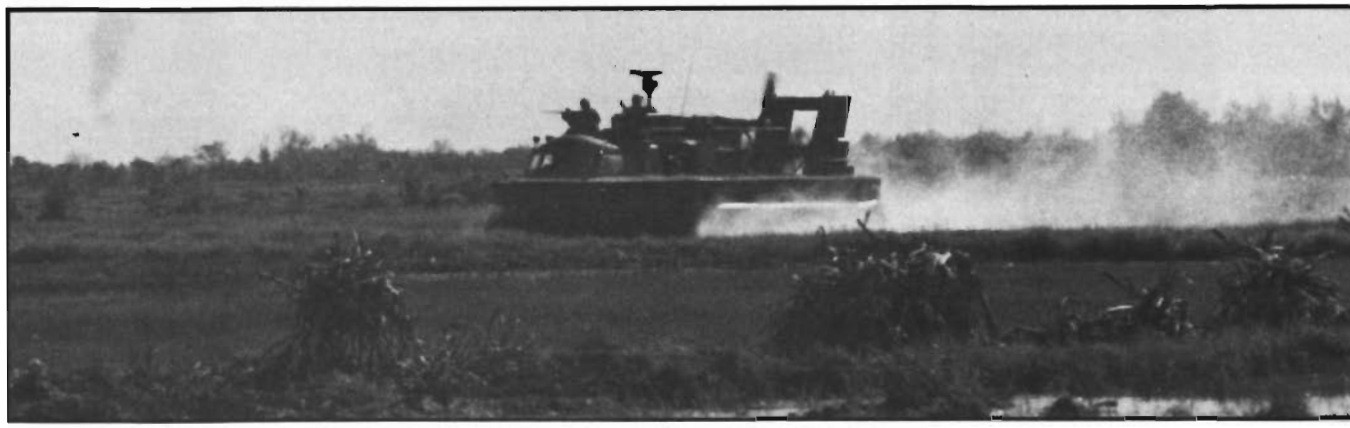
Both the first ACV unit commander, Major Donald G. Moore, and platoon sergeant, Staff Sergeant Ronald Crosby, spent time on Navy PACV operations before training up what would eventually become the 39th Cavalry Platoon (ACV).[2] To fill up the combat ranks of the Army unit, 11D cavalry scouts came from Ft Knox, Kentucky, while aviation mechanics came on board to maintain the SK-5's aircraft systems and engines. In January 1968, the unit formed and began training at Aberdeen Proving Ground, Maryland, and by April had all three SK-5s on strength.

SK-5 ACV Development

The idea for the 39th's SK-5s went back to the 1950s when the vision that vehicles could move on a layer of air was realized by such men as British hovercraft pioneer Christopher Cockerell. By the end of the decade, research had been going on in several countries, notably Great Britain and the United States, with positive results. In 1963, Bell Aerosystems, the leading American hovercraft company, entered into an agreement with British Hovercraft, the leading British company, to produce the latter's designs in the United States. His was critical to the Army's ACV program since the British SR.N5, first built in 1964, became the basis for the Army SK-5.

The concept of the SK-5, as well as any Air Cushion Vehicle, was to create a layer of low pressure air under the craft by using a ducted fan and then capturing the air within a flexible skirt. Air escaping from under the skirt then created a gap that kept the vehicle from contact with smooth surfaces and allowed for frictionless movement. Compartmentation within the skirt maintained the cushion of air when crossing large obstacles.

Design of the Army SK-5 began in 1966 and ended when the first example rolled off the production line in February, 1968. There were two versions, a weapons-heavy version known as Assault Air Cushion Vehicles (AACV), and a logistical version, the Transport Air Cushion Vehicle



(TACV). Of the three built, two were AACVs and one a TACV. The design differed from the earlier Navy SK-5s in many ways. Gone were the many passenger windows, as well as the non-load-bearing decks; in their place, an armored crew compartment as well as weight-bearing side decks. Other improvements centered on the armament, armor, skirt, and directional control mechanisms.

SK-5 Design

The metal hull of the 7255 had three parts, a center and two outer sections, and could be broken down to facilitate shipment. The center section contained the GE 7LM100-PJ102 engine, auxiliary power unit, British Westland transmission, 304-gallon self-sealing fuel tank, tail unit, and cargo compartment. The transmission linked the engine and lift fan together to provide lift and thrust. Air for the fan came from a bifurcated intake below the transmission; air for the engine entered intakes at the forward end of the nacelle. At the rear sat the tail unit consisting of twin rudders and elevators.

Above the engine air intakes sat the Decca 202 Radar dish. With a beam 30 degrees vertical and 2 degrees horizontal, capable of rotating 360 degrees, the radar could detect any target within 24 miles.

From the return, visible on a 7-½ inch cathode ray tube within the crew station, a bearing and range could be obtained. To make sure observers knew the "Naval" origins of the system the unit featured a bearing ring, rain and sea clutter controls. Tied to the radar was a navigation set, and gyrocompass.

The communications package consisted of a six-station intercom system, UHF/FM/HF radios, and a radio security set. The AN/ARC-54 FM radio quickly failed to live up to field use and could only muster a 35 percent operationally ready rate, and the unit sought to replace them with more reliable VRC-125s. No records confirm if replacement did in fact occur, but one ACV did receive a VRC-46. Also carried on board were FM manpack radios for communications with dismounted elements.

The two outer hull sections were compartmentalized to provide buoyancy. Above the outer sections were the load bearing decks, and underneath the 12-piece skirt. The skirt broke down into outer trunks, a keel trunk, stability trunks, and rear bags which contained the four foot cushion of air on which the vehicle rode. The driver could control vehicle movement at low speeds by dumping air via four hydraulically activated skirt segments, or releasing cushion air through the four "puff ports" located on the side of the outer hull sections.

When large numbers of troops were carried, many would ride on the outer decks, the soldiers preferring the open due to the cooling effect of the breeze and uncomfortable conditions within the vehicle. Typically, two ACVs supported an infantry company on operations, and each could carry 12 soldiers at a time. One drawback of people riding on the outer decks was that objects, such as helmets and shell casings, fell into the lift fan and propeller. The most poignant example came during a November 1968 raid when a soldier, sitting near the lift fan intake,

Decks on Navy versions of SK-5 could not bear weight and crew area was unarmored.

fell into the fan, resulting in his death. Attempts were made to correct this problem with a field expedient screen.

Weighing only 8-½ tons, the ACVs leant themselves to air transportation. CH-53 helicopters, capable of externally carrying 20,000 lbs, transported ACVs back to base on more than one occasion. On a four-day reconnaissance in force mission, starting July 1, 1968, two of three ACVs were damaged and required recovery, one after suffering engine problems, the other after plowing into a river bank, and when the soldier fell into the lift fan, a CH-53 went in to recover the ACV. The ACVs could also be carried in Air Force transports, which is how they were brought into Vietnam.

The GAU-2 7.62-mm minigun was one armament option.

SK-5 Armament

Originally the SK-5 had two M2 .50-caliber machine guns in separate cupolas above and to the sides of the cargo compartment. The TACV had a third M2 mounted in the cargo bay, firing forward through the center window space. Rounding out the machine gun armament were two side-door M60 weapons. AACVs also mounted on the front left deck an M5 40-mm grenade launcher, which could fire 230 rounds per minute from a 400-round supply at ranges up to 1,500 meters. By August 1970, the ACV's armament underwent revision with one cupola carrying a GAU-2 minigun and the other a single M2; there was no change to the side door guns. Personnel also replaced the TACV's front door M2 with a twin M60 mount.

On occasion, XM34APD Personnel Detectors were taken along on missions.[3] The detectors, also known as "people sniffers," had an operator's console and a sniffer tube that ran to the outside of the ACV. The system could detect carbon, ammonia, and sigma emissions, the latter discharge being distinctive to humans. Its purpose was to identify hidden enemy forces by these emissions. Dog teams were also carried to assist the unit in detecting the enemy.

The SK-5 carried 1,000 lbs of armor to protect it from direct fire weapons.[4] The primary threats in the Delta were RPG-2, RPG-7, 57-mm and 75-mm recoilless rifles, and all could fire projectiles capable of penetrating the armor. Plating around the crew compartment was only adequate against .30-caliber rounds at 100 yards/zero angle of obliquity, while the armor covering the engine, transmission, and fuel accessories could defeat .50-caliber rounds at 200 yards/zero obliquity.

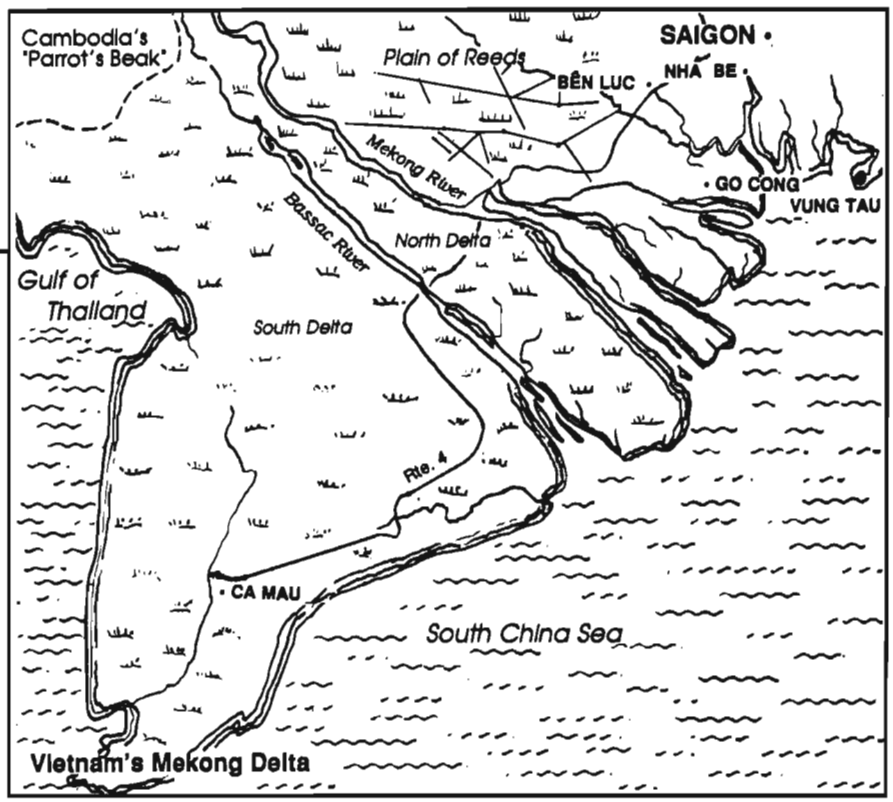
Damage became critical since the 1,000 lbs of plating were composed of numerous, hand-fitted, and non-interchangable sections. Reports mention, and an interview confirms, the removal of the armor around the crew compartment after initial combat operations to save weight. Interestingly, there were no recorded incidents of the ACVs ever actually taking fire from any large caliber direct-fire weapons.

Employment

The 39th went to Vietnam shortly after the TET Offensive and conducted its first mission on June 7, 1968. The mission, a five-hour overwater search and clear operation, saw all three ACVs insert and extract 30 troops, conduct surveillance operations, and search watercraft. During the next 28 months, the ACVs undertook many different types of operations: search and destroy (reconnaissance in force), search and clear, route security, raids, ambushes, and combat service support.

Viet Cong and North Vietnamese presence was strong due to the remoteness and difficulty of traversing the area with conventional troops. After TET, large scale enemy operations were no longer possible, but they were still attempting to infiltrate battalion-size elements into Saigon with no success. Tactics were primarily economy-of-force operations on the small unit level, or participation in political activities. Their political goals were to influence the local population to support the Viet Cong movement and to discredit Government activities. Most enemy resupply came from Cambodia's Parrot's Beak region, only hours away. This safe haven, at least until Allied incursions during 1970, was readily accessible to the enemy by using the area's extensive waterways.

The 9th Infantry Division (9th ID), specifically its 3d Brigade, was the higher headquarters for the 39th Cavalry Platoon (ACV). Originally, only one of the division's three maneuver brigades had a riverine mission, but in 1968 that number grew to two to include the 3d Brigade. Under the command of Major General Julian J. Ewell, the 9th ID gained a reputation



as an extremely aggressive unit specializing in nighttime operations.[5] During the same period the division's tactical area of operations shifted south and west away from Saigon and deeper into the Delta. In July, 1969, the 3d Brigade became a separate brigade under the operational control of the 25th Infantry Division in preparation of the 9th ID(-) departing Vietnam in late summer 1969.

The principal document guiding 9th ID operations during the ACV years was the March 1966 MACV Study, *Mekong Delta Mobile Afloat Concept and Requirements*.[6] This document was based on French riverine (infantry with boats) experience in Vietnam, and it brought into existence the joint U.S. Army-Navy Mobile Riverine Force. The plan called for operations in the entire Delta region, but fell short, with the majority of operations north of the Bassac River. According to Thomas J. Cutler, author of *Brown Water, Black Beret, 1961-1975*, riverine forces " could be moved 100 to 200 kms in a 24-hour period and could then launch a day or night operation within 30 minutes..." The force had an arsenal of specialized combat equipment: barge-mounted artillery, helicopter landing barges, armored troop carriers, monitors, and both rotary and fixed wing air assets.

As part of the riverine force, ACV operations took place in the Mekong Delta and on the Plain of Reeds. The Mekong Delta encompasses 26,000 square miles, about a quarter of Vietnam's area, and home to half its population. For military considerations the Delta is two distinct regions, a north and south, with the Bassac River the dividing point. Concealment and cover is in the towns, as well as in thickets along canal and river banks. The 9,000 square miles of rice paddies are the primary obstacle to military operations. Maneuver is nearly impossible, due to agricultural dikes and usually flooded rice paddies. Annual rainfall is over 100 inches, with intense heat for a good part of the year.

With less than 10 feet of difference in elevation, there is little key terrain. The primary avenues of approach are the five branches of the Mekong, the Song Vam Co, the Song Sai Gon, and the Song Dong Nai rivers. Besides the rivers, which run west to east, the other major avenues of approach are the highways, which follow a mostly north-south route connecting towns and small cities. From the north, the road network originates in Saigon, with National Highway 4 running from the capital all the way to Ca Mau in the extreme south. Along the Bassac River runs Interprovincial Routes 10 and 27, west to east, and Interprovincial Routes 31, 8A, and 9, north to south.

Multitudes of smaller waterways and canals crisscrossed the area and created varying degrees of difficulty to the ACVs, depending on the tidal level. With a tidal range from 5 to 10 feet, low levels usually meant a longer run from the water to the dry land above for the ACVs.[7] The greater the distance and gradient, the more difficult for the ACV to negotiate. Even with the ability to clear four-foot obstacles, the ACV could not handle gradients greater than 18 degrees from low speeds, or short runs of 38 degrees with a beginning speed of 50 miles per hour.

The area of the Delta from the west of Saigon to the Cambodian border is the Plain of Reeds. Concealment and cover is mostly dense grass, thick reeds, stands of trees, and other types of vegetation. The flat and inundated Plain can have one to six feet of water, depending on the season, and itself is an obstacle to most forms of transportation, being inhospitable and difficult to navigate. For the ACV, the plain was the optimum operating environment, because there were few steep grades. However, some of the canals and waterways, like those in the Delta, were narrower than the

ACV itself and did not allow for vehicle operations.

Most ACV operations were combined arms in nature. One such mission, a search and destroy operation, took place on October 14, 1968, 40 kms south of Saigon, within and along Go Cong Island. In a classic example of AirLand tactics, helicopters from D Troop, 3-5 Cavalry (Air) provided long-range fire while the ACVs and dismounted combat troops maneuvered and overran the objective.[8] During 39th combat operations, OH-6s or UH-1s played a key role by providing command and control when the ACVs were in unfamiliar or heavily defended areas.

One goal of the 39th was to disrupt future enemy operations as well as those currently underway. To do that, the 39th routinely captured enemy supplies hidden in caches. During the October 14 search and destroy mission, the enemy suffered 35 KIA and POW, and most importantly the loss of 400 lbs of weapons, packs, and documents. On a number of other oc-

Above, a Ranger from the 3d Brigade, 9th ID, patrols the Plain of Reeds as ACV waits.

The combined arms nature of the 9th ID's force in the Delta is obvious in photo at right, which shows barge-mounted floating artillery tied up along a river bank in Long An province, preparing to fire a mission in support of infantry.

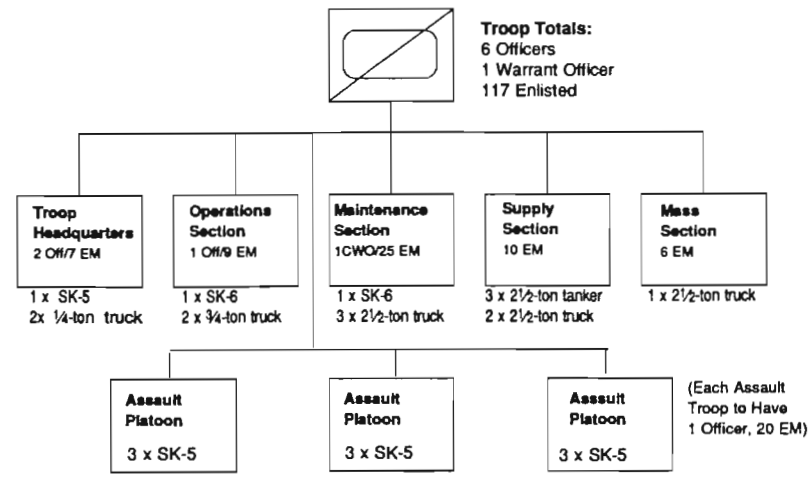
Below, one of the deck-mounted 105-mm howitzers. There were two on each barge.

casions, other significant caches were found by the ACVs. As an example, in November and December, 1969, the ACV unit recovered 126 82-mm rounds, 166 B-40 rockets, 196 hand grenades, 36 B-41 rockets, 40 AT grenades, 357 lbs of explosives, four Chinese claymores, plus automatic weapons and ammunition.

The high speed, maneuverability, and radar of the ACV were all combat multipliers allowing for improved tracking and pursuit of the enemy. The top speed of the ACV meant swift penetration into hostile areas, while vegetation, as in the Plain of Reeds, helped conceal the vehicle from early detection. Under the cover of darkness, and against an enemy without night vision devices, the ACV did effectively conduct ambushes. Done in conjunction with dismounted ambushes, ACV ambushes made heavy use of indirect illumination and hand flares to maximize effectiveness. Surprisingly, however, the first ambush did not take place until November 24, 1969, 18 months after the 39th's introduction into Vietnam.

As time went on it became clear there were similarities between ACV and helicopter operations. In general, the ACVs became a kind of helicopter in permanent ground effect. Troop insertions and extractions took place in much the same manner and like helicopters, the ACVs drew fire to identify hidden enemy positions. At other times, ACVs were used in combination with helicopter assault companies to bolster lift capabilities. On March 3, 1969, the ACVs and two helicopter assault companies supported all four infantry battalions of the division's 1st Brigade during a highly successful engagement with enemy forces.[9] But the biggest difference between the two weapons systems is that the ACVs could stay in very close proximity to the troops, like a tank or personnel carrier in mechanized or armor units.

1970 Proposal for an Air Cushion Vehicle Cavalry Assault Troop



ARMAMENT: Each platoon would comprise three SK-5s, two armed with the M5 40-mm grenade launcher, 20-mm cannon, .50 caliber MG, and M60 7.62-mm MGs, and one armed with TOW, .50 caliber MG and M60 MG.

Like ground combat vehicles, the ACV could be damaged by mines and indeed, these devices proved the greatest threat. Eventually, enemy mines accounted for both AACVs. The first was lost to a mine on January 9, 1970, but some question remains as to whether it was a mine or a dud 500 lb bomb. Nevertheless, of the 17 personnel on board, 14 were hurt, no one killed, and all but one person quickly returned to duty.[10] On August 3, 1970, the second met a worse fate when it left a waterway the day after a night ambush.[11] The device that destroyed this ACV is believed to have been a command detonated mine, and the explosion resulted in three KIA: Major Barry F. Graham, and SP5s Kent C. Wolf and Larry Joe

Three men died in the destruction of this ACV on August 3, 1970, probably due to a mine.

Meador. Others were seriously wounded, to include SP4s Jack Kavanagh and Tommy Macauley.

Formal ACV Evaluation

Even though the 39th stayed in Vietnam for over two years, most of the decisions about future employment were made within the first 12 months. The formal ACV evaluation[12] took place between June and December 1968. The evaluation, written by Major Moore, clearly outlined the pros and cons of the ACV as had been tasked before the 39th entered combat. Some system shortcomings, such as the armament, were improved later in the deployment.

•Operational Suitability and Maintainability of the ACV:

Suitability. The ACV works best in an environment such as the Plain of Reeds west of Saigon. The ACV did provide a unique cross country mobility not possible by any other system as long as the operations took place within marsh areas, coastal or inland waterways.

Maintainability of the SK-5 over the 39 missions of the evaluation fell out with a mission ready rate of 55.7 percent, a Not Operationally Ready for Maintenance rate of 22.8 percent, and a Not Operationally Ready for Supply rate of 21.5 percent. The maintenance rate came to 1.14 hours for every hour of operation.

•Potential Capabilities of the ACV for Combat Operations.

The evaluation report stated a potential capability of the ACV for combat operations, but considered the vehicle to be underarmed and that a need existed to expand the vehicle's weapons capability. Suggested weapons were the GAU-2 minigun, TOW missiles, or 106-mm recoilless rifle. In addition, smoke generators and an 18-inch xenon searchlight would also have improved ACV combat effectiveness.

•Feasibility of Employing a Larger ACV Unit in Vietnam and an Appropriate Organization:

USARV desired to have a larger force of ACVs available for operations in Vietnam and, as a result, requested 12 ACVs; the Department of the Army later reduced this number to 6. In the end, no further ACVs were produced, and none were sent to Vietnam. Along with the request was a proposed MTOE for an ACV cavalry troop of 124 people (see wiring diagram, preceding page). Of the 12 ACVs, ten were to be SK-5s and two SK-6s. The SK-6 was 10 feet longer and meant to carry 18 passengers more than the SK-5. The SK-5s were to be armed with a mixture of 20-mm cannons or TOW missiles, as well as .50-caliber machine guns.

Training and Support

During their deployment in Vietnam, the ACVs operated from several different locations. During one period, the 39th operated out of Ben Luc in Long An Province, close to the Plain of Reeds.[13] Along a river, there emerged perforated steel planking where the ACVs were parked for maintenance and when not being used. Past a small cove and back on the river was a barge that constituted both the living quarters and headquarters for the 39th. Sharing the base was a Navy UH-1 outfit that was also part of the mobile riverine force. When not at Ben Luc, the ACVs typically deployed from fire support bases (FSB). The bases provided the ACVs with mortar and artillery fire, to include illumination missions when in combat.

The unit only had 35 authorized personnel. Training of personnel replacements became vital in late 1969 and early 1970 when a high turnover materialized due to rotational policies.[14] During the period, over 16 people left, to include the commander, a vehicle commander, and all three primary drivers, in addition to others. Nha Be, the oil storage and naval facility south of Saigon, became an ACV training center. Sites like Nha Be were necessary because no ACV replacement training occurred in the United States. At least one six-day driver course took place and included extensive over-water training to help ease drivers to the challenge of piloting an ACV.

To support the 39th, Bell Aerosystems maintained a field site to help with maintenance and to coordinate the logistical needs of the unit. Maintenance of the ACV was unique — there only three vehicles and no parts replacement mechanism within the Army's logistical system. To limit the degradation of the ACV force, a rotation system was developed so that one vehicle would always be kept back at base for maintenance. This allowed the unit to keep a viable force of two ACVs in the field and still allow for proper maintenance of the third. On occasion, however, all three ACVs did operate together.

Epilogue

There is little documentation on the 39th in Army or Bell archives. Only about 100 people actually served in the unit, and the overall impact of the three ACVs on the Army was slight. Locating former unit members was nearly impossible. Jack Kavanagh, the only one to be found, graciously provided his time and memorabilia to help record the unit's history. Additionally, Major General Julian J. Ewell (USA, Retired), former 9th ID Commander, and Major General Jim Hunt (USA, Retired), former 9th ID Chief of Staff, gave their own recol-

lections and impressions of the 39th Platoon. James D. O'Bryan, Director, ACV Lighterage Programs, Textron Marine Systems, spent much time providing elusive technical and manufacturer details. The U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania, and the Transportation Museum, Ft. Eustis, Virginia, also provided much needed assistance.

The 39th ACV platoon ceased combat operations on August 31, 1970, and later began standdown operations at Di An with equipment turn-in at Long Binh. The surviving ACV went back to the United States and is now on display at the Army Transportation Museum. In September, the 39th Cavalry Platoon (ACV) officially left Vietnam. Under the command of Majors David G. Moore, Duane B. Root, and Berry Graham, the 39th Cavalry Platoon (ACV) twice earned the Vietnamese Cross of Gallantry with Bronze Palm for outstanding performance of duty and extraordinary heroism in action against an armed enemy from December 1, 1966 through June 30, 1968, and from July 29, 1969 through July 20, 1970. Additionally, the unit also was twice presented the Republic of Vietnam Civic Actions Honor Medal for performance of duty between May 1968-June 28, 1969, and July 26, 1969-July 20, 1970.

It is clear the ACV had a psychological impact in Vietnam against the enemy in support of the Allies. Large, noisy, and fast, it earned the nickname monster from the enemy, and to the Allies provided a reassuring feeling because it could go into difficult areas. There was little agreement and even less high level support for the SK-5s and their mission in Vietnam. In the end, the 39th, by virtue of its equipment, became one of the most unique cavalry units ever fielded in the United States Army and, by the deeds of its men, built a positive reputation among the soldiers who served beside them in the Delta of South Vietnam.

Footnotes

[1]The Coast Guard later received the USN SK-5s and modified them to meet other mission requirements. Changes included an observation dome in place of the .50-cal mount, KAAR LN66 radar, and SAR equipment. USCG eventually put the SK-5s in a unit at Fort Point, San Francisco Bay, California. *Jane's Surface Skimmer Systems*, 73-74, New York, McGraw-Hill Book Company, p. 92.

[2]During its existence there were several titles for the Army ACV unit: Air Cushion Vehicle Test Unit, 9th Infantry Division, Armor Platoon Air Cushioned (Provisional), and Air Cushion Vehicle Unit.

[3]*Operational Report Lessons Learned*, Headquarters, 3d Brigade, 9th Infantry Division, Period Ending 30 April 1970 (U), 2 September 1970, Republic of Vietnam.

[4]Armor on the ACV roughly equal to the protection on a M113. Committee Studies Report, "The Air Cushion Vehicle in Armor Organizations." CPTs A.H. Gaylor, R. Miles, D. Richardson, W.A. Russell, Office of the Director of Instruction, U.S. Army Armor School, 1969, p. 9.

[5]The Delta was conducive to night operations because of reflectivity of the water. Senior Officer Debriefing Program. Conversations between Lt. Gen. Julian J. Ewell (Ret.) and Mr. Robert Crowley & Lt. Col. Harmon M. Bissell, McLean, Va., 1979, p. 65.

[6]Cutler, Thomas J. *Brown Water, Black Berets, 1961-1975*, United States Naval Institute, Annapolis, Maryland, 1988. pp. 30-31.

[7]Telephone interview with Major General Julian J. Ewell (USA, Retired), former 9th ID Commanding General, October 30, 1992.

[8]An Air Cavalry Troop for a Divisional Cavalry Squadron had on strength nine AH-1G Cobras, nine OH-6A, two UH-1Bs, and six UH-1Ds. Shelby C. Stanton, *Vietnam Order of Battle*. New York, Galahad Books, 1986, p. 48.

[9]Telephone interview with Major General Jim Hunt (USA, Retired), former 9th ID Chief of Staff, November 14, 1992.

[10]Operational Report of Air Cushion Vehicle Unit for Period Ending 31 January 1970, Republic of Vietnam, Major Duane B. Root.

[11]Letter received from Jack Kavanagh, December 1992.

[12]U.S. Army. Concept Team in Vietnam. "Air Cushion Vehicle (ACV): Final Report of Evaluation." Typescript photocopy, Headquarters, 9th Infantry Division, 10 January 1969, p. 72. ARMY-ACTIV-ACV-ENSURE.133, VNColl.

[13]Letter received from Jack Kavanagh, December 1992.

[14] Root, p. 3.

Captain Kevin Keaveney was commissioned in Armor under the ROTC Early Commissioning Program in 1981. A graduate of the University of Arizona, he is currently pursuing his Master's Degree from Boise State University. Previous assignments include armor platoon leader, observer-controller at the NTC, and various battalion and brigade assistant staff officer positions. He is currently the assistant S2/S3 for the 3d Brigade, 100th Division (Training).

The Cat's Eye

Moving and Securing the Div Cav Squadron's Field Trains

by Major Allen T. Storey

There are several ways to skin a cat, just as there are several methods of tactically deploying and securing a division cavalry squadron's field trains. In accordance with Field Manual 17-95, *Cavalry Operations*, the mission of the field trains is to provide combat service support (CSS) of squadron operations. Additionally, Charlie and Delta troops (air) are based in the field trains and provide combat power forward in habitual relationships with Bravo and Alpha troops (ground) respectively.

Normally, the squadron's field trains will be deployed and located with a ground brigade's support area as part of the base defense cluster plan, with the aviation brigade's support area, or may possibly be deployed separately. A typical battlefield template for the divisional cavalry squadron and its field trains are depicted in Figure 1.

The tactical deployment and security of a field trains is conducted in phases: preparation or pre-deployment, displacement, establishment (occupation), and enhancement.

•**Preparation.** Preparation is the key to easily and expediently deploying and securing the field trains. Key events during the preparation phase are pre-combat inspections, publication of OPORDs and movement orders, and rehearsals.

While these are routine procedures throughout the Army, it is particularly important that, during pre-combat inspections, every individual soldier, every piece of unit equipment, and every vehicle be thoroughly inspected and their functions checked.

•**Displacement.** Upon completion of the preparation phase, tactical displacement begins with marshalling of vehicles and serial briefings to ensure drivers are informed. One of the unique features of a divisional cavalry squadron is its combination of air and ground components. Units can capitalize on the air troops' speed and intelligence-gathering capability during the displacement phase. Normally, one air troop is given the mission to conduct a route (air and ground) reconnaissance and may possibly be assigned to screen a sector of the route so as to enhance C^3I during convoy operations. After one air troop reconnoiters the route, the other may be tasked to conduct an aerial NBC and area reconnaissance of the assembly area prior to the arrival of the main body. During occupation of the assembly area, the air troop may maintain a screen to enhance security, and may be assigned the task of locating and identifying potential enemy avenues of approach and landing zones. The air cav troop submits its written report to the rear CP before darkness, because this information will be critical for planning security forces as well as fire support.

While reconnaissance operations are in-progress, convoy operations begin as part of the overall movement of the squadron. Based on the factors of METT-T, the situation may also dictate that the entire squadron initially deploy to the field trains site as an initial staging base (ISB). In this particular unit, field trains deploy in four serials:

The first serial is the advance (quartering) party, including the HHT commander, SMO and support platoon representatives, to include refuel on the move (ROM) vehicles, and first

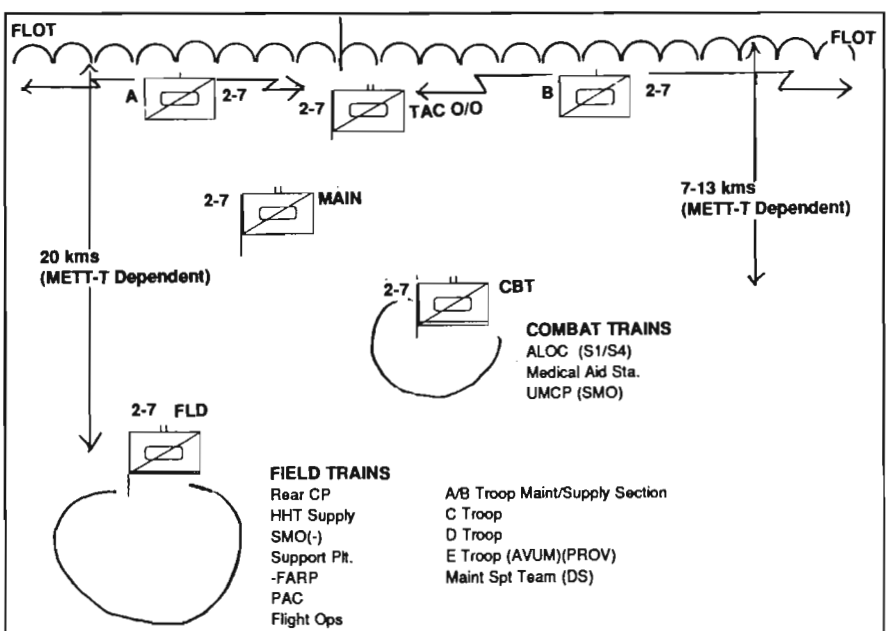


Figure 1

Battlefield Template - Cav Squadron and Field Trains

sergeants from C, D, and E Troops. With the HHT commander is the troop NBC reconnaissance party. It precedes the advance party prior to the release point (RP) to confirm the presence or absence of NBC contaminants, based on the aerial NBC reconnaissance. Obviously, this team conducts its reconnaissance in MOPP IV.

The second serial is composed primarily of HHT support elements. They are emplaced second to establish base support operations, to include flight operations, Class III/V, and the squadron mess. There should be a minimum of 30 minutes to an hour separation between the advance party and the second serial.

The third serial is composed of C, D, and E troops. They are normally 15 minutes behind the second serial. They are also emplaced well ahead of the arrival of the aviation assets. Each air troop may be required to leave a team at the tactical assembly area (TAA) or forward support base (FSB), to assist with logistical support for initial deployment of the aircraft, and then infiltrate to the squadron's field trains separately.

The fourth serial, or trail party, consists of the HHT first sergeant, SMO, and direct support maintenance assets. They also provide recovery for squadron convoy operations. They are normally 15 minutes behind the third serial.

For tactical displacements during the hours of darkness, there are also several methods of deployment. Successful "night moves" demand a sound driver training program and simple, routine quartering party operations. The "chem light method" can ease this process.

Each platoon, section, and troop has a unique identification. The basis for this system is the universal navigation lighting system — green light on the right, red light on the left — as seen from the driver's position. This particular unit's identification codes are as follows:

Section/Platoon/Troop	Color Code (L/R on Vehicle)
Rear CP/HHT Supply	None/Green
Support (Incl Mess)	Blue/Green
SMO/DS Maint	Red/Green
Flight Opns	Green/Green
PAC	Yellow/Green
C Troop	Red/Red
D Troop	Blue/Blue
E Troop	Yellow/Yellow

Note: All HHT vehicles have a green light on the right.

•**Establishment, or Assembly Area Occupation.** Priorities for occupation of a field trains site are identical to those for any other assembly area — security (cover and concealment), communications, operational readiness (the ability to provide combat, combat support, and/or combat service support), establishment of sleep areas, and continuous improvement (enhancement). The ease and expediency with which an assembly area is occupied depends primarily on well-established and understood operating procedures.

Respective platoons, sections, and troops have assigned sectors based on the clock method. The 12 o'clock position is usually oriented on the Threat or forward area of operations (see Figure 2). Additionally, entry and exit points are limited, visually identified in accordance with SOPs, and tightly controlled. As seen in Figure 2, the arrangement resembles a cat's eye.

Direct communications, via wire, FM, or the AN/PRC-127, are estab-

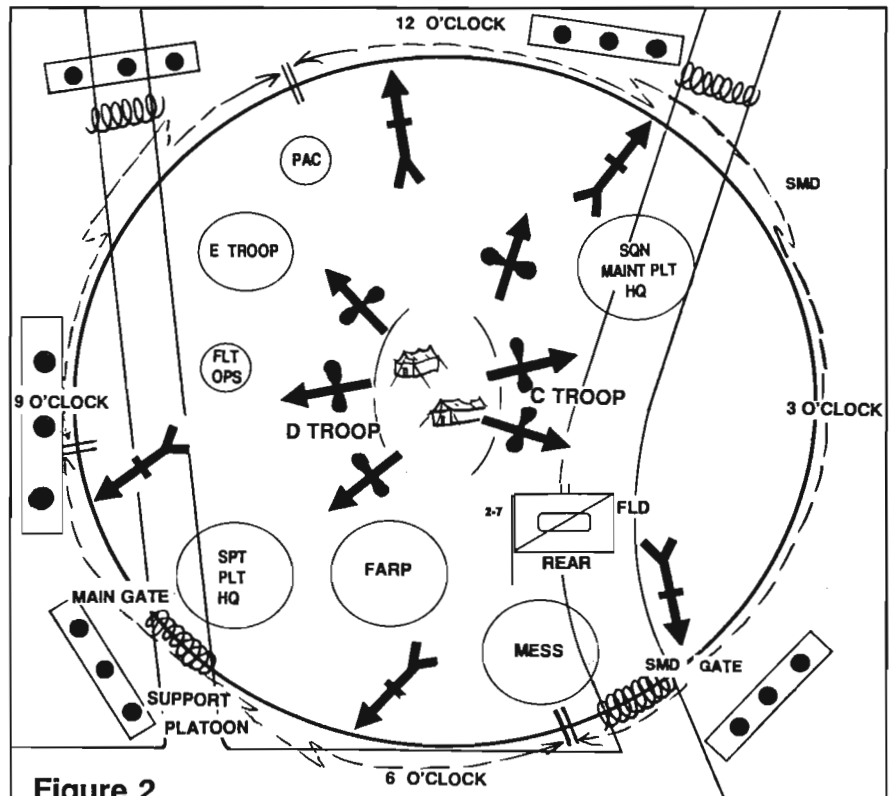


Figure 2

"The Cat's Eye"

lished and maintained between the rear CP and guard personnel.

Wire is the primary means of communication within the field trains, with the AN/PRC-127 as a back-up to critical sections, such as the gate guards, FARP, and flight operations. Within the rear CP, the squadron command and admin/log nets are maintained with secure voice. The division early warning (EW) is monitored in the event of an air attack. If required, an AM radio is available for long-distance communications.

The squadron maintenance section and supporting maintenance units are normally responsible for security from the 11 o'clock position to the 5 o'clock position. This is because they have the only heavy armor vehicles (M88A1s) in the field trains and several heavy crew-served machine guns (.50 cal M2s). Additionally, CSS doctrine calls for keeping armored vehicles that are not mission capable in the SMO area so that their weapons systems can be used for security. The road network should be in close proximity to this area to ease vehicle recovery and allow easy access for vehicles carrying major end items.

The support platoon, which includes the transportation, Class III/V, and mess sections, is normally responsible for local security from the 5 o'clock position to the 9 o'clock position. Additionally, they are responsible to maintain security of the "main gate." They are assigned a large sector to include the main gate because they also possess the majority of heavy machine guns (M2s). These crew-served weapons are emplaced to overwatch key terrain, to include road intersections, open fields, and obstacle emplacements which cover dead spaces. All crew-served weapons have the secondary role of air defense, and their emplacements are planned with this consideration as well.

The remaining perimeter security responsibilities, from the 5 o'clock to 9 o'clock positions, are shared by E Troop, the PAC, and the flight operations section. C and D Troops are emplaced within the perimeter because they are unable to provide security continuously. With fewer personnel, aircraft maintenance requirements, and the need for crew rest, they are least able to contribute to perimeter security. However, C and D troops do provide personnel for ready reaction forces (RRF).

The rear CP and flight operations are emplaced separately for redundancy in C^3I tasks.

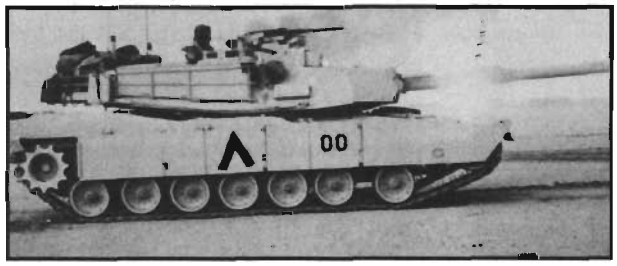
Passive and active security measures must be maintained to protect the field trains. Passive measures include the use of cover, concealment, camouflage, and strict noise and light discipline. Active measures must be aggressive and consistently monitored to be effective. Upon completion of occupation of the field trains, the unit designates fighting positions, fields of fire, and areas of responsibility. Then, the communications systems are installed to support the security plan. Communications systems consist of wire, FM, and the AN/PRC 127s. A diagram of the assembly area and the security plan is maintained in the rear CP to direct personnel to a specific section, particularly during the hours of darkness, and to guide ready reaction forces (RRF). The RRF is composed of approximately 15 personnel that may not have specific fighting positions. This group is formed to counter squad- and possibly platoon-sized threats. A rally point (RP) is designated to collect the RRF. Other active security measures are taken as resources are available.

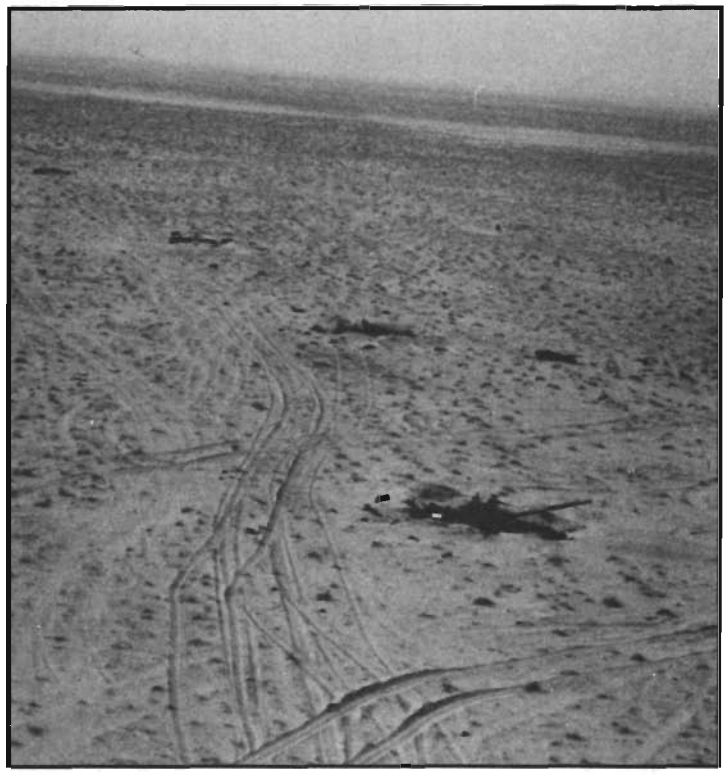
Weapons systems are emplaced to overwatch likely avenues of approach and open areas. These may include crew-served weapons on tracked vehicles and aircraft armament systems. Another key element of security is to conduct counterreconnaissance operations if forces are available. Based on intelligence, likely enemy avenues of approach may be kept under surveillance during specific times. Additionally, if enemy intrusions have been identified, the RRF may conduct aggressive counteroffensive operations to locate, positively identify, and destroy the threat. When air cavalry assets depart for or return from missions, they are also assigned the task of expeditiously screening the field trains before landing to locate and counter any enemy formations moving toward the assembly area.

•**Enhancement.** Improvements are continuously made to the assembly area as the unit refines communications and security systems. It establishes sleep areas and implements sleep plans. It trains and evaluates security forces and conducts continuous after-action reviews to improve operations. Obviously, there are several methods to administer a unit's trains. This is merely one way for those faced with this particular task.

Major Allen T. Storey received his Armor commission from North Georgia College in 1977. His previous assignments include tank platoon leader and company XO, B Co, 5-68 Armor; asst S3 (Tng), AeroRecon plt cdr, and trp S3, 2d Sqdn, 17th Cav; asst S3 (Opns) and adjutant, 4th Sqdn, 7th Cav (Air); Aviation doctrine and tactics writer/instructor at Ft. Rucker; Aviation training battalion XO, 1st Bn, 145th Aviation; Aviation training company cdr, Co D, 1st Bn, 212th Aviation; and S3, 1st Bn, 4th Aviation (Attack). He is currently commander, HHT, 2d Sqdn, 7th Cavalry at Fort Carson, Colo.

Desert Call for Fire for Tankers





by Captain Robert Kewley

Call for fire techniques currently taught to armor leaders rely on the observer's ability to locate either himself or his target on a map. As armored forces deployed to the Persian Gulf, where 1:50,000 map sheets sometimes had only two recognizable terrain features, these techniques became obsolete. Armored units could not call for fire without an FSO using his GLLD and a navigation device. However, a FIST-V is not always readily available in a position to observe and designate the target. This article describes how an armor leader mounted in a M1A1 tank can locate himself and his target in featureless terrain and call for accurate artillery or mortar fire. It will relate the experience of one unit in the desert, draw lessons and techniques from that experience, and relate those techniques to a tactical situation.

Several days before the ground offensive started in Iraq, the 2nd Brigade, 1st Cavalry Division probed the security zone of the Iraqi's front-line defenses as part of the division's plan to portray preparations for a main attack along the Wadi al Batin. During the night of 22 February, D Company (M1A1 pure), Task Force 1-32 Armor established a linear ambush along the border berm to destroy security or mine-laying patrols north of the berm. The task force commander attached the scouts to D Company to acquire targets on the flanks and placed the task force mortars in direct support. The night sight on the company FIST-V was broken, so tank thermals had to acquire artillery targets.

Just after dark, D Company deployed with three platoons on line oriented into engagement area WOLF as shown in Figure 1.

As the company pulled into position, the company XO pulled alongside the FIST-V 1000 meters behind the company and got his position from the FIST's GPS. He then used his compass, the tank laser, and a small plot-

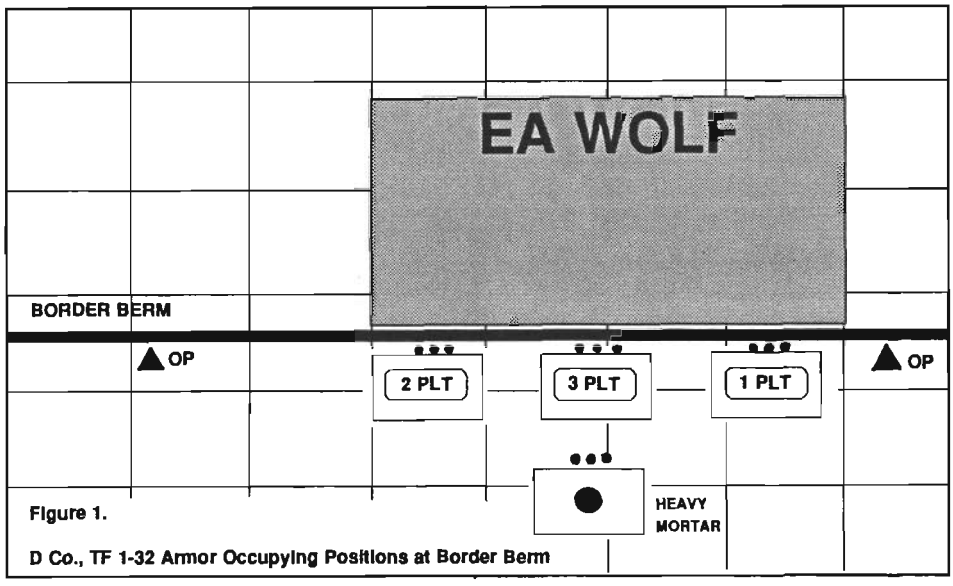


Figure 1.

D Co., TF 1-32 Armor Occupying Positions at Border Berm

"All tank commanders must be able to determine the direction to a target from their vehicle. There are a few techniques to doing this. The easiest is for the tank commander to have a previously made card showing the mil azimuth of the gun tube in relation to directly over the front slope...."

ting board to plot the positions of the platoon sergeants' vehicles. He relayed these positions to the company FSO. After occupying the positions, the 1st platoon identified an enemy OP 1840 meters northeast of its position on a 15-degree azimuth. Not wanting to compromise the ambush for such a low payoff target, the commander ordered 1st platoon to engage with artillery. The FSO relayed an adjust fire polar mission to the mortar FDC. The 1st platoon sergeant identified the first round on target and called fire for effect as the enemy observers attempted to flee the position. The fire for effect killed or wounded both soldiers. Later, an enemy truck stopped 3700 meters north of the 1st platoon position and dismounted a mine-laying team. Because this was beyond the maximum effective range of HEAT ammunition, the commander again ordered a mortar engagement. The FSO called an adjust fire polar mission to the mortars. The first round landed short, and the first platoon called an add 200 adjustment. The second round fell short, and he called an add 400 adjustment. The third round also fell short, and the enemy truck began fleeing north. Two HEAT rounds missed as the truck escaped beyond maximum range. Later in the night, the scouts on the east flank engaged a dismounted patrol with 25-mm HE. D company pulled off the berm just before daylight and returned to its battle position 10 km to the south.

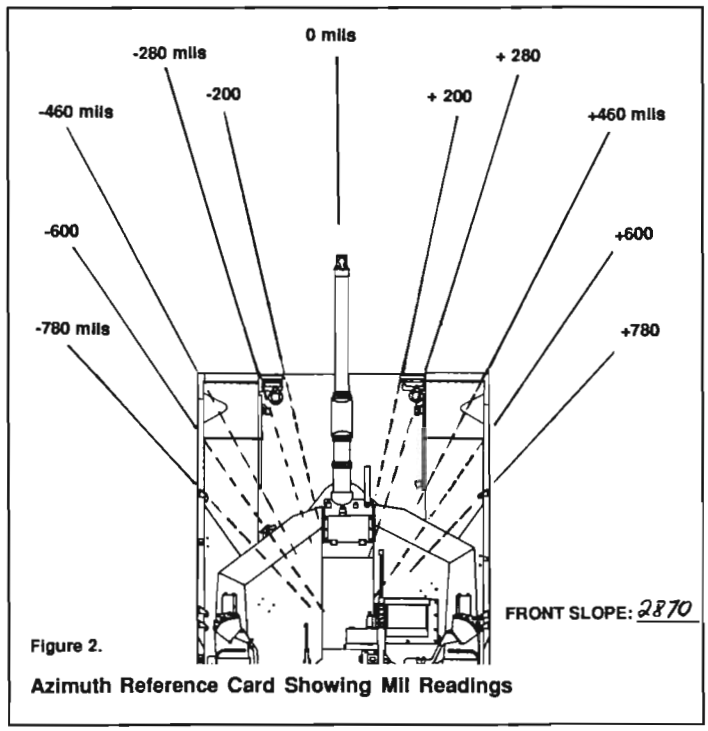


Figure 2.
Azimuth Reference Card Showing Mil Readings

The company after-action review brought out many points applicable to fire support in the desert. The M1A1 would be a devastatingly effective fire support vehicle with the addition of a GPS and compass on each vehicle. As a minimum, the turret should have an azimuth indicator.

Without these tools, polar missions can still be effective if a GPS, GLLD, or lasing tank accurately plots observer locations and enters them into the FSO's or FDC's computer. Finally, the FSO misunderstood the range to the truck by 1000m causing the first round to fall 1000m short. Distance is hard to judge in the desert, especially through a two-dimensional thermal sight. However, the tank reticle and laser could have been used to accurately adjust the subsequent rounds.

If the FSO is unavailable for a mission, the company XO must be prepared to take over his role. He should carry a plotting board at least 10 km square, preferably using 1:25,000 sized squares to reduce plotting errors. As the company sets, he should take up a location where he can see either the platoon leader's or platoon sergeant's vehicle in each platoon. If he does not have a GPS, he should use his laser and compass to plot his position in relation to a vehicle that does, probably the commander's tank. Do not use a LORAN to get locations for artillery fire. It is not accurate enough. Actual lasing to friendly vehicles should only be done in combat, and the unit must take precautions to prevent eye injuries. Lase to the grill doors, ensure no one is exposed, and announce your lase on the company net. Also, a lensatic compass is not effective unless at least 10 meters away from the tank. The XO then lases to and plots at least one vehicle in each platoon. Depending on his unit's priority, he may be able to have some key positions entered as observer locations in the mortar FDC's computer.

All tank commanders must be able to determine the direction to a target from their vehicle. There are a few techniques for doing this. The easiest is for the tank commander to have a previously made card showing the mil azimuth of the gun tube in relation to directly over the front slope. He could use the headlights, the inside and outside of the fenders, and the skirt pins as possible reference points on the vehicle. As the vehicle pulls into position, the tank commander dismounts and uses a compass to determine the direction his front slope is facing and records it on his card (See Figure 2). Then, as he identifies a target, he lays the gun on it, lases to get range, and

references his gun tube position on the card to add or subtract mils from the direction his front slope is facing. As the defensive preparations continue, he should record the direction to TRPs and likely enemy avenues of approach on his range card. Another technique is to record the deflection of the turret at different points on the hull interior below the turret ring and reference them through the opening above the driver's door.

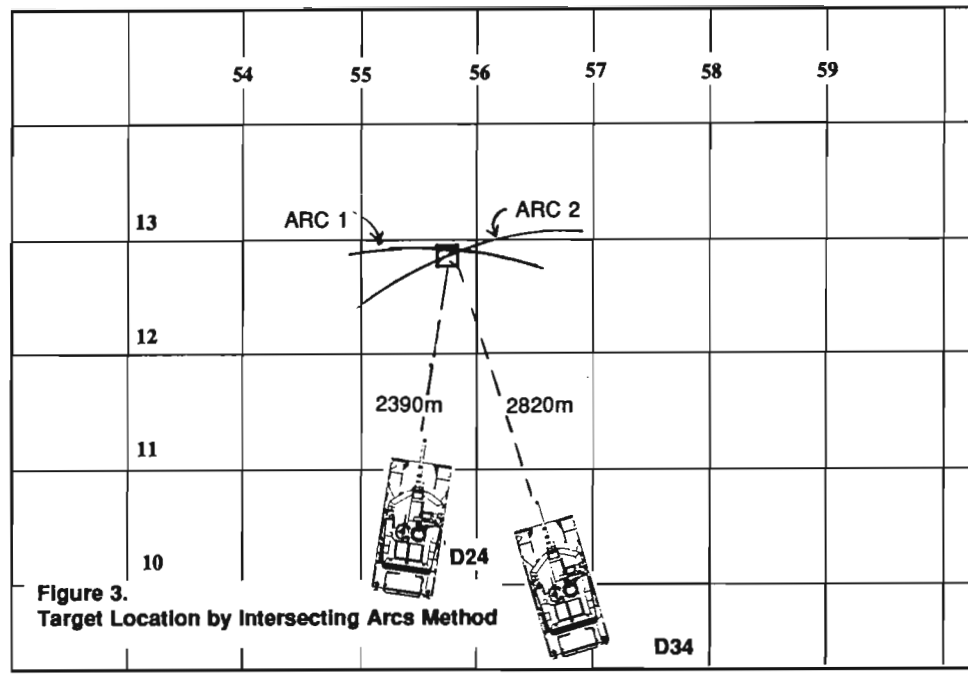


Figure 3.
Target Location by Intersecting Arcs Method

The company XO can determine the grid location of a target if he gets the distance to that target from two of the vehicles he has plotted. Using a drafting compass, he sets it for the distance from the first vehicle to the target and draws an arc. He then sets the compass for the distance from the second vehicle and draws another arc. The point where the two arcs intersect is the target location. For example, the second and third platoon sergeants each identify an artillery target to their front. The second platoon sergeant gives a range of 2390, and the third platoon sergeant gives a range of 2820. Using his plot board, the XO draws arc 1 (see Figure 3) with a radius of 2390 meters and arc 2 with a radius of 2820 meters. Point A, where the arcs intersect, grid 566128, is the target location.

Finally, adjusting fire in open terrain is very difficult because there is nothing to use as a distance reference. The tank sight and laser can solve this problem. After placing his sight in 3 power and laser in arm 1st return, the tank commander observes for a burst and lases to the burst cloud. This range is compared to the known range to target to get a perfectly accurate range adjustment. He then uses the reticle, which is 15 mils across, and the observer-target factor to get a very accurate deflection adjustment. If these techniques are mastered, the second round should be on target almost every time.

These techniques are most useful in a hasty defense. As the company occupies, the commander and platoon leaders establish the direct fire engagement area. The XO gets his location and plots the locations to the platoon sergeants' vehicles. He then relays these positions to the platoons. Once direct fire sectors are assigned, tank commanders should dismount and determine the azimuth straight over their front slope. Platoon leaders should plot locations of platoon vehicles using the one known position. This small amount of preparation will give leaders reference points from which they can use the tank's laser to call for accurate fires. As the XO monitors the company net, he can call for fires on either the battalion net or the mortar net, both of which are monitored by the battalion fire support officer.

Armor leaders can use these methods in any static tactical situation, even if the unit has an FSO. They give a reliable backup. With a little training and practice, a company should be able to get indirect fires in its engagement area quickly without pulling platoon leaders and tank commanders away from the direct fire fight. Until an equipment solution to target location is fielded, these methods can give the armor leader an alternative to trying to read a nearly blank map.

Captain Robert Kewley is a graduate of USMA class of 1988. After Armor Officer Basic Course and Ranger School, he reported to Task Force 1-32 Armor, 1st Cavalry Division. He initially served as the 3rd platoon leader in A Company for an NTC rotation in January of 1989. He deployed for Operation DESERT SHIELD and DESERT STORM as the executive officer for D Company. Upon the unit's return to Fort Hood, he served as the task force S4, Headquarters Company executive officer for an NTC rotation in February of 1992, and task force S1. He attended the Armor Officer Advanced Course and is currently serving at Fort Knox in Task Force 1-70 Armor as the S3 Air.

Breakout and Pursuit:

The Drive from the Pusan Perimeter By the 1st Cavalry Division And Task Force Lynch

by Major Arthur W. Connor Jr.

Some of our scientists do not understand the psychology of warfare. Infantry has a mortal fear of enemy tanks. The greatest morale-raising factor of this war was the arrival of American tanks which could knock out the Russian T-34. The tank is an essential member of the combat team.

Major General Hobart Gay, Commanding General, 1st Cavalry Division in Korea, 1950.[1]

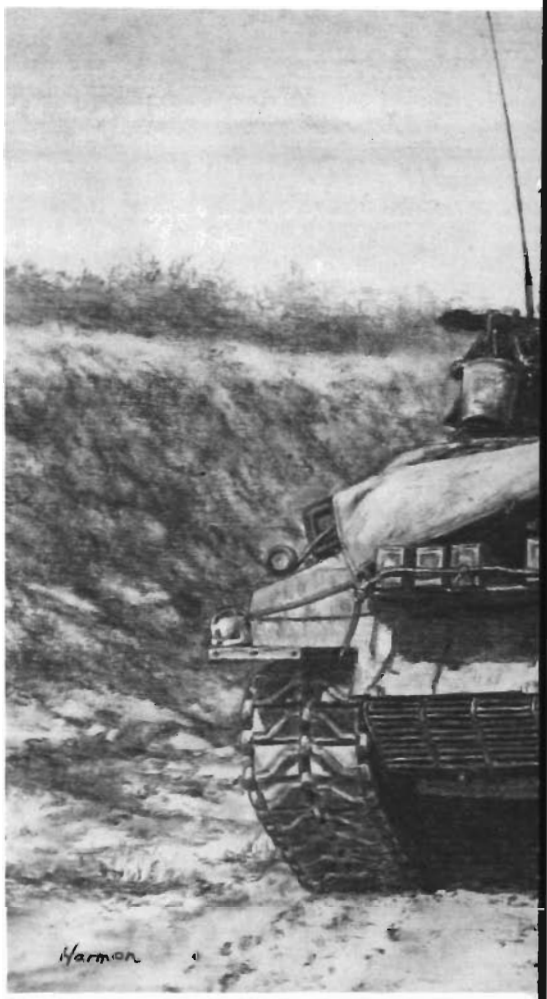
On the 25th of June 1950, the North Korean Peoples Army (NKPA) surprised the United States and the world by crossing the 38th parallel and invading South Korea. The Republic of Korea (ROK) Army fell back in disorder as the Communist forces drove deeply into South Korea, spearheaded by Russian-built T-34 tanks. The initial American forces sent to Korea could only slow the advance of the NKPA.

By the first week of August, Eighth United States Army and its ROK allies had been forced back into a perimeter around the port of Pusan. Grim resistance marked the battles of the Pusan Perimeter, as General of the Army Douglas MacArthur fed reinforcements to Eighth Army while planning a counterstroke aimed at Inchon. With the situation in the perimeter stabilized in mid-September, MacArthur launched X Corps (1st Marine Division and 7th Infantry Division) at Inchon on the 15th, directing Eighth Army to break out of the Pusan Perimeter and drive north to effect a link-up.

After securing a bridgehead over the Naktong River from 21-25 September 1950, the 1st Cavalry Division was poised to drive north and do just that. Major General Hobart Gay met with his regimental commanders at 0830 on the morning of 26 September 1950 at the schoolhouse in the village of Sangju. After almost three months of intense combat and constant fighting in defense of the Pusan Perimeter, the 1st Cavalry Division was finally going to go on the offensive and hurl its tanks and men into the heart of the North Korean Peoples Army.

The 7th Cavalry would lead the dash of the division northwest to the link-up with X Corps. Lieutenant Colonel James H. Lynch's 3d Battalion, 7th Cavalry (designated Task Force Lynch) would lead his regiment and the division in the breakout from the Pusan Perimeter. Colonel William A. Harris, commander of the 7th Cavalry and the regimental command group would follow Task Force Lynch, with 1st Battalion, 7th Cavalry (designated Task Force Witherspoon) bringing up the rear and prepared to leapfrog past Task Force Lynch should the need arise.[2] The 70th Tank Battalion's M4A3 Sherman tanks would provide firepower and shock effect for the cavalrymen, with 2d and 3d platoons of C Company attached to Task Force Lynch.

Task Force Lynch moved out at 1130 hours with the Intelligence and



Reconnaissance (I and R) Platoon leading Lieutenant Robert Baker and the three tanks of 2d platoon, C Company, 70th Tank Battalion. Baker's tanks were followed by an engineer platoon from B Company, 8th Engineers, Colonel Lynch's command group, I, L, and M Companies, 3/7 Cavalry Headquarters Company, K Company, C Battery, 77th Field Artillery (105-mm towed), with 2d Platoon, C Company, 70th Tank Battalion bringing up the rear. The infantrymen of the Task Force rode in two-and-a-half ton trucks in order to keep up with the swift moving lead elements. The task force objective was the village of Osan, nearly 102 miles away.

For miles there was no opposition, only the cheering of liberated Koreans as the task force moved through the countryside. At 1430 hours, the I and R Platoon and Baker's tanks reached

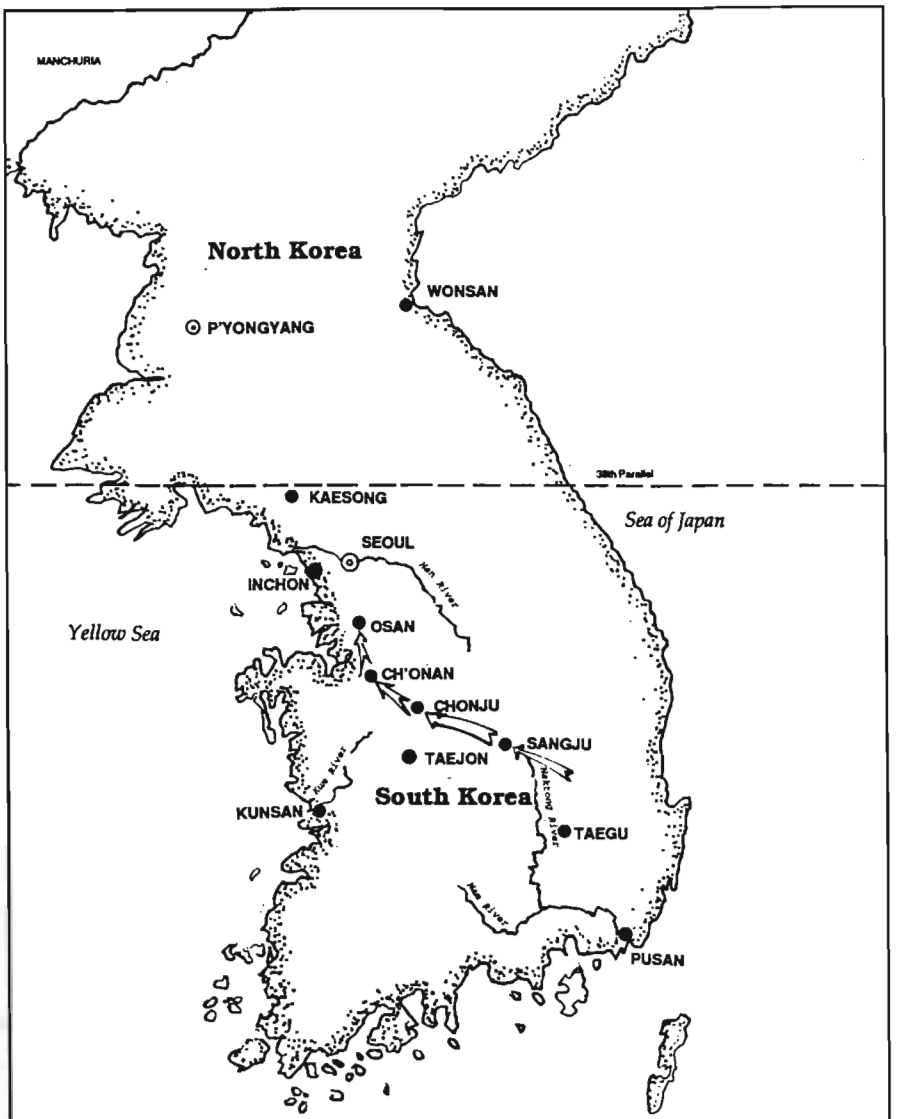
the outskirts of Chongju, where Colonel Lynch moved the tankers into the lead instead of the unarmored jeeps. Baker entered the town and found it deserted, even though some Korean women told him that the NKPA would shoot their husbands if he continued into the town.[3] The column left Chongju with the gun jeeps of the I and R Platoon back in the lead.

At 1800 hours, after traveling approximately 64 miles, the task force halted to refuel the tanks. To the consternation of Colonel Lynch, the refuel truck for the tanks had not moved out with the rest of the task force. As it was getting dark, Colonel Lynch consulted with Colonel Harris, who was accompanying the column, about the possibility of proceeding to the rendezvous with the 7th Infantry Division with the headlights of the task force turned on! Colonel Harris agreed, and his bold decision was relayed to Lieutenant Baker and the rest of the troopers in the force.[4] Baker received this order with a degree of discomfiture, but his immediate worry was refueling his thirsty tanks.

Baker moved down the line of the vehicles collecting all of the five-gallon cans of gasoline that he could find. As he passed the trucks carrying the infantry of 3/7 Cavalry, each truck closed up to the vehicle in front of it along the edge of the road. Colonel Harris chewed out Lieutenant Baker for causing the column to close up and become more vulnerable, asking the tank platoon leader if he hadn't had to correct him for doing the same thing before.[5] The beleaguered lieutenant continued to collect gas cans when the lead squad of the I and R Platoon came running back down the road toward the tankers, screaming that a North Korean tank was coming their way.

Baker's men mounted up and were ready to fire, when the "tank" turned out to be three NKPA trucks. In the near darkness, the enemy drivers did not recognize the Americans until it was too late. Panicking, they bailed out of the trucks and ran away, but not before one of the drivers crashed his truck into a jeep of the I and R Platoon that was parked astride the road. The tankers and scouts searched the trucks and discovered enough gasoline aboard them to refuel Baker's three tanks and the three tanks of the 2d Platoon at the rear of the task force. The generosity of the enemy allowed the column to move out again at approximately 2000 hours.[6]

The moon was up, but it was a cloudy night when Lieutenant Baker led Task Force Lynch into the village of Chonan and onto the main highway to Osan. The headlights of the force burned brightly as it ground its way



KOREA: The Route of Task Force Lynch

north through enemy territory and toward the link-up with X Corps. Baker was given permission to engage enemy soldiers if he needed to, but a captain from the command group told him to "go slow for about ten minutes, and then highball as fast as you can."[7]

Baker complied and entered Chonan from the south. He found the village full of enemy soldiers who did not seem to mind the presence of the American tanks. The numerous streets of the village did not match those on his map, so Lieutenant Baker stopped his tank at an intersection that had a single NKPA soldier standing guard. The tank platoon leader brazenly pointed at one of the roads, and asked the North Korean "Osan?" The befuddled soldier pointed out the right road, then recognizing the tank as American, fled in panic. Lieutenant Baker cut him down with machine gun fire, and then moved out.[8]

Moving north from the village, the tankers passed dozens of enemy soldiers and vehicles. The tankers sprayed the NKPA with machine gun fire and high explosive (HE) rounds from the main guns of their Shermans, but they did not stop. Baker caught a company of NKPA in full uniform and camouflage just after leaving Chonan, and chewed them up. One of the enemy soldiers was run over by Baker's tank when he and another soldier collided while trying to get out of the way of the charging Americans. Several enemy soldiers on bicycles and two jeeps were also crushed by the tankers. Baker attempted to contact Colonel Lynch, but he had not been able to establish radio contact since entering Chonan. Since he could see the headlights of the task force behind him, he plowed on toward Osan.[9]

Meanwhile, Colonel Lynch was becoming very uneasy with the rapid progress of the tanks and I and R Platoon. The trucks carrying the rest of his soldiers could not keep up with the lead elements, creating a gap in the column of vehicles. North of Chonan, Colonel Lynch found himself "in the lead" of the main body of his force. After passing groups of enemy soldiers as large as 10 and 15 men, Lynch decided that discretion was needed. He pulled over and reorganized the task force, putting a platoon of infantry in trucks in the lead, with the lead truck carrying a .50-caliber machine gun in a ring mount, and a 3.5-inch bazooka.[10]

"Captain James Webel, the regimental S3, jumped on the tank and took the can from the hands of the lieutenant, pouring the whole thing into the engine compartment. A huge explosion blew Captain Webel 30 feet in the air, as the tank began to burn fiercely."

Ten miles south of Osan, Colonel Lynch could hear the sounds of sporadic artillery and small arms fire. Deciding that the "parade was over," Lynch ordered the headlights of the vehicles turned off.[11] Farther to the north, Lieutenant Baker and a squad of the I and R Platoon roared into Osan at full speed. Stopping briefly just north of the village, Baker identified numerous T-34 tracks, but he did not spot any of the tanks themselves. The T-34 was Russian-built and heavily armored, with an 85-mm main gun. Like the Sherman, the T-34 was a World War II veteran, with the NKPA fielding a brigade of T-34s at the start of the war.

Moving out, Baker's tanks started taking small arms and antitank fire. Baker kept moving, and identified American M-26 Pershing tracks in the road. With his headlights still on, the tanks barrelled forward when suddenly an antitank round fired from their rear hit the third tank in line, killing the tank commander. A white phosphorus grenade exploded near Baker's tank illuminating his diminutive force in its glare. Someone shouted up at Baker, "What the hell are you doing out here?" Baker shouted back, "I'm from the First Cavalry!" Jumping from his tank, Baker shook hands with a lieutenant from the 31st Infantry Regiment of the 7th Division. It was 2226 hours on 26 September when this happened, 106 miles from their starting point in Poun earlier that day.[12]

The rest of Task Force Lynch moved toward the village of Habungni about an hour behind Baker. After bypassing a downed bridge just south of the village, Colonel Lynch drove past a T-34 tank on the side of the road that had its gun tube pointed out across the road. Lynch joked about the tank, thinking that it was destroyed. Suddenly the tank opened fire on the column with its machine guns and main gun. Another tank, hidden along the side of the road, joined the first in raking the column with fire. Colonel Lynch's jeep lurched to a stop, with the passengers scrambling to find some semblance of cover in the ditch along the side of the road.[13]

All along the length of the task force, vehicles stopped and the men in them scurried to meet the enemy threat. Lieutenant John Hill, Lynch's S2, moved forward to collect the infantry platoon that was the point element and bring them and their 3.5-inch bazooka back to attack the enemy tanks. The crews of the T-34s became nervous and started the engines of their tanks, but they did not move. It was a fatal mistake for the enemy tankers, as Lieutenant Hill led an attack that destroyed one of the T-34s with a shot from a 3.5-inch bazooka. Before the second tank could be engaged, it lurched forward onto the road and ran over two jeeps and several trucks before it ran off the road into a rice paddy, several hundred yards from its starting point. A barrage of 57-mm and 75-mm recoilless rifle fire crashed into the enemy monster, immobilizing it in the darkness.[14]

A brave trooper, Sergeant William Hopkins, ran up to the T-34 and climbed aboard. Hopkins tossed several grenades inside the tank, but the motor kept running. Frustrated at their inability to "kill" the tank, Lieutenant William Woodside, the L Company commander, brought a five-gallon can of gasoline forward and dumped a small amount into the engine compartment of the tank. When the tank still ran, Captain James Webel, the regimental S3, jumped on the tank and took the can from the hands of the lieutenant, pouring the whole thing into the engine compartment. A huge explosion blew Captain Webel 30 feet in the air, as the tank began to burn fiercely. Luckily, Captain Webel suffered only minor burns to his hands and face.[15]

At 0012 hours on the morning of 27 September, Colonel Harris was able to get through to the 1st Cavalry G3 on the radio and inform him that Task Force Lynch was in a fire fight. Harris did not ask for help, but indicated that the enemy resistance would be readily dispatched. He was not so sanguine just an hour later when he reported that Lynch was being held up eight miles south of the objective. "Send tanks forward immediately. We can-

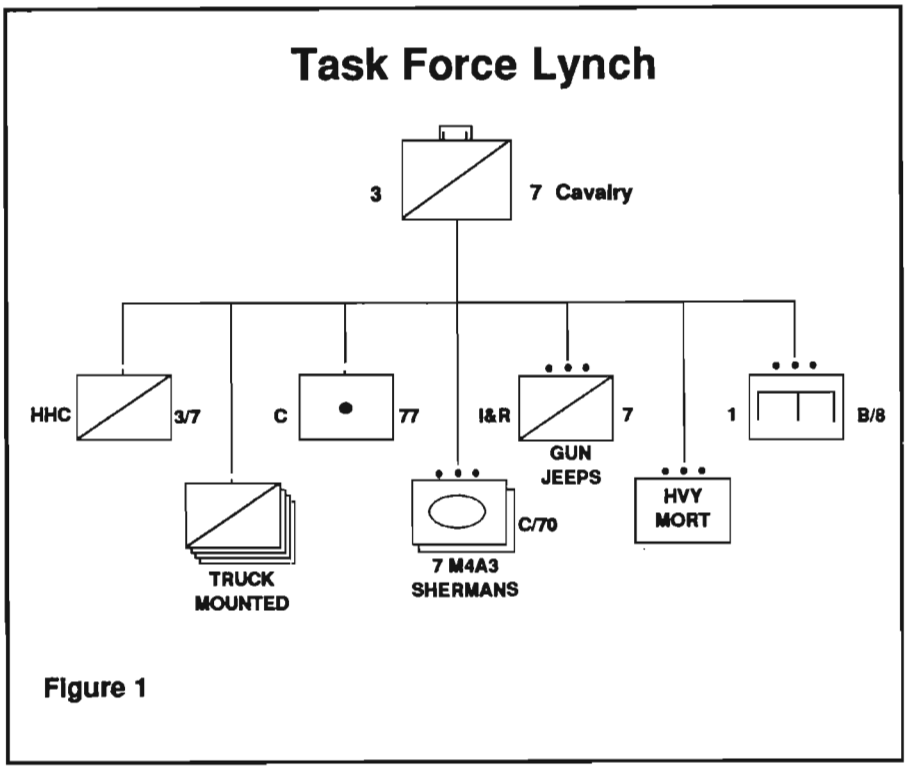


Figure 1

not disengage," radioed Harris.[16] After the first two enemy tanks had been dispatched by the cavalrymen, more NKPA tanks clanked down the road toward the stalled task force.

The village was burning and several of the trucks that had been run over by the rampaging T-34 were also on fire. Colonel Lynch heard the roar of tank motors and the clanking of treads coming down the road from the north. He held out the hope that they were Lieutenant Baker's tanks, but realized they were not when he saw two more T-34s clearly illuminated in the glare of the collective fires. It seems that Baker's three tanks and the I and R squad that reached Osan had somehow bypassed a strong enemy contingent of tanks and infantry along the road. Lynch ordered his driver, Corporal Billie Howard, to get in the closest truck and move it astride the road to block the movement of the NKPA tanks.[17]

Corporal Howard dashed to the truck and got it in position with two enemy tanks only 100 meters away. The two tanks halted at this brazen and quizzical action by a truck in what should have been a secure area. The tank commander of the lead tank opened his hatch and shouted in Korean; "What the hell goes on here?" The Americans answered this query with a hail of small arms and recoilless rifle fire that set the truck ablaze, and caused the tanks to slam their hatches shut. Eight more T-34s rumbled up behind the two now sitting at the burning truck. They arrived just as 2d Platoon, C Company, 70th Tank Battalion had finally been able to make its way to the front of the column past the entire task force.[18] The American and NKPA tanks exchanged shots from almost point blank range. Nearly simultaneously, one T-34 and two of the Shermans were hit. The lead American tank fired again and penetrated a T-34 with a Hyper Velocity Armor Piercing (HVAP) round just to the left side of the gun mantlet. There were simply too many T-34s, however, and their combined fire immobilized the last M4A3.[19] One of the T-34s pulled out from where the truck had stopped the first two tanks, and began to meander down the line of the stopped task force vehicles. Once again, jeeps and trucks were crushed and machine gunned. As the tank wound its way through the column, it came to where the Headquarters Company of 3/7 Cavalry was stopped. Incensed at the destruction being caused by the tank that he thought was "friendly," Captain Robert McBride, the company commander, jumped out into the road and started screaming and shouting at the tank commander for running over his jeep. A burst of machine gun fire creased the captain in the rear end and sent him scurrying into the ditch.[20]

The rogue T-34 continued down the line of vehicles. The courageous Sergeant Hopkins fought it with grenades, but his luck did not hold with this tank, and he was killed. As the tank approached the rear of the force, Captain Theodore Wardlow, commanding the artillery battery, unlimbered a 105-mm howitzer with three of his men, and manhandled it into firing position astride the road. The men fired several rounds into the oncoming tank, with the final round blowing the turret off the tank when it was only 30 meters away from the howitzer.[21]

Colonel Lynch moved back south among his troops in an effort to reach Colonel Harris and to coordinate hunter-killer operations against the remaining eneny tanks. He did not have to worry about his men, as they had already formed several groups that were stalking the NKPA tanks in the darkness. Over the next hour, four more of the T-34s fell victim to 3.5-inch bazooka teams. Finding Colonel Harris amid the din of battle, Colonel Lynch and he decided to consolidate their position for the night before attempting to continue north. A perimeter defense was organized, and by 0200 hours the fighting died down. Seven of the enemy T-34s were destroyed in the night's fighting, with the other three moving away to the north.[22]

At 0700 hours, Colonel Lynch reorganized his task force for a foot approach to Osan. Scattered resistance was encountered and quickly silenced by the lead company. At 0800 hours,

the force was in Osan, and 26 minutes later, Task Force Lynch linked up with H Company, 31st Infantry. The drive was complete, but fighting would continue for the next two days, as trapped pockets of NKPA soldiers and tanks attempted to escape the converging American forces. C Company, 70th Tank Battalion destroyed four more T-34s on 28 September in Pyongtaek and Osan, while Air Force planes caught two more in the open and destroyed them.[23]

The drive of the 1st Cavalry Division and Task Force Lynch had eaten up enemy terrain in a spectacular fashion. The task force and the division had cut across enemy lines and linked up with X Corps because of the courage of leaders at all levels of command. A large sign erected at the north end of the road leading out of Osan boasted of the movement of the 1st Cavalry Division, the 7th Cavalry Regiment, and Task Force Lynch. It read:

At 0826 hours on 27 September 1950, forward elements of Company L, 7th Cavalry, 1st Cavalry Division made firm contact with Company H, 31st Infantry, 7th Infantry Division at this location, thereby making a solid United Nations front from Pusan to Seoul. This drive, from Taegu to Osan, a distance of 196 road miles and 116 air miles, marked the longest advance in the history of the American Army through enemy held territory. — GARRY OWEN[24]

A young tank platoon leader led for 106 miles of that advance.

Notes

[1]General Gay as quoted in Eighth Army Armor Section, "Report of Observations of Performance of Ordnance Equipment in Korea," 2 December 1950, copy found in 70th Tank Battalion War Diary, December 1950, Washington National Records Center, Suitland, Maryland, Record Group 407, (hereafter WNRC), Box 4433.

[2]7th Cavalry War Dairy, September 1950, Box 4431, WNRC.

[3]Statement of First Lieutenant Robert W. Baker, found in 70th Tank Battalion War Diary, September 1950, Box 4433. Hereafter cited as Baker Statement.

[4]Statement of Lieutenant Colonel James H. Lynch, found in 7th Cavalry Regiment War Diary (hereafter cited as Lynch Statement), September 1950, Box 4431; 7th Cavalry War Diary, September 1950, Box 4431.

[5]Baker statement.

[6]Ibid.; 7th Cavalry War Diary, September 1950, Box 4431.

[7]Baker statement.

[8]Ibid.

[9]Ibid.

[10]Lynch Statement.

[11]Ibid.

[12]Baker statement; 70th Tank Battalion War Diary, September 1950, Box 4433. Quotations taken from *Stars and Stripes, Pacific Edition*, Thursday 28 September 1950, copy found in 70th Tank Battalion War Diary. The 31st Infantry Regiment War Diary for September 1950, Box 3179, records the link-up time as 2345 hours instead of 2226 hours.

[13]1st Cavalry Division War Diary, September 1950, Box 4409, WNRC; 7th Cavalry War Dairy, September 1950, Box 4431; Lynch Statement.

[14]Ibid.

[15]1st Cavalry Division War Dairy, September 1950, Box 4409; 7th Cavalry War Diary, September 1950, Box 4431.

[16]1st Cavalry Division War Diary, G3 Journal, 27 September 1950, Box 4409.

[17]Lynch Statement; 1st Cavalry Division War Diary, September 1950, Box 4409.

[18]Ibid.

[19]70th Tank Battalion War Diary, September 1950, Annex Number 1, "Actions in Which M4A3E8 Tanks Were Damaged or Destroyed," Box 4433.

[20]Lynch Statement.

[21]Ibid; 7th Cavalry Regiment War Diary, September 1950, Box 4431.

[22]Lynch Statement; 7th Cavalry War Diary, September 1950, Box 4431.

[23]Lynch Statement; 70th Tank Battalion Command Report, September 1950, Box 4433.

[24]7th Cavalry War Diary, September 1950, Box 4431.

Major Arthur W. Connor Jr. is currently a history instructor at the U.S. Military Academy. His previous assignments include platoon leader and executive officer in 3d Battalion (ABN), 73d Armor, 82d Airborne Division; tank company and headquarters company commander in 3d Battalion, 37th Armor, 1st Infantry Division, Fort Riley, Kan.; a tour as a United Nations Military Observer in Lebanon and Syria; and graduate school at Temple University in Philadelphia.

The Company/Team Preparation for Combat

by Captain David J. Lemelin Jr.

The company/team (CO/TM) commander must ensure that the unit's preparation for combat for every mission includes:

- OPORD
- Graphics
- Pre-Combat Inspection (PCI)
- Reconnaissance
- Rehearsal
- Resupply
- Boresight/Zeroing

Once the CO/TM makes contact with the enemy, the commander's influence on the outcome is limited. In order to minimize this limitation, he must take full advantage of the time before battle, when his influence is all but unlimited, to prepare his subordinates for the decentralized action which is to occur. Here, then, in the "pre-combat" time, is where the commander "earns his pay" and can do the most good toward mission accomplishment.

Given the speed, fluidity, and violence of modern mounted combat, units — especially CO/TMs — must anticipate the loss of key leaders and prepare to be successful in that event. Further, CO/TMs' personnel and equipment must be adequately prepared to focus combat power more rapidly than the enemy and maintain excellent situational awareness in a rapidly changing scenario. The seven tasks listed above each build essential redundancy and depth in the CO/TM's posture in specific areas. Together, when accomplished, these preparations have a synergistic effect on the CO/TM's ability to fight successfully regardless of the dynamic situation and loss of leaders.

As stated earlier, the CO/TM must issue an OPORD, distribute graphics, conduct PCI, boresight and/or zero, rehearse critical actions, conduct reconnaissance and resupply, each in some form, for every mission. Time, the most valuable of the METT-T factors, will determine the extent and thoroughness with which each task is accomplished. Even given minimal time before crossing the LD or defending, the commander and the CO/TM can get them done. In these abbreviated circumstances, the commander must exert his will to prevent time from being an excuse for failure to adequately prepare for combat.

The OPORD

This order is the catalyst for all subordinate planning. It must provide the platoon leaders with enough information so that they can function in the event that they find themselves in command of the CO/TM. The order is also probably the least overlooked of the combat preparations. Optimally, it is very detailed and covers all contingencies with a clear picture of the commander's intent. As a minimum, the commander must pare down the enemy situation for the platoon leaders and explain the enemy's most likely and most dangerous course of action. He must give a clear picture of the task force commander's intent and scheme, as well as his own, and an easily understood mission statement. The scheme of maneuver must include the critical contingencies should the battle not go as expected.

When time is short, the commander can use his "staff" to assist in preparing portions of the order. For example, with minimal guidance the CO/TM FSO can prepare the "Fires" pararaph and a fire support execution matrix. The first sergeant can, with guidance, prepare the "Service Support" paragraph and matrix. The XO can assist in preparing any portion of the order, given proper guidance. The XO, however, may be busy supervising the CO/TM's preparation for combat in accordance with the timeline. This timeline, issued with the WARNORD and modified in the OPORD, must include all seven criti-

cal prep for combat tasks, be logical and flexible, and BE ENFORCED.

Graphics

Graphics clarify and augment the OPORD and, optimally, clearly portray the scheme of maneuver. In the best circumstances, each subordinate leader and vehicle commander (including company trains and attachments) should have the operations, fire support, CSS, and enemy graphics. The CO/TM should limit the number of actual overlays these leaders must post over their maps, however. Time and acetate available should drive the commander to combine the operations, fire support and enemy graphics onto one overlay. When time is limited, distribution of the CSS graphics can be limited to first sergeant, XO, and the platoon sergeants. By insisting on this level of graphics dissemination, the commander ensures redundancy of understanding of all aspects of the ensuing fight.

The commander must, of course, add company graphics to the task force graphics to provide enough detail for company- and platoon-level operations. Company graphics should improve flexibility of command and control. That is, these graphics should have enough control measures to execute the scheme of maneuver and to shift forces to cope with contingencies. These graphics must supplement task force graphics but not replace them. Subordinate leaders must have the task force graphics in case they find themselves on the task force command net where they must refer to task force, and not CO/TM, control measures.

In order to efficiently disseminate these overlays, the CO/TM commander must establish an "overlay drill," if you will, with his command post personnel and within the individual platoons. The end state of this drill is that each member of the CO/TM orders group is issued one full set of overlays to take back to his platoon or section. A successful technique, given the right circumstances, starts with the task force issuing the CO/TM commander a full set of overlays before the start of the task force OPORD. The CO/TM commander gives these to the NCO who has accompanied him to the order's brief. This NCO then takes the overlays back to the XO or other responsible leader at the CO/TM command post, who then begins the actual copying. The commander's, XO's, and FSO's crews are available for this task and must be supplied with plenty of acetate and alcohol pens.

Each unit must have a plan to execute this drill at night and in poor weather. Mech-heavy CO/TMs can use the commander's and XO's vehicles, backed together with tarps over the gap, as a work area. Tank-heavy CO/TMs can use a similar arrangement with the FSO's track and a medic track. Regardless of conditions, the optimum result is that each member of the orders group has the graphics posted when he attends the CO/TM OPORD. Meanwhile, the platoons (including the 4th platoon, i.e., company trains) are executing their own "overlay drill."

Reconnaissance

As the adage goes, no time spent on reconnaissance is time misspent. Optimally, the commander and his subordinate leaders will conduct a visual recon of the objective and the approaches to it, or, in the defense, of the battle position and engagement area. The latter is more likely than the former. Given the constraints of time and the tactical situation, the CO/TM commander must personally recon as much as possible. Subordinates must examine what he cannot recon personally. What leaders cannot physically recon, they must look at on the map. Additionally, what the CO/TM commander cannot recon, he can request be looked at by task force assets.

A good solution, given typical time and tactical constraints in the offense, is for the CO/TM commander to conduct a map recon of the objective and area forward of the LD with his subordinate leaders. Then, have the lead platoon leader conduct a recon from the assembly area to the LD. If a vantage point is available overlooking the LD (one rarely is), then the commander and leaders can conduct a visual recon from there. In the defense, better reconnaissance is generally possible and the commander can personally see virtually everything, given the time.

Resupply

Resupply and LOGPAC operations are critical tasks for every mission. The CO/TM LOGPAC should be routine and efficient. The basics of fuel, ammunition, food, and water must be resupplied for all missions. Additionally, the CO/TM commander should advise his XO and first sergeant, at the time of the WARNORD, of any adjustments in requirements based on task organization (e.g., two tank and two mech platoons instead of two and one, or a new attachment of a Vulcan platoon) or on the type of mission (e.g., urban fighting, antitank ambushes, or breaching have different ammunition requirements). It is the CO/TM commander's responsibility to promptly correct any deficiencies in resupply so as not to effect the unit's ability to accomplish its mission.

Rehearsal

Rehearsals are arguably the most important of all the pre-combat tasks. Good rehearsals greatly enhance command and control and situational awareness by improving all participants understanding of the flow of the battle, i.e., the sequence of events, what action triggers another action, where each element is at each phase of the fight, how the combat support

elements are integrated into the fight, and so on. Ideally, units conduct rehearsals at all levels, like building blocks, with smaller element drills being rehearsed in isolation, then incorporating these drills into platoon, then full CO/TM rehearsals.

There are different types of rehearsals, of course. Full-up rehearsals are those that units conduct with all personnel and vehicles on similar terrain. Key leader rehearsals are full-up with only key leaders participating. Units conduct sand table rehearsals when time or the tactical situation do not allow a full-up rehearsal. Given very limited time, a CO/TM commander can conduct a rehearsal with subordinates moving unit symbols on a map. The key to a good rehearsal, regardless of the type, is that the participants actually walk through their actions in some form and physically and/or visually understand their portion of the fight in relation to the other elements.

Like resupply, rehearsals begin with the WARNORD. The CO/TM commander can initiate squad, platoon, and even company rehearsals just knowing whether he is attacking or defending. For example, if the commander knows he is lead element in a movement to contact, he can have the platoons (especially mech platoons) begin breach drills and action drills. If the situation permits, the commander can then conduct full CO/TM breach and action rehearsals. The XO can supervise the rehearsals if the commander is unavailable. Once the task force issues its order, the CO/TM commander can refine his rehearsal plan. Even if, at this point, the mission has changed from the WARNORD, the platoon rehearsals will have had the benefit of getting the soldiers' heads in the game, if only by synchronizing actions within their elements.

Finally, CSS elements must rehearse their own actions within the unit's rehearsal. The medics must rehearse evacuation procedures and the routes to each of the aid stations or exchange points. Sometimes, CSS elements and attachments benefit the most from rehearsals because, often for the first time, they can see where they fit into the scheme of maneuver in relation to the combat elements.

Pre-Combat Inspections

Good pre-combat inspections (PCI) result from good, usable checklists and ruthless enforcement. CO/TM commanders should have two PCI checklists. One is all-encompassing, for more formal, stand-by type inspections, when time is not critical. The other, more often used, is tailored to the type of mission anticipated, covers critical items, and can be completed in a short amount of time. All leaders must rigidly adhere to the standards of each check and must ensure, if the inspection is delegated to a lower level, that subordinate leaders adhere to the standards. CO/TM commanders must also apply the above criteria to attached units, and ensure the CO/TM has a checklist for that type unit, e.g., a Stinger section.

It is a rare tactical situation that allows the commander to personally conduct a full pre-combat inspection. More often, the commander can only spot check. It is critical, however, that he find time to inspect some critical item. For example, the commander can check that tank commanders and dismounted squad leaders have the appropriate graphics posted. If one does not, that fact may be indicative of a larger, more serious dissemination problem. The commander will get a feel for his unit's readiness, even through a brief spot check. Junior leaders, in turn, get to see the commander and perhaps get clarification on some part of the fight they might not have otherwise gotten.

Boresight/Zero

Units must boresight/zero at every opportunity. A CO/TM can maneuver brilliantly, but they are of no use if they cannot kill. This fact seems self-evident, yet this pre-combat task is often either overlooked or not done frequently enough. All weapons must go through this procedure at every opportunity, including the small arms of the infantry. Other pre-combat tasks are often decentralized, but boresight/zero is so essential to the CO/TM's lethality and survivability that the commander may consider conducting the task under CO/TM supervision at the anticipated engagement ranges.

We train as we fight, or more exactly, we fight as we have trained. CO/TM commanders, then, must emphasize the capabilities, limitations and maintenance of their MILES systems just as they do the actual weapons. If soldiers and leaders constantly check, clean and boresight their MILES in training, those habits will carry over to combat.

The CO/TM commander can most influence the outcome of his fight by insisting that these pre-combat tasks be accomplished before every mission. Further, he must instill in his subordinate leaders the understanding that they must accomplish them in the commander's absence.

Captain David J. Lemelin Jr. is a 1983 graduate of the U.S. Military Academy. He has attended the Infantry Officer Basic and Advanced courses and the Combined Arms and Services Staff School. He has commanded a Bradley-equipped infantry company and HHC, 1/32 Armor, 1st Cavalry Division, the latter during DESERT SHIELD and DESERT STORM and during three NTC rotations. He is currently a small group instructor at the Armor Officer Advance Course.

To communicate orders clearly and quickly, try the maneuver sketch

A Picture Tells a Thousand Words

by Captain Jack Gumbert and Captain Brad Gericke

As Clausewitz so clearly stated 150 years ago, "Everything in war is very simple, but the simplest thing is difficult." Nowhere is this truth more evident on today's battlefield than in the battalion CPs and on the front slopes of M1A1 tanks as leaders attempt to convey operations orders to their subordinates. A valuable yet largely under-used tool to rapidly and visually convey information during the orders briefing is the maneuver sketch.

A maneuver sketch is merely a graphic expression of how a commander wishes to conduct an operation. In essence, it is the operations order in picture form, a means to highlight whatever information the commander deems most important to convey. The sketch is flexible, simple, and limited only by the imagination of its users. Further, it may be drawn on virtually any surface available, from MRE box lids to elaborate map boards. The only requirement for a successful maneuver sketch is that it assist subordinates to see the battlefield as their commander does.

Specifically, the maneuver sketch improves the operations order briefing process by providing the following advantages. It:

- enables the commander to visually express his intent, concept of operation, and scheme of maneuver.
- is easy to see during the brief.
- is easier to create and use than a sand table.
- has unlimited ability to communicate information.

A maneuver sketch may be used any time the commander wishes to present directions to his unit and time permits a gathering of his orders group. The sketch is most effective during the initial orders brief. FM 71-123 specifies that, in issuing orders, the commander should, "use any aids that can help personnel to understand the conduct of the operation...such as sand tables, sketches, and graphics." The overriding goal of the orders meeting is that, "all personnel should leave the meeting with a clear understanding." The maneuver sketch neatly fulfills both aspects of this doctrinal intent.

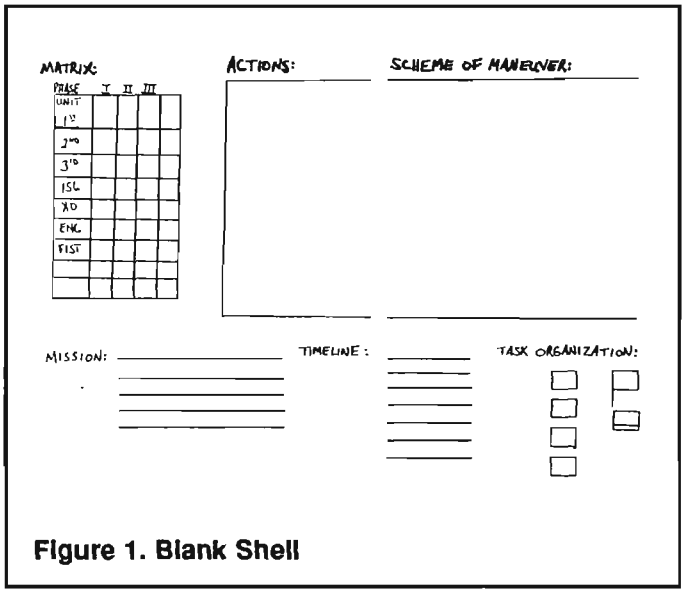


Figure 1. Blank Shell

Thus, with a sketch, everyone can see the drawing without straining to identify the relevant 1:50,000 graphics normally posted on walls and boards in operations order briefs. The sketch is a technique and does not reduce the required attention to detail necessary in ops graphics but serves to supplement and expand the operation order itself. This article will focus on preparation of a maneuver sketch at the company/team level. The ideas presented apply at all levels of command (from company through brigade and beyond).

The maneuver sketch should contain a minimum number of essential elements. These elements may be different for offensive operations than for defensive operations. Divide the sketch area into whatever fashion fits the particular operation, or to reduce preparation time, create a generic blank shell (Figure 1) to complete upon receipt of the order. A suggested list of minimum elements of information follows in descending order of importance.

Offensive Operations: (Figure 2)

- Scheme of maneuver
- Actions on the objective
- Actions on contact (enemy or breach)
- Mission statement
- Task organization
- Critical events timeline
- Execution matrix

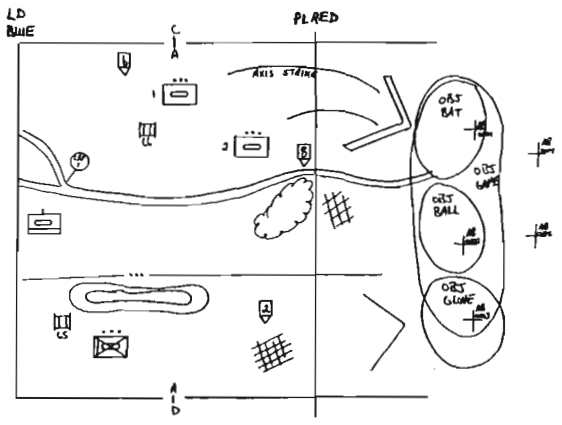


Figure 2. Scheme of Maneuver — Offense

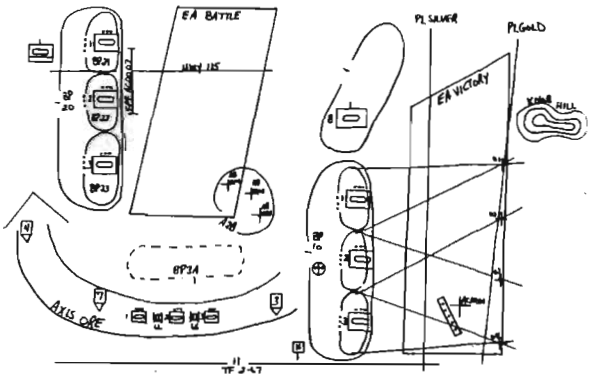


Figure 3. Scheme of Maneuver — Defense

Defensive Operations: (Figure 3)

- Scheme of maneuver (include security ops and counterattack)
- Mission statement
- Task organization
- Critical events timeline
- Execution matrix

The commander may elect not to include all of the above data or to add other important data that is mission specific. He may merely enlarge and enhance operations graphics to display possible outcomes he expects to encounter. Whatever symbols and control measures serve to clarify the commander's vision are important and essential. Subordinates see the commander's thought process more clearly with a sketch and graphics than with only operations graphics posted on a map. This is particularly true during the briefing process when subordinates must quickly and accurately assimilate a variety of data and understand to the point of immediately being able to brief-back the commander. Timely questions are fleshed out and everyone leaves the brief with a clearer understanding of the commander's intent for their unit.

A commander can prepare the maneuver sketch on a variety of mediums. A popular technique is to prepare the sketch on the reverse side of a map board using alcohol pens on acetate. This technique works well if the map board is large enough to clearly show all the information the commander wishes to convey. However, map boards suffer from size restraints and inflexibility. Another technique is to create a board specifically for maneuver sketches. While this may be preferred at battalion and above, space is a premium at the company level. An alternative that may work for the company commander is to use a flexible maneuver sketch drop. This is easily made by placing plain white butcher paper between flexible acetate and edging it in standard green (duct/100 mph) tape. The sketch in this form can be rolled up and carried just like any other set of graphics. The commander creates his sketch in one location, then rolls it up and briefs his order somewhere else, perhaps the front slope of his tank, overlooking the zone or sector. At battalion and above, a sketch prepared from acetate overlaid on a butcher pad and hung on an easel or wall works well.

The heart of the maneuver sketch is those portions which specifically illustrate the upcoming fight in terms of movement of forces. This includes, for defensive operations, the scheme of maneuver, and for offensive operations, the scheme of maneuver, actions on contact, and actions on the objective. As is the case with the overall sketch, the maneuver portion should contain a minimum amount of information to be most effective:

Scheme of Maneuver:

- Operations graphics (axis of advance, objectives, TRPs, counterattack axis, passage lanes, engagement areas, battle positions, etc.)
- Enemy situation template
- Key terrain
- Key decision support template graphics

Actions on the Objective: (Figure 4)

- Operations graphics (dismount plan)
- Enemy situation template
- Key terrain

Actions on Contact: (Figure 5)

- Decision graphics based on likely contact
- Decision graphics based on actions at a breach

Time permitting, a further enhancement is to include a brief execution matrix on one corner of the sketch. This is particularly helpful should the commander wish to brief the order directly from the sketch. To be effective, the matrix need not be burdened with detail, but rather highlight key information such as obstacle

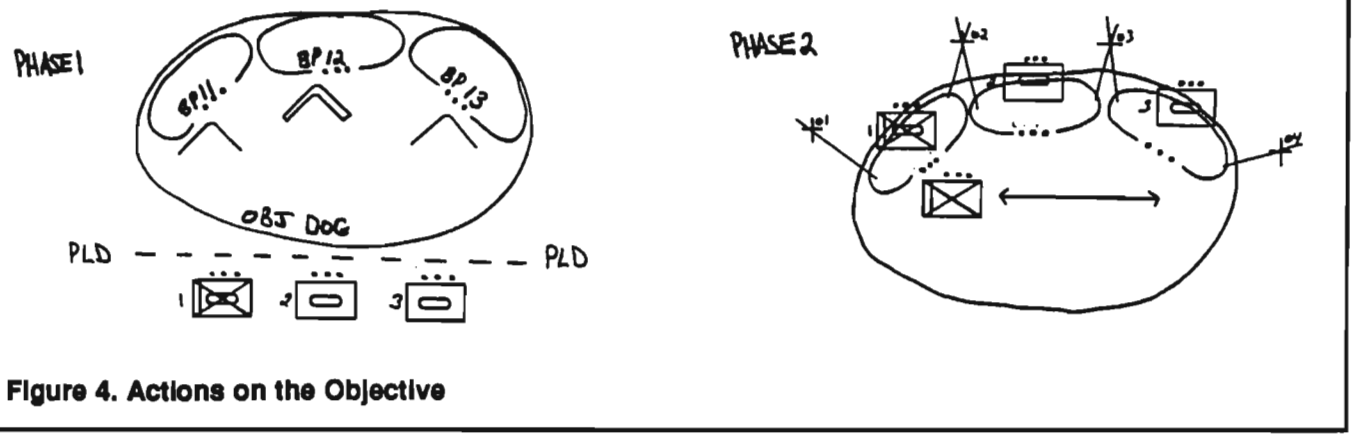


Figure 4. Actions on the Objective

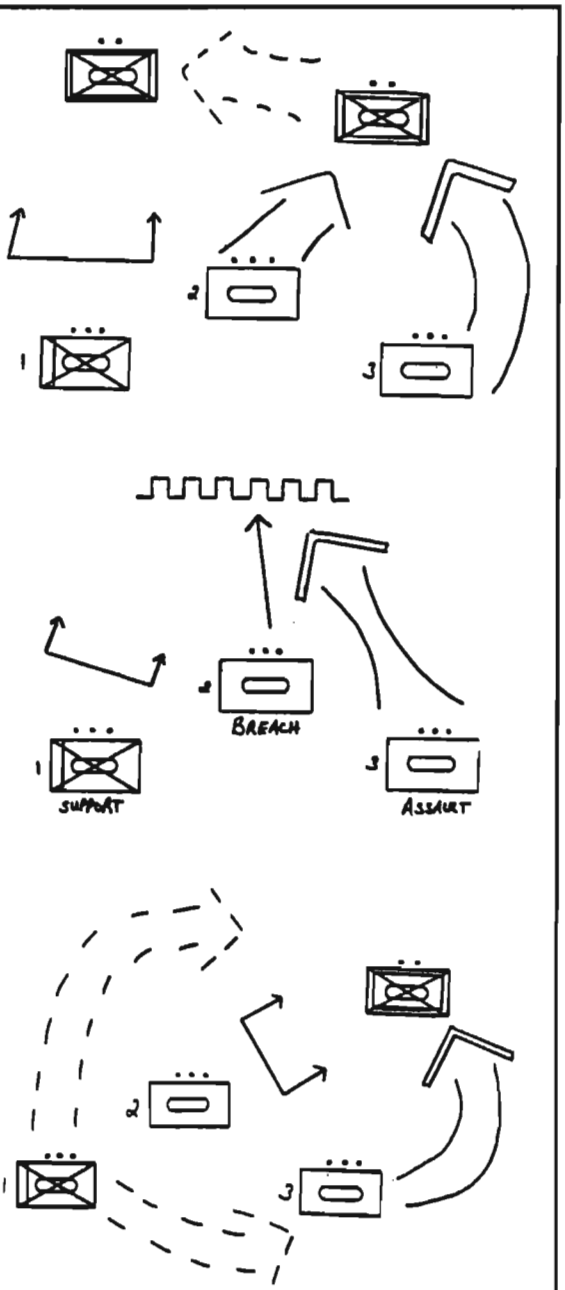


Figure 5. Actions on Contact

coverage, calls for fire, engagement/disengagement criteria, and TRP orientations.

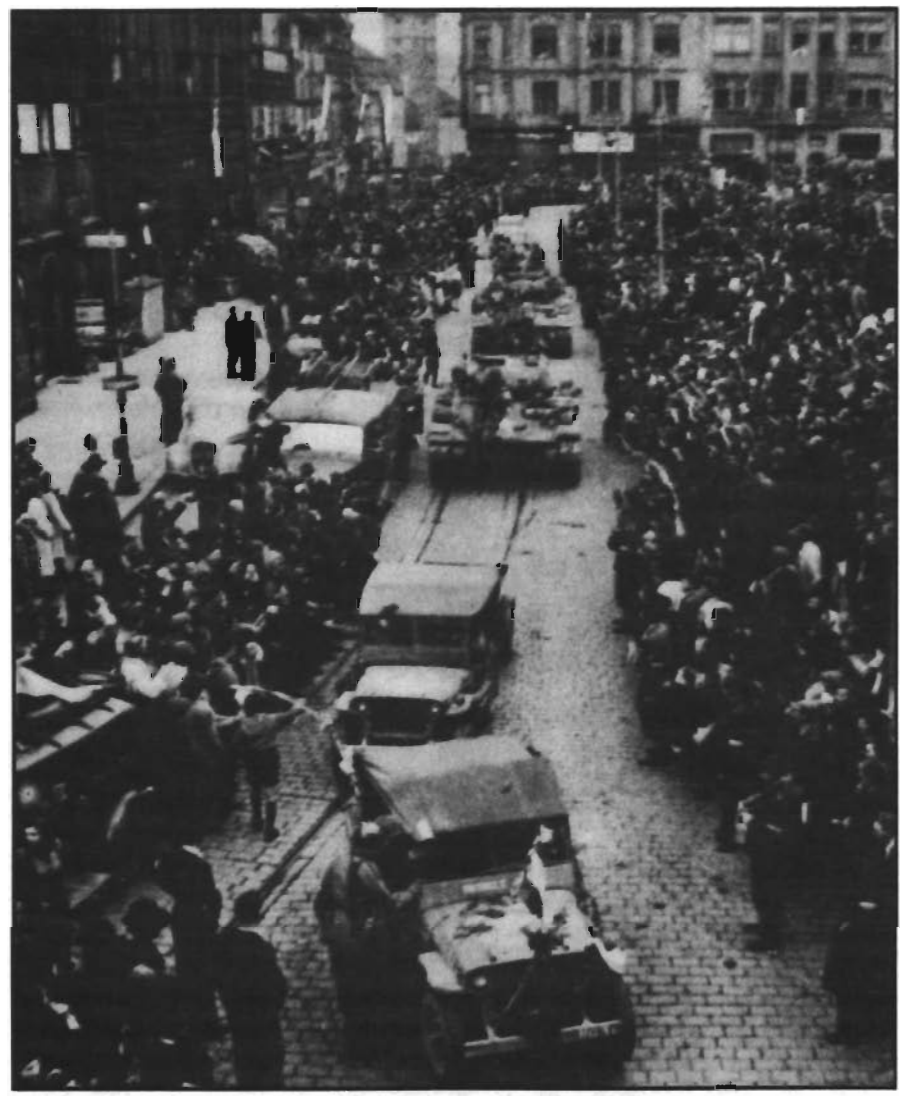
The maneuver sketch is a valuable tool for leaders at all levels. The techniques presented here have proven successful during both field maneuvers at the Combat Maneuver Training Center and as a technique during numerous command post exercises conducted by students at the Armor Officer Advanced Course. Simply put, the maneuver sketch is a portable and longer-lasting sand table; easy to use, easy to understand, and easy to see. A properly prepared sketch adds immensely to the commander's ability to express his intent and show his mind's-eye view of the battlefield. Commanders or operations officers can clearly and concisely convey intent, concept of operation and scheme of maneuver using the maneuver sketch. The maneuver sketch is a better means of communication, a tool to further reduce our familiar adversary — the fog of war.

Captain Jack L. Gumbert II enlisted in the Army in 1981. He served as a tanker in the S3 shop of 2-37 Armor, Panzer Kaserne, Germany. A graduate of OCS, AOBC (Cav), IMPOC, Airborne, AOAC, AGOS, TC^3 and ADIC, he holds a B.S. degree from KSU. He served as mortar platoon leader, tank platoon leader, company XO, and battalion maintenance officer for 3-37 Armor, Ft. Riley, Kan., and as S3 Air and company commander in 2-64 Armor, Schweinfurt, Germany. He is currently a small group instructor at the Armor School, Ft. Knox, Ky.

Captain Bradley T. Gericke is a 1988 graduate of the U.S. Military Academy. A graduate of AOBC, AOAC, Airborne, Air Assault, and Jungle Operations schools, he served as a tank platoon leader, company XO, and battalion S1 with 2-67 Armor, Friedberg, Germany. He is currently the battalion maintenance officer for 2d Battalion, 72d Armor, Camp Casey, Korea.

50th Anniversary: 16th AD

16th AD Was the Last U.S. Armored Division Formed During WWII, And the Last Deployed



16th AD troops get a hero's welcome as they liberate Pilsen, Czechoslovakia in May 1945.

This July, the 16th Armored Division will celebrate its 50th anniversary. The 16th AD was the final armored division to be activated, trained, prepared for overseas movement, and deployed during WWII.

Although it does not bear a nickname, and never became part of the post-World War II Regular Army, the 16th played a crucial role in the Central European Campaign and the subsequent occupation in Europe.

General Order 56, Headquarters Armored Force activated the 16th Armored Division on 15 July 1943 at Camp Chaffee, Arkansas. The 8th Armored Division provided the initial cadre for training. Several of the new division's officers attended the New Divisions Course at Fort Leavenworth together. They arrived at Camp Chaffee well acquainted and complete with plans for the activation. Soldiers arrived straight out of basic training at Fort Knox. Steadily, new men and equipment arrived, and the division took form. The division continued to train at Camp Chaffee until it deployed overseas.

Men from all walks of life came to the division. The Army had put out a call for volunteers from the automobile and truck industry. Their technical skills were needed in the new modern armored units. For $30 to $100 skilled mechanics and manufacturers became acquainted with the manual of arms, foot locker inspections, military courtesy, weapons qualification, and countless hours of standing in lines.

The 16th worked hard and prepared for war. There were seemingly endless training cycles and maneuvers in the Ouachita Mountains. During one exercise, the 23rd Cavalry overran a moonshiner's still going full blast.

Men learned the limits of the new equipment. Some officers brought a halftrack downtown for a date and got it stuck in the mud under a bridge.

After D-Day, American casualty losses increased, and the 16th was tasked to furnish individual trained replacements. These men moved through "Repple Depples" to join units already in combat. Nevertheless,

World War II Commanders

MG Douglass T. Greene
July 1943-September 1944
BG John L. Pierce
Sept 1944-May 1945

WWII Campaign Credits

Central Europe

the division was combat ready. Soon, there were rumors about deployment. By fall 1944, some doubted that the 16th would need to go to Europe, but the German Ardennes offensive dashed such optimism. In late January, the division moved by rail to Camp Shanks, New York for the voyage overseas. Men carefully packed their equipment and loaded up on train after train. Supposedly, one enterprising finance officer even brought along his safe, filled with bourbon. These trains took a total of 26 different routes to move the armored division to the port of embarkation. Some even traveled by way of Canada.

Camp Shanks was like a mini-Camp Chaffee. The division moved into small tar paper barracks. The men stencilled names, numbers, and symbols on everything. There was more training, new equipment issue, inspections, and endless shots. But there were also passes to New York. At times, the ferry carried as many as 1,000 soldiers down the Hudson River and across the harbor into the city. Finally, on 5 February 1945, the 16th left for France.

The *S.S. Hermitage*, along with the *S.S. Santa Rosa, S.S. Marine Panther*, and the *S.S. Marine Eagle* carried most of the division. Although some of these had previously been cruise ships, they had been refitted as military transports and comfort was no longer among their virtues. Soon out of New York, the men of the 16th were reminded that the war was still far from over when their ship passed a torpedoed cargo ship slowly sinking. With destroyer escort, they joined a convoy for the trip across the Atlantic. A zig-zag course and a few depth charges kept the feared U-boats at bay. Except for the winter seas of the North Atlantic, the trip was uneventful. Lifeboat drill, PT on deck, and German lessons filled each day. On 19 February 1945, the 16th arrived at LeHavre, France.

The division unloaded equipment and moved into a holding area near Forges-les-Eaux, France. Although most French were friendly, some wanted immediate payment for war damages. This caused some unusual interaction between men of the 16th and the local populace. The 16th carried out intense combat training and prepped for battle. Some units were tasked to guard and transport German prisoners. Finally in late April, the 16th moved as one unit towards the front.

16th AD troopers enjoy the taste of victory in Pilsen, the Czech city famous for its beer.

Initially, the 16th took up the security mission in the city of Nuremberg. Then the 23rd Cavalry Reconnaissance Squadron was detached, and from 28-30 April joined the 86th ID in combat from the Isar River to Wasserburg. This city was the headquarters of the German Sixth Army Group, and they met strong resistance, but by May 2, the area was secure. The unit returned to Nuremburg to continue security duty until May 5, when it was ordered to assemble for a drive eastward into Czechoslovakia. The 16th was assigned to General Huebner's V Corps of General Patton's Third Army. It rapidly moved to the front, deployed, and attacked to seize Pilsen, Czechoslovakia.

The 16th quickly overcame the sporadic enemy resistance, took large numbers of enemy prisoners, and was welcomed by the friendly populace. They overran the Eger Airport at Pilsen and the famous Skoda Munitions Plant. The city of Pilsen was secured by 6 May. Partisans heard of the American advance and rose up against the Germans in Prague. Unfortunately, an Allied agreement prevented the division from continuing further east. This marked the deepest penetration of Czechoslovakia from the west.

General Patton credited the 16th as being the first members of the Third Army to link up with the advancing Russians. After V-E Day, the 16th remained in the area of Pilsen as part of the occupation. The soldiers enjoyed the local beer and the attention of the friendly Czechs. The officers even erected a plaque to commemorate the liberation of Pilsen.

The points system for rotation changed the division. Some soldiers went to other units for extended occupation duty, or retraining for the Pacific Theater. New men arrived. Finally, on 17 September 1945, the 16th headed back to France. There, the division departed on 6 October for the United States. The 16th arrived in New York and was deactivated at Fort Kilmer, New Jersey on 15 October 1945.

This account was prepared by CPT John Buckheit during his temporary assignment to ARMOR. Additional material was submitted by Walter Norris Smith of LaPorte, Ind., whose father was a member of the 16th AD.

Forgotten Principles:

The 28th Division in the Huertgen Forest

by Harry J. Schute, Jr.

On today's modern battlefield, dominated by the microchip, computer screen, and laser technology, there would seem to be little use for a military theory over 150 years old. But that seemingly venerable theory — the principles of war — remains as viable and vital today as it was in the early 19th Century, when the Prussian strategist Carl von Clausewitz devised it in its earliest form.

Although still a cornerstone in the doctrine of today's AirLand Battle, the principles of war have not always been as strictly regarded and practiced as they are in today's Army. In the fall of 1944, in the forests of western Germany, one U.S. division forgot what the principles were all about.

This account will describe just what can happen to a unit, now as well as then, when the principles are forgotten, or ignored. The unit then was the U.S. 28th Infantry Division, and the place, the Huertgen Forest.

The fact that the principles of war are a vital part of current AirLand Battle doctrine is undeniable. The latest compendium of tactical doctrine, FM 100-5, states that, "The nine principles of war are fundamental to U.S. Army doctrine."[1] As an application of this doctrine, the principles are taught today at most levels in the Army military education system. And they are directly linked to the tenets and the imperatives of AirLand Battle.[2]

It is also a matter of record that the Army first began listing principles of war in its *Training Regulations 10-5* in 1921.[3] The principles listed then had gone through a long evolution, beginning with Clausewitz' conceptualization of them in the Napoleonic Era. His work culminated with their posthumous publication in *On War*, published in 1832.[4] Several other theorists and authors, including Jomini and Foch, contemplated principles of war, and the young J.F.C. Fuller analyzed them again in the period before World War I.

After Fuller spent some time analyzing earlier theory on principles and formulating his own in 1911 and 1912,[5] his work finally made its way into print in 1916, in a British Army professional journal.[6] It was these "modernized" principles, published anonymously, that the U.S. Army Americanized and assimilated into its own doctrine in 1921.[7]

Some further modernization led to our current principles of war, part of AirLand Battle doctrine. As a refresher for some, our principles now are: Objective, Offensive, Mass, Economy of Force, Maneuver, Unity of Command, Security, Surprise, and Simplicity.[8] These are the principles that I will use to analyze the action in the Huertgen Forest. Whatever the form, and whatever the period, the principles are unchanging.

Given this fact, and the fact that the U.S. Army recognized the principles of war in World War II, the 28th Division — for whatever reasons — chose to place little credence in them, with disastrous consequences.

Situation: November 1944

A short review of Allied action in the summer and fall of 1944 is necessary to set the stage for the 28th Division's actions that November. Two months earlier, the rapid Allied advance across France had slowed as supply lines lengthened. In mid-September, General Eisenhower had authorized the only divergence from his "Broad Front" strategy. That was the ill-fated Operation MARKET-GARDEN, which tied down thousands of soldiers in Field Marshal Montgomery's 21st Army Group sector. In addition, the operation had diverted millions of tons of supplies from other areas of the Western Front. The lack of replacements and new equipment forced the soldiers of LTG Omar Bradley's 12th Army Group to halt and regroup at their forward positions along the German border. This halt also gave the battered German Army a much needed respite.

The first foray into the Huertgen Forest was in September 1944. The U.S. 9th Infantry Division entered the region as a supporting attack of a reconnaissance in force by the 3d Armored Division around Aachen, to the north. With the failure of MARKET-GARDEN, and given the lack of progress in the First U.S. Army area, the 9th Division action became a deliberate attack. This renewed effort was launched on 6 October. By 16 October, the 9th Division's attack had been completely blunted. Two regiments of the division had succeeded in taking only 3,000 yards of forested land, far short of their objectives, at a cost of over 4,500 casualties.[9]

As late October approached, the Allied leadership set on a new course. General Eisenhower wanted to press on beyond the German border area and seize a crossing point on the Rhine River south of Cologne. To do this, he designated General Bradley's 12th Army Group as the main attack, with LTG Courtney M. Hodges' First Army to be the main effort.[10] Within the First Army, VII Corps would lead the assault with a thrust between

Aachen and the Huertgen Forest. LTG Hodges had serious misgivings about the Huertgen Forest. He was a veteran of World War I, and had seen how the Germans had launched major counterattacks out of the Ardennes into the Allied flank during the Meuse-Argonne offensive of the summer of 1918. He feared the Germans, striking out of the Huertgen, would do the same to his attack. He decided that the Huertgen must be physically taken, and so as not to weaken the main effort, he adjusted his Corps boundaries and gave the task to LTG Gerow's V Corps.[11] (See Map 1.)

LTG Gerow further assigned the mission of taking the Huertgen Forest to one of his newly arrived divisions, the 28th ID of the Pennsylvania National Guard. The unit had recently come forward after a short rest in Belgium.

The VII Corps attack was scheduled to begin no later than the beginning of November, so as to secure the flank before the main attack began.[12] Hodges, Gerow, and the 28th Division commander, MG Norman Cota, planned for their Huertgen operation to achieve three objectives.

First, this attack on the VII Corps southern flank would give them additional maneuver space and supply routes into their sector in the north. The supply routes would open up along the Monschau Corridor, which ran northeast through the Huertgen along three prominent canalizing ridge lines, and through the villages of Huertgen and Schmidt.

Second, the 28th attack would protect the VII Corps southern flank from German counterattacks out of the Huertgen Forest.

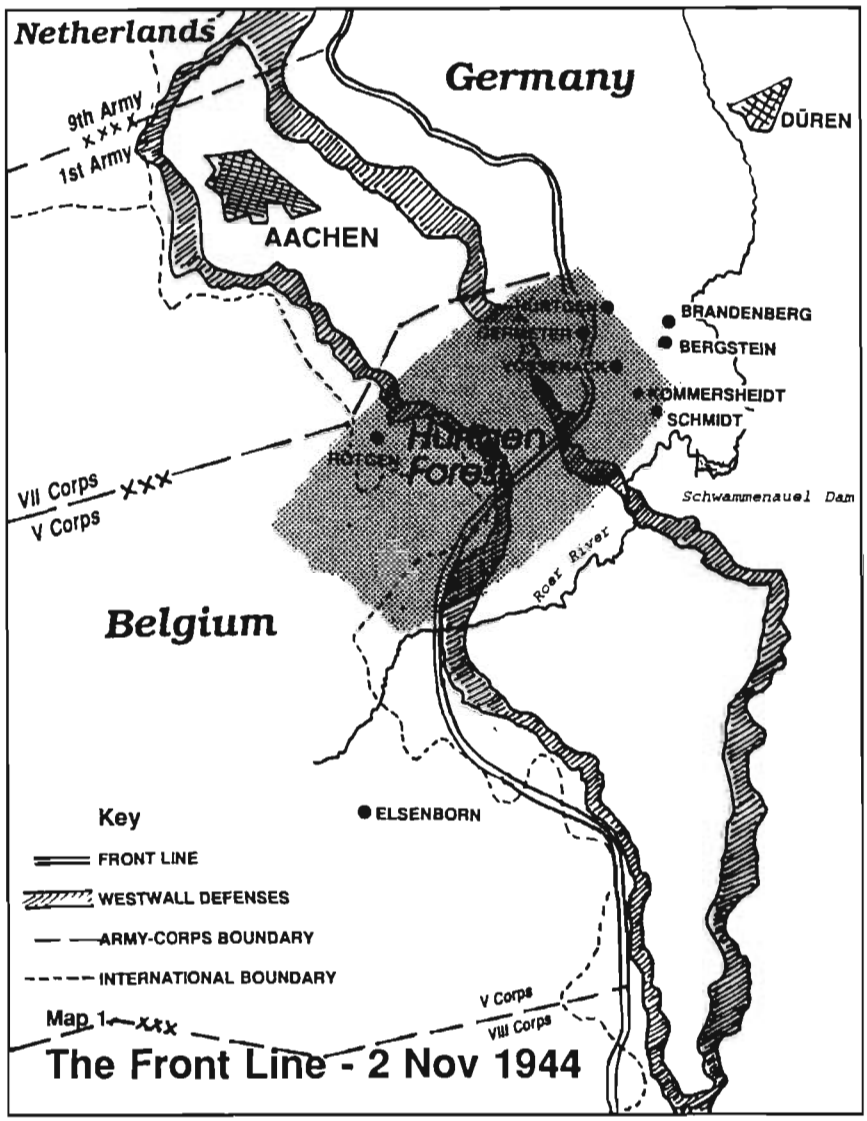
Third, the 28th attack would pull German reserves away from the VII Corps area of operations, allowing the main effort to proceed with less threat of enemy reinforcement.[13]

The three Regimental Combat Teams of the 28th were given three very divergent objectives. Cota had little choice in the positioning of the objectives — all were selected by Gerow and his staff. All that was left to Cota was the fine-tuning and the execution.

The 109th Infantry would attack to the north from Germeter toward Huertgen, with the objective of countering any German counterattack from the area, as had happened to the 9th Division one month earlier. The 109th Infantry would protect the left flank of the division, and secure a departure line for future operations.

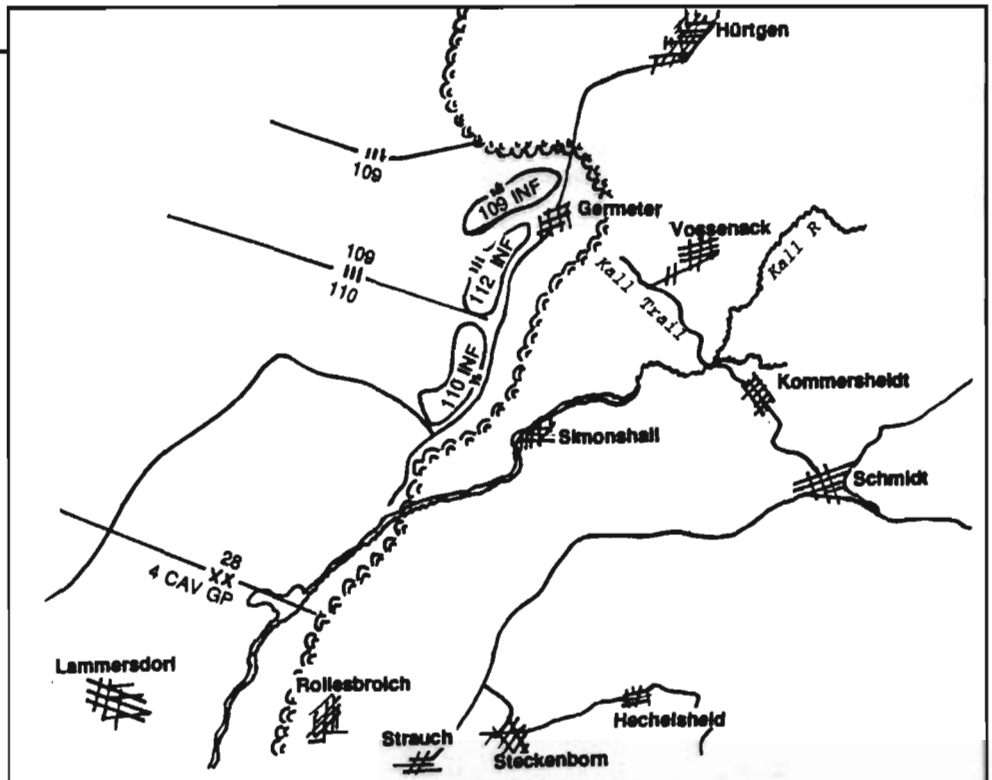
The 110th Infantry would attack south from Germeter through dense forest and Westwall defense positions to secure the Rollesbroich-Strauch-Steckenborn road network. This would ensure a more secure supply route into Schmidt.

The remaining regiment, the 112th Infantry, would conduct the division main attack, striking east from Germeter into Vossenack. It would leave one battalion at Vossenack, turn south down the Kall Trail into the dense forest, cross the Kall River, and then head back up the Kall Trail to secure the village of Kommerscheidt. It would leave one battalion at Kommerscheidt, and attack with its remaining battalion to seize the vital crossroads and division main objective, Schmidt. The 112th would also be charged with holding the Division main supply route (MSR), the Kall Trail, open until the 110th could complete its mission. To accomplish these tasks, the 28th also received attachment of several battalions of Engineers and



Field Artillery. In addition to one Medium Tank Battalion (707th) and two Tank Destroyer Battalions (one self-propelled [893d], the other towed [630th]).[14] (See Map 2)

The 28th ID attack was originally scheduled to commence on 1 November, however, it was postponed due to poor weather, which prevented any close air operations. On that day, Eisenhower also delayed the beginning of the main effort from 5 November to 10 November, or at the latest 16 November, due to the slow arrival of some units into the VII Corps sector. Under the original plan by Hodges, the 28th attack had to begin the next day, 2 November, regardless of the weather. Yet with the new guidance from Eisenhower, no one, from Hodges to Gerow or Cota, suggested a new start date for the 28th attack. This meant that under the worst circumstances, the 28th attack could proceed for fourteen days before the main VII Corps attack ever began, leaving the German reserves to potentially chew up the 28th and turn to counter VII Corps. The 28th attack date stood at 2 November.[15]



Map 2. The 28th ID - Positions Prior to Attack

To summarize the 28th attack into the Huertgen as a defeat would be an understatement. It was a complete disaster. The division achieved two days of moderate success on 2 and 3 November, and even succeeded in taking Kommerscheidt and Schmidt. From the 4th until complete relief on 19 November, however, the 28th lived in pure hell.

The 109th Infantry only succeeded in taking half of its objectives before being decimated, relieved by the 12th Infantry, 4th Division, and ordered into Vossenack to assist in the defense there. The 110th Infantry made NO progress. By the end of the action, they had secured objectives three and four, but left numerous subsequent objectives untouched, while being ground to pieces in the process.

The 112th Infantry secured its objectives on 3 November, but was rapidly driven from Schmidt. Its remaining forces were pounded in Kommerscheidt and Vossenack by ceaseless artillery, endless counterattacks, and the bitter elements. Ultimately, the 112th was forced to evacuate Kommerscheidt, leaving behind numerous wrecked tanks, TDs, and supply vehicles, and only held onto Vossenack and part of the Kall Trail. Even then, the 112th had been reinforced by most of the attached engineers, who were fighting as infantry, and the remnants of the 109th Infantry.

The relief of the 28th began on 14 November and was completed by 19 November, as the division was pulled back to a rear area in Luxembourg. The second phase of the fighting for the Huertgen Forest was over.[16]

The cost of the fighting by the 28th Division in the Huertgen Forest was incredibly high. In the 14 days that it actively participated in fighting from 2-16 November 1944, it suffered a minimum of 6,184 casualties. This figure gave the 28th the undesired distinction of being the most battered American unit in all of the combat in Europe during World War II.[17] And why did this all happen? It was because of some amateurish planning, which virtually ignored any accounting for the principles of war. Why the poor planning? It's hard to say 45 years later. Maybe it was because the Allies had become overconfident after their rapid assault through France. Maybe they thought the Germans were finished, even though they were on the German's own soil for the first time. Maybe they were unduly intimidated by the Huertgen and should have bypassed and isolated it. Maybe Cota was intimidated by Gerow, and Gerow by Hodges, to the point where none could question the insane plan. Maybe.

Whatever the reasons, and whoever was to blame, the lessons for the Air-Land Battle and the applications of the principles of war are numerous and distinct.

The plan's first error lay with Objective. The division had no clear, deci-

sive and attainable objective. The plan called for the 28th to attack in three different directions, to support three different mission objectives. This greatly reduced the 28th's combined combat power, reducing its chances of achieving any one objective, let alone the so-called main objective of Schmidt. Furthermore, the delay and ultimate cancellation of the VII Corps attack removed the decisive factor from the 28th attack. They were conducting a supporting attack in support of no main attack. Even more incredibly, they were the only American unit attacking along the whole Western Front at the time, allowing the Germans to maneuver any reserves against them that they so desired.

The plan was minimally offensive in nature. It called for rapid seizure of pieces of land by infantry and then holding them indefinitely against counterattack, with minimal armored support. Unfortunately, the plan failed to include the most lethal close offensive assault arm, tanks and TDs. Their only firm planned use was in Vossenack, and their only mission there was to augment division artillery in the indirect role. It would seem that the planners expected to see no enemy tanks, counted on constant air support, or had complete confidence in their infantry antitank capabilities, all obviously ludicrous assumptions. As history shows, antiarmor support was desperately needed, but the tanks of LTC Ripple's 707th, and the TDs of LTC Mays' 893d could not negotiate the treacherous nine-foot-wide Kall Trail in sufficient numbers. Also, foul weather effectively kept the IX Tactical Air Force out of the skies.

The effects of Mass and Economy of Force can be analyzed together in this case and are closely related to the Objective. Having been assigned three divergent objectives, none of which allowed support of the other, the 28th whittled its combat power down to a level where no sufficient force was available at any place or time to achieve any marginal result. Additionally, the plan called for seizing the prime objective of the whole operation and holding it with practically the smallest maneuver force available, when the strongest force possible should have been given the task. In conjunction with Mass, the smallest possible forces should have been allocated to the flank support missions, merely to maintain them, so as to allow additional forces for the main effort.

The principle of Maneuver was ignored at the outset with the plan to attack head-on into the Huertgen. The enemy could have been placed at a serious disadvantage by making his position untenable, either by isolating him through bypassing, or by flooding the Kall Valley after capturing, controlling, or destroying the Rur River dams. And if assault into the Huertgen was absolutely necessary, an assault from the flank through one of the mobility corridors on favorable terrain would seem much better than going across corridors through dense, fortified forest.

Unity of Command in the operation was not at all apparent. Cota was forced into most of his planning actions by his superiors, Gerow and Hodges. Also, Cota was never fully in touch with the battle. He never visited the front line, relying instead on the reports of his staff officers, who appeared to be attempting to mislead him, or paint a better picture than actually existed. The only division staff officer really in touch with the situation was the assistant division commander, BG Davis, who seemed to be everywhere on the front, personally directing numerous actions.

But even this attempt at command had no unity. Davis would give directions to individual tanks, or platoons, or soldiers, frequently without the knowledge of their superiors. Thus, occasionally instances would arise where subordinate commanders would unknowingly countermand Davis' orders, or expect their units to be performing one mission when they were actually elsewhere doing another mission.

Security operations were also poor. There were no orders given for preoperation patrolling by any commander, at any echelon, to attempt to find enemy positions or strengths, or to ascertain the viability of the Kall Trail as a division MSR. The absence of patrolling and intelligence gathering gave the enemy units an unnecessary advantage by keeping their locations and strengths unknown until the attack actually began. The inadequacy of the Kall Trail proved to be fatal also, as it was inadequate for armored support or supply. The poor state of the trail should have been determined before the attack ever began.

Finally, Simplicity was compromised from the start. Two of the regiments (the 110th and 112th), were given orders to attack initially along several axes towards one objective, then to split their force and turn more than 90 degrees to attack towards several other objectives. Such a maneuver is difficult on open terrain in peacetime, much less in dense forest under direct and indirect fire.

The 28th Division plan today seems to have been doomed from the start. Not only did it strain good logic and ignore the experience of the 9th Division, but it ignored virtually every principle of war. The why of the violation of the the principles of war is not important at this time. What is important is the fact that they were violated and that a U.S. division was completely decimated as a result. World War II was not that long ago. And World War II action may not be all that different, in essence, from action on the AirLand Battlefield. The same principles apply throughout. If it could happen then, to the 28th Division, it can certainly happen now.

Notes

[1]FM 100-5, *Operations*, May 1986, p. 6.
[2]*Ibid*, p. 14 & 22, a description of the Air-Land tenets and imperatives and their relation to the principles.
[3]Bernard Brodie, *Strategy In The Missile Age*, Princeton, N.J., Princeton University Press, 1965, p. 24.
[4]Carl von Clausewitz, *On War*, Princeton, N.J., Princeton University Press, 1976, p. 27.
[5]Anthony John Trythall, *'Boney Fuller,'* New Brunswick, N.J., Rutgers University Press, 1977, p. 31.
[6]*Ibid*, p. 35.
[7]*Ibid*, p. 269.
[8]FM 100-1, *The Army*, August 1981, p. 13.
[9]Charles B. MacDonald, *The Battle of the Huertgen Forest*, Philadelphia, J.B. Lippincott Co., 1963, the summary of action in the Huertgen Forest before Nov. 1944 came from Chapters 4-8.
[10]*Ibid*, p. 88.
[11]*Ibid*, The summarization of the First Army and VII Corps plan came from several places in the book.
[12]Cecil B. Currey, *Follow Me and Die*, New York, Stein and Day, 1984, p. 60.
[13]*Ibid*, p.63.
[14]*Ibid*, p. 63-66.
[15]MacDonald, p. 93.
[16]Charles B. MacDonald & Sidney T. Mathews, *Three Battles: Arnaville, Altuzzo, and Schmidt*, Washington, D.C., Dept. of the Army, 1952, p. 257-414, a summary of the unit actions was obtained from these pages.
[17]Currey, p. 264.
[18]*Ibid*, p. 46 & 48, Maps.
[19]MacDonald, *Three Battles*, Map VI, back cover.

Captain Harry J. Schute Jr. was commissioned in Armor in 1985 from the U.S. Military Academy. A graduate of AOBC, AOAC, CAS[3], and Airborne School, he served as an M1 tank platoon leader, subcommunity ops officer, and company XO in 3d AD, FRG, and as a training battalion adjutant, company commander, and in the Directorate for Total Armor Force Readiness at Fort Knox, Ky. He is currently in the USAR.

Safety Notes:

POV Accidents: Serious Business

When asked, the majority of armor soldiers would say that the most serious type accidents confronting them deal with operating and maintaining armored combat vehicles. Some would be shocked to learn that the majority of deaths and serious injuries occur while soldiers are off-duty operating their privately owned vehicles (POV). POV accidents kill and injure more soldiers throughout the Army than all other accidents combined. The table below shows the impact that POV accidents have had on the Armor community. Since Fiscal Year 1988, nearly 60 percent of the armor soldier fatalities have been a result of POV accidents.

Accident investigations reveal that in most fatal POV accidents, the driver is speeding. This includes not only exceeding the posted speed limit but also driving too fast for road and weather conditions. "A soldier driving to work at 0530 hours rearended a truck, which had slowed for a traffic light. Visibility was poor due to dense fog. The soldier struck the truck without applying his brakes, and he was not wearing a seat belt. He was transported to a local hospital where he was pronounced dead on arrival." This example highlights another factor in POV deaths: soldiers not wearing seat belts. Accident records show that drivers wearing seat belts are 70 percent less likely to be killed or seriously injured than unbelted drivers. Although excessive speed, fatigue, and failure to wear seat belts are all factors in many POV accidents, the number 1 cause of fatal POV accidents is drinking and driving. "Two soldiers were returning from a party where they had been drinking heavily. The driver lost control of his POV and ran off I-70, rolled across the median, and was struck by an oncoming vehicle. Both soldiers were pronounced dead at the scene."

Information and education programs are the heart of POV accident prevention. Command interest and accountability are vital elements. Leaders must set an example and educate their soldiers starting with the following:

•Stress safety every day — not just as a checklist item before holidays.

•Use supporting safety professionals to help your unit develop POV accident prevention programs targeted at identified problem areas.

•Make soldiers aware of penalties for driving while intoxicated (DWI).

Leaders can have a significant impact on reducing the probability that their soldiers are not involved in life-threatening POV accidents. And if, by chance, they are involved in a POV accident, leadership involvement can increase the soldier's chances of survival.

ARMOR SOLDIER FATALITIES

FY88	34 fatals	(23 POV)
FY89	30 fatals	(14 POV)
FY90	31 fatals	(20 POV)
FY91	17 fatals	(10 POV)
FY92	6 fatals	(3 POV)
FY93 (as of 17 May)	10 fatals	(6 POV)
TOTALS	**128 fatals**	**(76 POV)**

An Introduction to Yugoslavia

Editor's Note: The disintegration of the former Yugoslavia and the ensuing civil war between factions in the various republics have resulted in the presence of a large United Nations peacekeeping force and the prospect of a wider, general war that may spread through the Balkans. Congress has discussed a range of U.S. options, from complete non-involvement, to participation in the peacekeeping force, to some form of direct intervention, like air strikes. The following analysis was assembled from non-classified sources by the Intelligence Division, Directorate of Combat Developments.

Geography

The former Yugoslav Republic (FYR) covers an area of approximately 99,000 square miles, about the size of Wyoming. It was the ninth largest country in Europe and was the largest in the Balkans. It occupies an irregularly shaped, mostly mountainous region, stretching northwest to southeast along the eastern shores of the Adriatic Sea on the southern flank of eastern Europe. It is nearly 600 miles long, and its maximum width of almost 300 miles occurs in the central portion of the country.

The greater part of the country is hilly or mountainous: about 60 percent of the total land area consists of hills and ridges from 600 to 3,000 feet in elevation, and another 20 percent consists of high mountains and ranges over 3,000 feet high. Tall mountains are a dominant feature of the landscape in the south and southwest as well as in a small area of the extreme northwest near the Austrian border.

The principal lowland area lies in the extended Pannonian Plain, located in the north and northeastern part of the country. This fertile area, together with the many fluvial valleys scattered among the hills and lower mountain slopes, constitute the remaining 20 percent of the Yugoslav territory.

The 1,200 mile-long coastal area is studded with more than 600 offshore islands, most of which are rocky and hilly. The highest in this long chain is about 2,500 feet. The coastal lowland is generally hilly and, in some sectors, barren mountains and bluffs rise abruptly from the sea to elevations above 5,000 feet.

Boundaries and Political Divisions

The seven states that border on the FYR, together with the eastern shore of the Adriatic Sea, form a perimeter of more than 3,000 miles. The approximatley 1,800 miles of land borders are divided as follows: Hungary, 387; Romania, 350; Bulgaria, 330; Albania, 300; Greece, 160; Austria, 200; and Italy, 130.

All of the land boundaries have been demarcated and none are in dispute; most of them cross mountainous terrain and follow natural features. The FYR claims territorial waters extending for 10 miles from its coastline along the Adriatic Sea.

Weather

Yugoslavia has a wide variety of climatic conditions. A Mediterranean climate of mild, rainy winters (December through February) and warm to hot, less rainy summers (June through August), prevails in a narrow zone along the coast. Over the plains in the north, the climate is continental. Winters are cold and have light precipitation, frequently snow, and summers are hot and showery. In the rugged hilly and mountainous interior between these two regions, the climate has some of the characteristics of both the Mediterranean and continental regimes; however, because of differences in elevation and exposure, climatic conditions vary markedly from place to place. In general, temperatures are lower year round, and snow cover usually lasts longer in the highlands.

Military Aspects of Movement and Terrain

Roads The highway system consists of approximately 54,000 miles of roads of various types. Of these, about 11,400 miles are all weather and hard surfaced; over 27,000 miles consist of gravel, crushed stone, or rock surfaces; nearly 13,000 miles are graded but unimproved; and the remainder are traces of tracks suitable only for limited use in good weather. The highway network is oriented northwest-southeast and, because of the dictates of terrain, largely parallels rail routes between major ports.

Railroads The FYR operated about 6,600 miles of mostly single-tracked lines, of which about 5,700 were standard gauge, and about 900 miles were narrow gauge. The rail network was relatively limited, being mostly developed in the north and northwest portions of the country. A large portion of the lines generally followed narrow river valleys, has steep grades, sharp curves, and numerous viaducts, bridges, and tunnels.

Ports The coastline of the Adriatic Sea, along its 1,200 mile stretch from

north to south, is highly indented and has many sheltered bays with virtually no silting or extreme tidal action. The water is generally deep close to shore, providing excellent conditions for harbors and ports.

There are as many as 200 locations suitable for sheltering various types of craft used in the many maritime activities along the coast. Rijeka (Fiume), in the north, on the Gulf of Fiume, is the country's largest and most modern port. It has excellent rail and road locations and is well equipped to handle large oceangoing vessels.

The nation's second major port is Split, in the central portion of the Dalmatian Coast. It is a general purpose port and also has excellent repair and cargo handling facilities.

The seven secondary ports of Koper, Pula, Sibenik, Ploce, Dubrovnik, Zelenika, and Bar are well distributed along the coastal area and handle coastal and international shipping.

There are more than 1,200 miles of inland waterways; the majority of the routes are a part of the Danube-Tisa canal system in the extreme northwest sector of the plains area. The leading river port is Belgrade, followed by Novi Sad, Smederevo, and Vukovar in the Vojvodina region.

Military

The principal source of manpower for the FYR, since 1948, has been universal conscription. It applied equally to all male citizens; no distinction was made between regions of the country or between national or religious groups. The system selected hardy individuals who were physically fit, adaptable, and capable of performing general military duties. The majority of the young recruits had rural backgrounds and were accustomed to the rigors of life in the open, taking care of themselves, and subsisting on simple foods. The period of service was for 18 months, with most conscripts being inducted between the ages of 19 and 27. There were no organized reserve units, but a trained manpower pool of individual reservists was maintained. These individuals were given regular periods of refresher training and, in time of emergency, would be recalled to active duty and assigned to operating units.

Accurate data on manpower and equipment are difficult to ascertain. An approximate total can be devised

Manpower and Equipment Statistics

	FORCES	MBT	APC	ARTY
BOSNIA-HERZEGOVINA	Serb 67,000 Muslim 30-50,000 Croat 50,000	300	180	480
CROATIA	100,000	200	200	150
MACEDONIA	20,000	N/A	N/A	N/A
SLOVENIA	15,000	120	20	UNK
SERBIA/MONTENEGRO	135,000	1,000	1,100	1,650

Note: Croatia's force numbers include 50,000 reservists called up. Serbia/Montenegro has 400,00 reservists from their former Territorial Defence Force.

Figure 1

for equipment based on where it was located under the FYR. Some allowance will have to be made for equipment stolen, abandoned, or captured that has served to cross-level some holdings of the Serbs and Muslims in Bosnia-Herzegovina. It is known that Belgrade withdrew all heavy weapons from armories in Bosnia-Herzegovina up to two years in advance of their split from Serbia. Figure 1 is based on these assumptions.

The Former Yugoslavian Republic's military was always geared towards defense. The FYR envisaged a concept of total nationwide defense as a deterrence against aggression by even the most powerful aggressor. They held the premise that they would succeed even without outside help, if necessary, by making intervention and aggression so costly, militarily and politically, that it would not be attempted.

Each republic had an army to defend that republic, although limited plans were in place for the republics to shift some forces from one to the other.

The patriotism and determination of FYR troops when their country was endangered by foreign forces has been described as highly exemplary. With the breakup of the republics, forces are once again divided among major ethnic groups. These groups will have the necessary training and ability to form and maintain coordinate forces of troops and material to prosecute well-led and vigorously applied doctrine and tactics.

The threat of massive outside intervention may well drive some ethnic groups together long enough to form unsteady alliances to combat these forces should they feel that it would give them greater control or voice in their future determination of self-government.

The M-84, a version of the T-72, is manufactured in the former Yugoslavia. This one was part of an order for Kuwait, which purchased the tanks just prior to the Iraqi invasion. Note the non-standard gunner's primary sight and the wind sensor on turret roof.

On the Fence

Yugoslavia's Motley Arsenal Reflected Nation's Position Between East and West

For over 40 years, the diverse ethnic and religious factions living in the former Yugoslavia were held together by the powerful regime and personality of Josip Broz (Tito), a wily resistance fighter whose partisans tied down and bedeviled the thousands of Nazi troops attempting to occupy the Balkans.

When the Cold War followed and surrounding nations fell within the Soviet Union's Iron Curtain, Tito resisted Stalin's pressure. Nor did he join the West. Both sides attempted to gain influence through provision of military technology, which accounts for Yugoslavia's diverse stocks of armor and artillery.

According to *Jane's*, the nation's war reserves include many of the 400 surplus M4 Shermans supplied by the U.S. in the postwar years, and 200 T-34-85s supplied by the Soviets. The U.S. later gave Yugoslavia over 300 M-47 medium tanks, and the Soviets about 800 T-54/55s. In 1977, the nation arranged to build a version of the T-72 under license and completed its first prototypes in 1982-83. The M-84 in the photo above grew out of this capacity.

Yugoslavia's military stocks in APCs, artillery, and other systems also reflect this East-West flavor — M8 armored cars and Soviet BTRs, for example. A recent issue of *International Defense Review* included a report of some fighting in the former Yugoslavia. With it was a photo of a nearly pristine ex-U.S. M18 Hellcat tank destroyer — a vehicle that would be the envy of many a military vehicle museum curator today.

Hunter-Killer Operations

by Captain Karl S. Flynn and First Lieutenant Joseph Miller

DATE/TIME: *170545 October 1991, NTC Rotation 92-1.*

LOCATION: *National Training Center, Fort Irwin, California.*

SITUATION: *1st Platoon, Fox Troop, 2d Squadron, 3d Armored Cavalry Regiment occupies a screen line vicinity Brigade Hill, Hill 910, and Debnam Pass.*

Two Bradleys and one tank silently sit, observing and waiting for any enemy activity in their sector. Red Two, a Cavalry Fighting Vehicle, identifies a T-72 tank and a BMP slowly entering his sector, and initiates a radio transmission bringing his element into action:

"White One, this is Red Two. I have two enemy vehicles entering our sector. Come up on my left flank, and you'll find a T-72 at 10 o'clock and a BMP at 12 o'clock."

"This is White One. Roger, executing!"

Within 20 seconds, White One, an M1A1 tank, quietly passes to the left of Red Two, and three seconds later, he opens fire on the T-72 as Red Two simultaneously engages the BMP with his 25-mm chain gun. As the T-72 and BMP burn, White One fades back to his alternate hide position. The enemy has lost two vehicles and still doesn't know what he faces, but you do. This is your introduction to Hunter-Killer (HK) operations. This formation is the logical combination and integration of scouts and tanks.

At the National Training Center in 1989, Captain Chuck Noll, commander, F Troop, 2d Squadron, 3d Armored Cavalry Regiment, organized a formation combining the reconnaissance assets of scouts with the destructiveness of tanks to better fight and win on today's fluid and lethal battlefield.

F Troop continued to train HK formations in preparation for its return to the NTC in a year, but HK formations and F Troop faced a different challenge with deployment of the regiment to Saudi Arabia for Operations DESERT SHIELD and DESERT STORM.

During DESERT SHIELD, the troop refined the HK formation and the ability to change from HK to other formations. This training proved invaluable as the troop went into combat during DESERT STORM.

The troop used the HK formation and several standard troop formations during the 100-hour war, with missions including a moving flank screen, zone reconnaissance, stationary screen, and hasty attack. Fox Troop used the HK formation during the zone reconnaissance and stationary screen missions, illustrating the additional formation flexibility and diversity that the HK formation gives the armored cavalry troop.

When the 3d ACR returned from Iraq, many in the armor community wondered about the effectiveness of HK operations. Six months after returning from the Gulf War, the regiment deployed to the NTC to fight another war. It was the first DESERT STORM unit to face the NTC OPFOR. During several battles, the OPFOR repeatedly lost its reconnaissance assets in the Fox Troop area of operation, proving that HK operations are as effective in the desert of California as in the Gulf War.

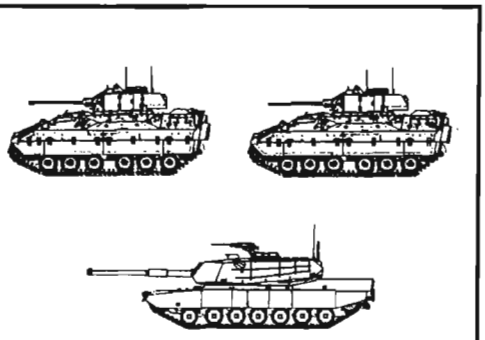


Figure 1. The Hunter-Killer Team

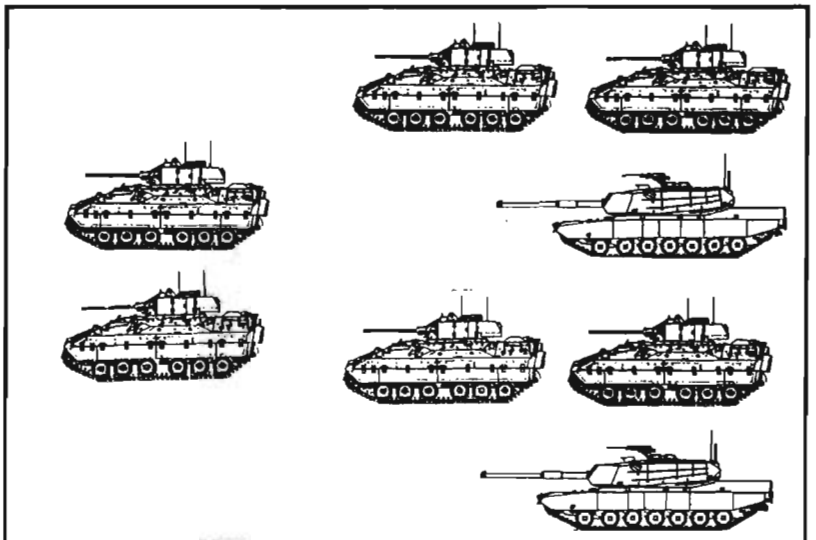


Figure 2. The Hunter-Killer Platoon

General

The primary purpose of Hunter-Killer operations is enhancement of scout reconnaissance/counterreconnaissance abilities while increasing their survivability and lethality by integrating tanks into their formations.

Two Bradleys and one tank comprise the integrated team, with the senior scout in charge (Figure 1). The two Bradleys work as a normal scout section, and the tank follows at the center of the section, 50 to 500 meters to the rear. The distance the tank follows depends on METT-T, with the tank responsible for providing continual overwatch for both scout tracks. When the scouts encounter the enemy, they radio the tank, which can immediately respond to the enemy threat.

There are two ways to task organize a HK platoon. The platoon can operate with either six Bradleys and two tanks or five Bradleys and two tanks; both operate with two HK teams and a control (HQ) element (Figure 2). The HK platoon performs the same missions as a normal cavalry scout platoon.

The HK troop has two HK platoons and one tank platoon with four or five tanks. This formation, although a significant change from the normal four platoon cavalry troop, is flexible and effective.

To give a troop the ability to rapidly change from four platoons to the three platoons of the HK formation and back again requires intense training. The bottom line is that the unit's success relies on the teamwork between the scout and tank crews.

Reconnaissance

During reconnaissance missions (zone, area, or route) the HK troop usually deploys in the Troop V formation, with the HK platoons on line and the tank platoon maneuvering in the center and slightly to the rear. When a HK platoon makes contact with an enemy force too large to destroy, the platoon immediately fixes the enemy. The tank platoon then maneuvers to destroy the enemy from the flank, while the other HK platoon maintains forward and flank security.

When the maneuver corridor doesn't support two HK platoons abreast, the HK troop uses the HK Troop Column formation with the HK platoons following each other and the tank platoon bringing up the rear.

The HK formation is ideal for the 3d ACR's Hot Troop concept. Under this concept, the squadron designates one troop to operate well forward of the squadron's main body as an advanced guard. The troop can organize in either the Troop V or Troop Column formation. The Troop Column is preferable as it increases the troop's flexibility and reconnaissance depth, although it limits the frontage the troop covers. When the lead scouts encounter an enemy outpost, their tank support rapidly engages the enemy. This scout and tank combination increases the scouts lethality and survivability. The Hot Troop concept and the HK security formation closely resemble the OPFOR's forward security element and combat reconnaissance patrol formation.

When equipped with M1A1 mine plows, the troop can quickly breach enemy obstacles without the arduous dismounted wire cutting and pop-and-drop emplacement. Even without mine plows, the tank provides both near- and far-side security for the breaching force, either scout or engineer. The time required for this critical task decreases when HK tanks are quickly accessible.

Counterreconnaissance

In the counterreconnaissance battle, the HK concept proves exceptionally lethal. There are numerous writings, including NTC AARs, detailing the

importance of a successful counterreconnaissance fight. A screen line that is able to defeat the enemy forward of the main battle area is a success. Defeating the enemy's reconnaissance forces allows defending units to prepare defensive positions undetected and provides useful intelligence.

On the screen line, the HK platoons deploy to occupy several observation posts while the tank platoon prepares defensive positions as the base of the troop defense. The HK tanks remain slightly behind the Bradleys in hide positions. At night, the HK tanks move closer to the scouts, but remain in concealed positions. This provides depth on the screen line, which helps prevent the enemy from penetrating the sector.

When the enemy penetrates the screen line, the troop sends a HK section to dispose of the threat. The HK team maneuvers to engage and destroy the enemy while all other HK teams maintain the screen line. The scouts are the hunters and the tank the killer.

Disadvantages

One disadvantage to the HK formation is the cavalry troop's difficulty in massing all nine tanks to destroy an enemy force or provide the punch necessary to breach the enemy's defenses. The commander must consider the need to mass all nine tanks before selecting the HK formation as the method of maneuver. When the mission requires massing nine tanks, HK is not the appropriate formation.

The addition of two tanks to the normal scout platoon places additional responsibility on the platoon leader. He must possess the leadership skills necessary to handle the increase in personnel and equipment. Our experience shows that the scout platoon leader is ready for the additional responsibility of HK operations.

The support necessary for a multitype vehicle platoon requires consideration and careful planning. The Bradley can operate effectively for three days, if necessary, without refueling. The tank, however, must resupply once or twice a day. This forces the logistics section of the troop to resupply the screen line daily, which is extremely difficult during certain missions. The maintenance section must also push tank maintenance operations further forward to widely dispersed vehicles. A well trained HQ platoon will quickly adapt to these changes.

Advantages

We quickly pointed out the difficulty a troop experiences massing all nine of its tanks. We, however, must highlight that a troop operating in the HK formation can mass six or seven tanks much quicker than a troop in the normal platoon formation. Two tanks are already at the point of enemy contact, and the troop can flex the tank platoon, rapidly massing six or seven tanks. The troop can keep the other HK platoon intact to secure the troop's flank or continue the mission.

Cavalry doctrine teaches that a good scout must remain undetected and only engage with direct fire when absolutely necessary. HK operations provide the scouts additional protection, allowing the tanks to kill, not the scouts. A scout firing a TOW missile in self-defense at a range of 2000 meters needs approximately 20 seconds engagement time while the tank completes the engagement in three to five seconds.

As mentioned earlier, a tank with a mine plow can execute an obstacle breach before dismounted scouts have time to start a mechanical one. This increases the maneuverability and speed of an attacking force while keeping the scouts active in hunting, rather than mechanical breaching.

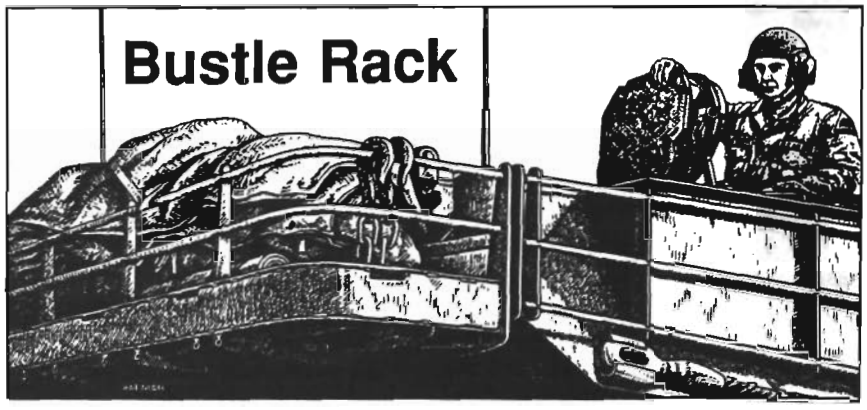
The unit, as it trains HK operations, will find many additional advantages as their proficiency increases. It is up to you to accept the HK formation and fully realize its potential.

Conclusion

Hunter-Killer operations, as the logical combination of scouts and tanks, vastly increases the lethality and survivability of scouts in reconnaissance and counterreconnaissance missions. During the past four years, Fox Troop, 2d Squadron, 3d Armored Cavalry Regiment, proved that Hunter-Killer works! Hopefully more units will use this formation, continue its refinement, and eventually participate in Hunter-Killer's adoption into cavalry doctrine.

Captain Karl S. Flynn is a graduate of California State University Sacramento. He has attended AOB, Airborne, NBC, AOAC, and CLC. He served as tank platoon leader, scout platoon leader and tank company XO in 1/64th Armor, Kitzingen, Germany; as the 2/3 ACR adjutant; and as commander, Fox Troop, 2/3 ACR. He is currently the 3d ACR training officer.

First Lieutenant Joseph Miller is a graduate of the University of Arkansas Little Rock. He has attended AOB, JOMC, SPLC, Airborne, IMPOC, and NBC schools. He served as tank and scout platoon leader in Fox Troop, 2/3 ACR. He is currently the assistant S3, 2/3 ACR.



First Annual External Unit Scheduling Conference Held at Fort Knox

In an effort to make Fort Knox the station of choice for external unit armor training, the G3 held its first annual External Unit Scheduling Conference on 3 May. Forty-eight representatives from eight states representing 15 Army National Guard, two U.S. Army Reserve, and two Active Army units scheduled ranges, training areas, and all types of simulators for May 1993 through September 1994. Opening up such a training window for external units like this meant that all program of instruction course managers had to schedule 18 months in advance and lock in all resources at plus 16 months. Once scheduled, participating units are guaranteed to get what they schedule — no bumping.

Participants received information briefings from members of the post and school staffs, then scheduled nearly 50 tank ranges and training areas, UCOFT, CATTC (SIMNET), 78 small arms ranges, and the M1 tank driver trainers. Schedulers resolved one or two minor conflicts on the spot. Everyone left with what they wanted, or something close to it.

All present realized that the way we conduct business (training) is changing and that resources to support training are decreasing. We must share our quality resources and use our ranges and simulators 24 hours a day and seven days a week, if possible.

The 2-252 Armor Battalion, North Carolina Army National Guard plans to come to Fort Knox next March for their second annual training (AT) in Kentucky. This same battalion performed AT92 here as a participant of the Second Army Reserve Training Concept (RTC). The 2-252 particularly liked the one-stop operation setup at the conference that allowed them to schedule and coordinate ammunition, mess, and billeting all in one room.

The second annual conference will be on the Monday preceding the 1994 Armor Conference. All external units are welcome to attend.

MBTs for the Swedish Army

The Swedish Defence Materiel Administration (FMV) has been retained by the Commander-in-Chief of the Army to prepare, prior to the 1994 Governmental decision, procurement of main battle tanks from abroad. The provision of the Swedish Army with the new main battle tank system will start in 1996.

At present, FMV is conducting extensive tests with three different foreign battle tanks, aiming at providing the best possible basic data for selecting one of three competing systems — the M1A2 Abrams, the French Leclerc, and the German Leopard 2 Improved.

Defense Attache System Opportunities for NCOs

Army NCOs E-5 through E-8 looking for a challenging and rewarding career opportunity in over 80 countries worldwide are being sought for duty in the Defense Attache System (DAS).

The DAS is now recruiting highly motivated and qualified NCOs seeking joint service staff assignments within American Embassies throughout the world. Selected NCOs are given the opportunity to represent the United States Army in diplomatic assignments in Europe, North/Central and South America, Africa, the Far East, and the Middle East.

According to SFC John Currier, Enlisted Assignments Coordinator, "No other Army program provides soldiers with the opportunity to live and work in so many different countries. From Austria to Zimbabwe, from Brazil to Finland, and from Canada to Turkey, these worldwide diplomatic assignments offer a challenge quite like no other."

NCOs considering attache duty must be clearable for Special Intelligence, have a GT score of 115 or higher, a CL score of 120 or higher, and a typing score of 40 WPM or more. Soldiers must also test 100 or higher on the Defense Language Aptitude Battery (DLAB) or be a skilled linguist. Computer (word processing) skills are helpful as well. All family members must be U.S. citizens and meet the medical standards for the country of assignment.

Prerequisites, application procedures, and countries available within the program can be found in AR 611-60. For additional information, contact SFC Currier at commercial (410) 677-2134/7361, ext. 2633, FAX (410) 677-5352; or DSN 923-2134/7361, ext. 2633, FAX 923-5352.

Reunions

11th Armored Division — August 26-29, 1993, in New Orleans, La. Contact Peg Pfeiffer, 2328 Admiral St., Aliquippa, PA 15001, phone (412) 375-6295.

740th Tank Battalion — September 2-5, 1993, in Louisville, Ky. Contact Harry F. Miller, 2150 6th Ave. N. #102, Seattle, WA 98109, phone (206) 283-8591.

10th Armored Division — September 2-6, 1993, in Augusta, Ga. Contact Samuel F. Murow, Box 213, Bay Port, MI 48720, phone (517) 656-3551.

12th Armored Division — September 19-23, 1993, at Plaza Hotel in Las Vegas, Nev. Contact Paul R. Hempfling, Sr., 11418 Hillcroft, Houston, TX 77035, phone (713) 729-7586.

2d Tank Battalion, 9th Armored Division — September 21-24, 1993, in Oshkosh, Wis. Contact Cele Jensen, 3286 Shorewood Dr., Oshkosh, WI 54901, phone (414) 231-2316; or Ruth Ganser, 713 5th St., Mosinee, WI 54455, phone (715) 693-3104.

"Hardcore" Platoon — 1st Platoon, E Troop, 2d Squadron, 11th Armored Cavalry Regiment, whose members served from August-September 1968, are invited to a reunion for the summer of 1993. Also looking for CPT Templer and LTs Powers and Avent. Contact Clair P. Yeager, RD 1, Box 163A, South Fork, PA 15956, phone (814) 495-4797.

BOOKS

How the German Army Rose from Defeat

The Roots of Blitzkrieg by James Corum, University Press of Kansas, Lawrence, Kansas, 1992.

As late as the summer of 1918, the German Army retained the *capability* to challenge the Allied armies. But, in late summer, the Allies finally turned the tide. When the armistice was signed, Allied generals could safely claim to have beaten the Germans in the field. Corum argues that most German officers and, most importantly Hans Von Seeckt, who commanded the Reichswehr from inception until 1926, understood that they had not been stabbed in the back, but beaten. Von Seeckt found himself in command of the merest shadow of the old Imperial Army. The Allies denied the Germans offensive weapons, forbade the existence of the General Staff, and allowed only what they believed would be sufficient to provide Germany with a constabulary capable of maintaining order and patrolling her reduced borders.

Von Seeckt's problems were numerous — civil uprisings, the right-wing Freikorps, predatory neighbors, intrigue among his officers, an empty purse, and close scrutiny from his former enemies, to name a few. Corum illuminates Von Seeckt's innovative solutions. Politically conservative, Von Seeckt was a radical thinker in military terms. Equally important, he tapped into the German Army's tradition of learning from history. At the outset, he organized the Truppenamt, a shadow general staff, and tasked that body of officers to glean the lessons from the Great War. Lessons learned ran the gamut from tactical, technological, and doctrinal lessons. On this basis, Von Seeckt sought to develop a cadre army which could expand rapidly, and one which focused on the implications of developing technology and forward-looking operational doctrine.

Von Seeckt's army prepared for the future through training, which included testing new operational concepts and the use of new weapons (at least in simulation). Corum's account is readable and demonstrates clearly that Von Seeckt deserves much of the credit for the early successes of Hitler's legions. The experience of Von Seeckt and the Reichswehr suggest two important lessons for the United States Army. First, it is possible to achieve excellence and prepare for war in straitened circumstance. Finally, the key to achieving excellence is to learn from the past, examine the possible, and look to the future.

COL GREGORY FONTENOT
Fort Monroe, Va.

[Although the tree was cut down, the seed lay dormant underground, nourished by a dedicated cadre of professionals until it could be brought into full bloom again. Mr. Corum's book has much to teach us. — Editor]

The American Warrior by Chris and Janet Morris, Longmeadow Press, Stamford, Conn., 1992. 271 Pages. $18.95.

Authors Chris and Janet Morris have attempted to capture the fighting spirit of the American military. They have attempted to find the defining characteristics that make soldiers, sailors, airmen, and marines into American warriors. They carry their search even deeper by asking the question: Does the United States support a "Warrior Class" in contemporary society? As we bring the 20th Century to a close, has American society spawned its equivalent to the Prussians, the Cossacks, the Samurai, or even the Moguls?

The dust jacket proclaims the American Warrior to be "an oral history of the men and women who have served in our armed forces from World War II through Desert Storm." In the introduction, the authors explain their methodology as: "compiled from a questionaire sent to members of the foreign policy, military, and intelligence communities who were carefully chosen for their diversity of experience, rank, and points of view. The questions... were meant to be difficult, evoke emotional responses, or cause a personal inventory of experience to take place."

From an unspecified number of survey responses the authors chose 38 personalities to feature in six sections: "Warriorship, Personal Commitment, Combat, the World, the Future, and the Overachievers." Instead of defining the American warrior spirit, the authors have produced a compendium on Beltway Banditry. This book is more notable for what is missing from the text than from what is included. The respondents seem to be chosen more for their availability to the author's Washington offices rather than for their ability to provide any scholarship to the subject.

No doubt many of the respondents have distinguished military and civilian service records, and it would be inappropriate to question here their combat experiences. However, it is a collection of "Warriors" without balance. There isn't a Medal of Honor holder nor any particular military scholars. There isn't an officer candidate nor a student at the USMA Prep School. There isn't an air policeman on shift at K.I. Sawyer Air Force Base nor a boatswain on a submarine tender. There are innumerable examples of the "warrior spirit" that are more realistic representatives than the thinly veiled special operators and intelligence operatives that the authors seem so facinated by.

The issue is credibility. This book is lacking it. The book represents a solid idea — one that should be explored by our society. Indeed, any democracy ought to examine its propensity for war and what motivates those who will fight them. Such an important question deserves better research and better writing. The anecdotes that fill the pages of *The American Warrior* are interesting and evocative, but they no more capture the spirit of American Warriors than a Saturday night conversation at any VFW hall in the country.

American Warriors past, present, and future deserve a better effort.

JIM ALLARD
LTC, Armor
Cdr, 2-16 Cav
Ft. Knox, Ky.

Vietnam-on-the-Potomac written by Moya Ann Ball, Praeger Books (from the Praeger Series in Political Communication), New York, 1992. $45.00, 232 pages.

Vietnam-on-the-Potomac is not your run of the mill book on the war in Vietnam. In fact it offers a rather unique approach to the growing literature on that war. As the author, an Assistant Professor of Speech Communication at Trinity University, says in her introduction, "The purpose of this book is to trace the Vietnam decision-making activities of the Kennedy and Johnson administrations that led to the overt introduction of American combat forces in July

1965... My point here is that decision makers, through their written and spoken communication, spin webs of significance and, out of such webs, decisions emerge that sometimes, as in the case of the Vietnam decisions, ensnare the spinners as well as their prey."

Thus, *Vietnam-on-the-Potomac* is not directly about the war in Vietnam, rather about the "communication dynamics of Presidents Kennedy and Johnson and their key advisers." It is based on the premise that "the study of symbol use and communication is vital to any analysis of decision making or foreign policy making."

In writing this book, Professor Ball has intentionally taken the events in Washington out of the context of those taking place simultaneously in Moscow, Beijing, Paris, Hanoi, and sometimes even Saigon. Like other academic studies which take something out of the context of the whole in order to view the particular in greater detail, *Vietnam-on-the-Potomac* cannot be read alone. The reader must be relatively familiar with what occurred "outside the Beltway" in order to understand the significance — and even the validity — of the events described and conclusions drawn on these pages. As an example, the author assumes that peace through negotiation was always possible. She poses the question: "Why did neither President Kennedy nor President Johnson seize the potential for peace?", a question she then promises to answer. As part of her answer, Professor Ball asserts that, in June of 1965, Johnson Administration "decision makers wanted agreement on their terms only" with regard to peace negotiations. She implies that had these decision makers not been captives of their own rhetoric, peace negotiations would have been possible.

The context in which the Washington discussions took place are not described here and must be drawn from another source. For example, the government in Hanoi sent 10,000 NVA troops into South Vietnam in 1964, starting with individual replacements but ending the year with NVA units moving down the Ho Chi Minh trail. At the 11th Plenum of the Central Committee held 25-27 March 1965, Hanoi's leaders made the fateful decision to escalate the war, transforming it "into a patriotic revolutionary war of the people of the entire nation against the U.S. imperialists." Finally, even at the time President Johnson was making his famous speech offering the possibility of peace through negotiation at Johns Hopkins University on 7 April, Hanoi's leaders were in Moscow and Beijing seeking (and receiving) promises of additional military aid. Clearly Hanoi was interested neither in peace nor in negotiations, and it was events — and communication — in Hanoi, not just in Washington, which made a negotiated peace in June of 1965 unlikely if not impossible.

Keeping this in mind, *Vietnam-on-the-Potomac* is well written, informative, and an unparalleled, well-researched source for what went on "inside the Beltway." The discussion of the White House debates over the Diem coup in 1963, for example, is exceptional, superbly documented, and clearly explained. Perhaps the book's most valuable contribution, however, is made in confronting the "conventional wisdom" that President Kennedy tried everything to keep American troops out of Vietnam, while President Johnson did everything possible to get them there. The author's treatment of this subject alone makes the book worth reading. Professor Ball has done considerable groundbreaking work on the role of political communications in decision making during the war in Vietnam, and *Vietnam-on-the-Potomac* will undoubtedly become an indispensable source for future studies on the crucial decisions made during the Kennedy and Johnson administrations. It must, however, be taken in context.

DONALD C. SNEDEKER
LTC, U.S. Cavalry, Retired
Washington, D.C.

Sam Houston: A Biography of the Father of Texas by John Hoyt Williams. Simon & Schuster, New York, 1993. 448 pages, bibliography, notes. $25.00.

Sam Houston is a legendary hero. But the legend is larger than the man.

Houston was a complex man whose life was made up of roller coaster episodes — galvanizing achievements, and inexplicable, catastrophic failures. His early military life was marked by conspicuous heroism. Andrew Jackson took him on as a protègè and would lend powerful support to Houston's various political aspirations. He became a lawyer, an outstanding Indian agent, and governor of Tennessee. He also acquired the reputation of a carousing boozer. A shattered marriage drove him back to the Indians (he even became a citizen of the Cherokee Nation!), and a vision began to shape his life, a vision of Texas free of the Mexicans, a new republic to be annexed by the United States. And led, of course, by Sam Houston!

He would have another brief military episode as a major general of militia, culminating at San Jacinto, which finally guaranteed Texas independence. He later twice became president of the Republic of Texas, then a U.S. senator for Texas, and finally governor again. He presided reluctantly over secession, predicting devastating war, and was forced from office and branded a traitor by his state.

Through all these momentous events, Houston's life was a series of contradictions. He was accused of fraud, denounced as anti-Southern, condemned as an habitual drunk, charged with indecision on the battlefield, and with interfering in U.S. international relations. Yet others praised him, and the people continued to elect him.

Dr. Williams has written a succinct but comprehensive account of this controversial legend. His emphasis is on Houston's political life, but the military aspects are carefully covered. These were exciting times, and this book reflects it.

JOHN R. BYERS
COL, USA, Ret.
Alexandria, Va.

WARTHOG: Flying the A-10 in the Gulf War by William L. Smallwood. Brassey's U.S. Inc., McLean, Va., 1993, 288 pp. $23.

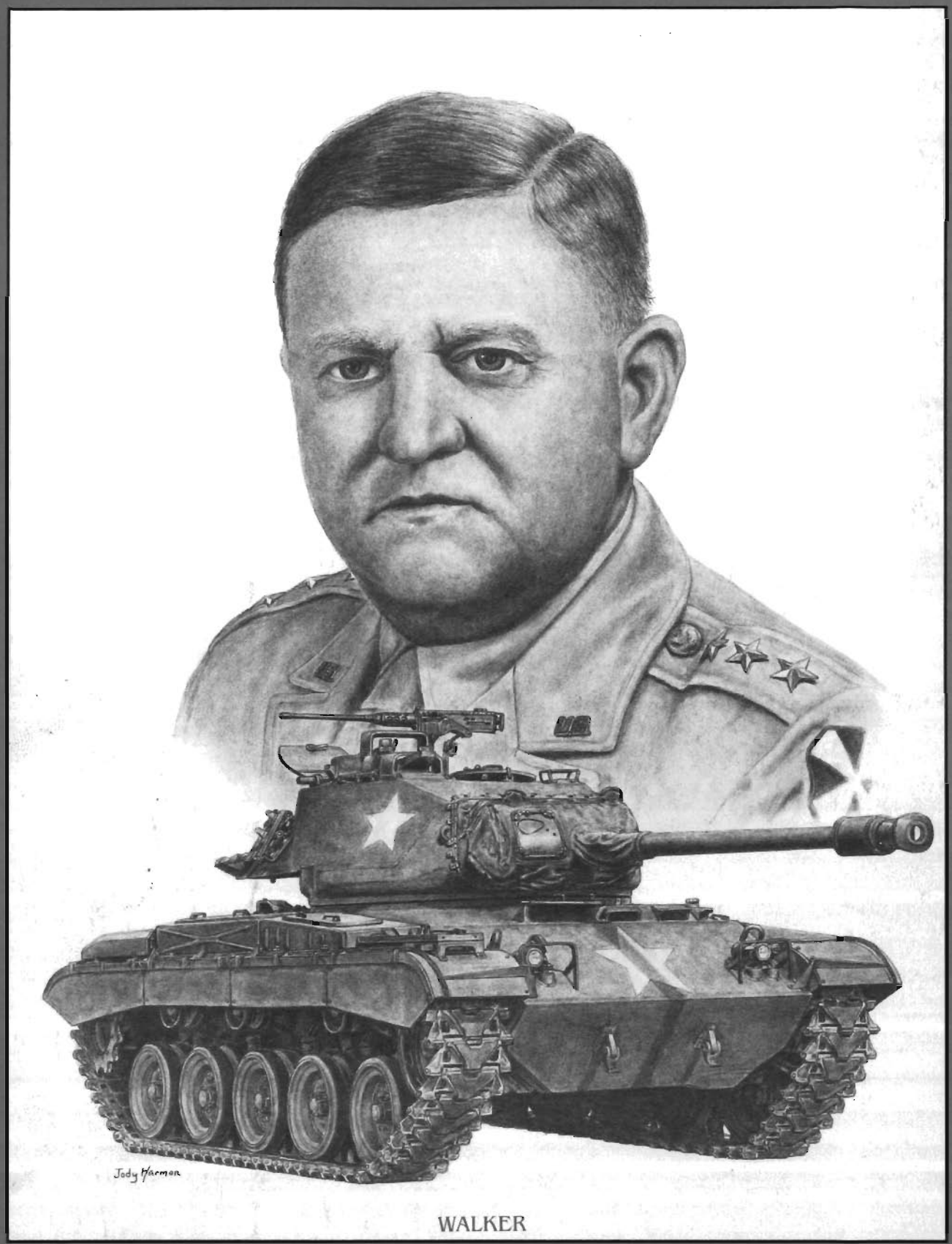
Normally, a book on one aspect of an air campaign wouldn't be considered review material for the ground-bound readers of *ARMOR*, but those with aspirations for future combat leadership — tied to deep attack and AirLand Battle — might learn a lot from this one.

Smallwood has interviewed over a hundred A-10 "Hog-drivers" who fought in the Gulf, and their stories give the ground commander a good insight into what's possible, and what isn't, from their viewpoint high above the battlefield. Aside from being an exciting read, the book provides excellent grounding in the capabilities and limitations of truly close air support.

The A-10 pilots killed hundreds of Iraqi tanks, despite the fact that they got little respect in an Air Force of mach-jockeys, flew a truly ugly little plane thought to be obsolete and headed for the boneyard, and were really ill-equipped to fight at night, as they were asked to do. It's a story of guts, and clever inspiration. Tasked to night missions, the A-10 pilots had to use the seekers of their infrared Maverick missiles as their forward-looking infrared viewers — like "looking at the ground through a soda straw," as one pilot put it.

Despite fighting at different altitudes, the TC and the A-10 pilot have a lot more in common than you might think. It's useful to see their side of the battlefield.

JON CLEMENS
ARMOR Managing Editor



"The Namesake Series"

This portrait of General Walton W. Walker and the M41 light tank that later bore his name is another in the new series by *ARMOR* Contributing Artist SPC Jody Harmon. The portraits are in color and will be available through the U.S. Armor Association.

PIN: 057530-000