ARMOR

Focus on the NTC

Stand To

Was it Good for You?

For the most part, the mail that comes into *ARMOR* is complimentary about what we are doing with your magazine. You generally like the mix of articles and largely approve of the "tad of this and tad of that" recipe, rather than a thematic-based approach. You like having some pictures to break up the text, and you uniformly enjoy Jody Harmon's artistry. We always appreciate that kind of warm and fuzzy feedback.

However, there is also the occasional reader who doesn't like what is going on within these covers. Either the mix of material isn't right, or we aren't focusing on the correct issues, or we've committed some other fault. We find that cold and prickly feedback less comfortable, but every bit as useful.

We need to hear from you periodically, thumbs up or thumbs down, to ensure that we keep our eyes focused on the leveling bubble. If we have the formula pretty much right, let us know. If we have done bad things to the poochie, by all means let us know, so we can effect change if necessary. We can effect change easily, if you want it, and the status quo is no problem, either.

When criticizing, there are a couple of factors about the operation everyone should keep in mind:

— Other than those writers who are tasked to write schoolhouse articles, all of the authors are volunteering to share their opinions. Some of them you will not agree with; some of them will spur you to action; some of them will make you wish you had written it down first, because you had been saying the same thing for the last couple of years; some of them will make you wish you could be their senior rater just once. But the bottom line is this: they are volunteering to stand up.

— What appears in the magazine is the best of what people send in, and we publish in about the same proportion of each type of article that we receive. If you have a complaint that there is too much of this, or not enough of that, get off your butt and write something. It is intellectually all too easy to snipe, but it takes a lot more in the guts department to be the one laying it out for the comments of others.

— The contents of the magazine are unofficial. Sure, the Chief of Armor pays the bill, but a long line of Chiefs have felt secure enough in the position to allow this forum to exist. You can say that the emperor's clothes are threadbare, or even missing, and not commit career suicide. In that kind of environment, then, you will see pieces that are not always within our published doctrine, other pieces that seem fantastic, and ideas that totally tick you off. I say that this is the strength of our magazine, and it was one of the things that, as an ROTC cadet over twenty years ago, appealed to me. I thought it would be pretty darn cool to be affiliated with a part of the Army that thought and gave a public forum to what oftentimes amounts to dissent.

That said, if the magazine ever heads in a direction that you feel is suspect, say so. It is your publication, and truthfully, you have a large say in our direction. Pre-1973, when the United States Armor Association printed the magazine, the Association's Executive Council oversaw the magazine's ops. The current Chief of Armor, MG Harmeyer, like his predecessors, continues to follow General Starry's lead in 1973 of promoting this professional discourse and encouraging debate as healthy for each one of us personally and professionally, for the branch specifically, and for our Army generally. It works for me. How about you?

— TAB

By Order of the Secretary of the Army:

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

Official:
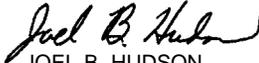
Joel B. Hudson
JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army

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Features

Departments

Directory — Points of Contact

ARMOR Editorial Offices

Editor-in-Chief
LTC Terry A. Blakely   2249
E-Mail: blakelt2@ftknox2-emh3.army.mil

Managing Editor
Jon T. Clemens   2249
E-Mail: clemensj@ftknox2-emh3.army.mil

Editorial Assistant
Vivian Oertle   2610
E-mail: oertlev@ftknox2-emh3.army.mil

Production Assistant
Mary Hager   2610
E-Mail: hagerm@ftknox2-emh3.army.mil

Staff Illustrator
Mr. Jody Harmon   2610
E-Mail: harmonj@ftknox2-emh3.army.mil

U.S. Army Armor School

Director, Armor School   (ATSB-DAS)
COL Richard P. Geier   1050
E-Mail: geier@ftknox-dtdd-emh5.army.mil

Armor School Sergeant Major   (ATSB-CSM)
CSM J. D. Duncan   5405
E-Mail: duncanjd@ftknox-emh5.army.mil

NCO Academy   (ATZK-NC)
CSM Kevin P. Garvey   5150
E-Mail: garveyk@ftknox-emh3.army.mil

16th Cavalry Regiment   (ATSB-SBZ)
COL Gregory M. Eckert   7848
E-Mail: eckert@ftknox16cav-emh12.army.mil

1st Armor Training Brigade   (ATSB-BAZ)
COL Scott R. Feil   6843
E-Mail: feil@ftknox-emh3.army.mil

U.S. Army Armor Center

Commanding General   (ATZK-CG)
MG George Harmeyer   2121
E-Mail: harmeyer@ftknox-emh7.army.mil

Deputy Commanding General   (ATZK-DCG)
BG Robert Wilson   7555
E-Mail: wilson@ftknox-emh5.army.mil

Chief of Staff   (ATZK-CS)
COL William E. Marshall   1101
E-Mail: marshall@ftknox-emh7.army.mil

Command Sergeant Major   (ATZK-CSM)
CSM David L. Lady   4952
E-Mail: ladyd@ftknox-emh7.army.mil

Directorate of Force Development   (ATZK-FD)
COL John F. Kalb   5050
E-Mail: kalb@ftknoxdfd-emh13.army.mil

Directorate of Training and Doctrine Development (ATZK-TD)
COL William R. Betson   8247
E-Mail: betson@ftknox-dtdd-emh5.army.mil

TRADOC System Manager for Force XXI   (ATZK-XXI)
COL Robert L. Westholm   4009
E-Mail: tsmfxxi@ftknox-xxi-emh1.army.mil

TRADOC System Manager for Abrams   (ATZK-TS)
COL David M. Cowan   7955
E-Mail: cowand@ftknoxdfd-emh13.army.mil

Mounted Maneuver Battlespace Battle Lab   (ATZK-MW)
COL Karl J. Gunzelman   7809
E-Mail: gunzelman@ftknox-mbbl-lan.army.mil

Office, Chief of Armor   (ATZK-AR)
COL Patrick F. Webb   1272
E-Mail: webbp@ftknoxdfd-emh13.army.mil
FAX 7585

Special Assistant to the CG (ARNG)   (ATZK-SA)
LTC Randall Williams   1315
E-Mail: williamr@ftknox-emh7.army.mil

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armormag@ftknox2-emh3.army.mil

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out of your shaded version. (We have found that when we convert files to a format we can use, the shading gets lost or distorted.) If you have any questions concerning electronic art submissions, call Vivian Oertle at the phone number above.

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

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LETTERS

Article Addressed Issues "No One Wants to Discuss"

Dear Sir:

MAJ Donald Vandergriff's article, "Without the Proper Culture: Why Our Army Cannot Practice Maneuver Warfare," *ARMOR,* Jan-Feb '98, serves as a startling testament of the frightening condition of our Army today. MAJ Vandergriff proposes that it is impossible for the Army to adopt maneuver warfare given our current culture of, among other things, "centralized control," our focus on "individualism and self-promotion," and "zero-defects." I strongly applaud MAJ Vandergriff's assessment of our culture and his determination that maneuver warfare is beyond our grasp, given these cultural weaknesses.

MAJ Vandergriff proposes a real revolution in the Army culture. I believe that he has addressed the issues that no one wants to discuss in his assessment of the Army today. Before we can successfully execute the Army After Next, we must look at our basic selves and come to terms with our shortcomings and faults. The problems in personnel management, leadership, and centralized control are short-sighted reactions and habits benefiting only the current Army and not the Army that our junior soldiers and leaders will lead and operate in 2010 and beyond.

I applaud his call to tear down the facades of centralized control and address the cultural reasons for not adapting to maneuver warfare. Our failure to meet his call will stymie the adoption of whatever form of warfare we take on in the next century and contribute to the further demise of our professional culture.

To the "Technos," I must challenge your thoughts in regard to the development of German military reform by quoting General Charles de Gaulle, "the superiority of good (German) troops was abundantly clear. How else is one to explain the prolonged success of the German armies against so many opponents? For the 1,700,000 deaths which they counted in all, the Germans, better trained than anyone else, killed 3,200,000 enemies; for the 750,000 prisoners which they lost, they took 1,900,000." James S. Corum, *The Roots of Blitzkrieg, Hans von Seeckt and German Military Reform,* (University Press of Kansas, 1992), p. 13.

As military professionals, we must all recognize that we are currently at a paradigm in military affairs. It is time to look into the eyes of the elephant and change our course before we are overcome by our own minutia.

Undoubtedly, many of you will think my views and comments are a bit reactionary. I would encourage you to study Dwight Eisenhower's experiences in the 1920s when he was threatened with court martial for advocating stronger tank forces.

MAJ Vandergriff, I raise my glass in your honor and accept your challenge to start a revolution in military thinking. Our failure to follow your call will only lead to failure on tomorrow's battlefields.

ANDRE HALL
CPT, Armor
(USAR)

Heavy Force Emphasis Flirts with Irrelevancy

Dear Sir:

I am a currently serving Armor officer. I write to voice my displeasure with the irrelevance to which the Armor Center is condemning my branch. I also wish to state my dissatisfaction with *ARMOR* Magazine, that increasingly dilatory and backward-looking professional journal published by the Center.

As much as Armor Branch may wish otherwise, WWII is over. As inconvenient as it may be to our heavy force structure, the Cold War is also over. The probability that, in the foreseeable future, we will fight another industrialized nation in high-intensity mobile armored warfare is so close to zero that it might as well be zero. The Abrams and Bradleys are magnificent vehicles, but the major conflicts for which they were designed are in our past. The present and future requirements for armor are much "lighter."

I am not suggesting that Armor Branch abandon the heavy force completely — it is, after all, the ultimate guarantor of American dominance in land warfare. I am concerned that by concentrating almost exclusively on heavy force operations, Armor Branch is becoming increasingly irrelevant to the kind of force projection operations that are certain to be the wave of the future.

We need light, strategically mobile armored vehicles that are capable of operating in a logistically austere environment. We do not have such armor now, nor were we going to get it with the miserably conceived Armored Gun System, nor do we have, as far as I know, a serious initiative to develop or otherwise obtain such armored vehicles. Why is this? Why are we the only army in the world without armored cars or wheeled light armored vehicles? I submit that the rest of the world is not wrong in their appreciation of the utility of light armor. I believe it is Fort Knox's view — that the only bona fide armored vehicles are track-laying, 20-70 ton behemoths, capable of shooting it out with some alleged Future Soviet Tank — that is narrow-minded. However limited the role of light armor in the confines of the Fulda Gap, the wide ranging battlespaces of the CNN, force projection age scream for armored vehicles which are both strategically and tactically transportable to, and logistically supportable in, the hot spots of the world on a moment's notice.

What would a light armored wheeled vehicle offer the force in terms of capability? The list includes traditional armor virtues:

- Mobility, both strategic and tactical, enhanced by fuel economy and high operational readiness rates, meaning a small logistics tail, which also serves to increase strategic and operational maneuver capability.

- Armor protection against small arms, the principal Third World threat.

- Firepower. A modest turret supporting a 25mm Chain Gun, coax machine gun, and thermal sight, especially if stabilized, would dominate most any Third World fire fight. TOW and mortar variants would round out a combined arms team.

- Shock effect against poorly armed opponents.

- Ground reconnaissance over large areas with great speed.

- High powered, mobile radios, capable of calling in fire support from whatever sources are available.

The vehicle should not be designed to defeat a heavy armor threat. First of all, adding such a requirement would, as we discovered with the AGS, increase weight and cost and decrease strategic and tactical mobility, defeating the very purpose of the vehicle. The fact is, most potential adversaries have no modern armor capability. What modest capabilities they possess can be defeated by a combination of lightweight anti-armor weapons and fire support called in with tactical radios — this was how the Marines defeated the Iraqi armor thrust at Khafji. If the enemy possesses sophisticated heavy armor, then our task force could always deploy Abrams to defeat it. The U.S. armed forces already possess a plethora of tank-killing systems and is in no need of yet another.

The absence of a light armored vehicle has in the past, and will in the future, hurt Army operations. Grenada is a textbook example of the efficacy of small amounts of armor in Third World environments. While the 82d lacked armor and was pinned down on the airfield taking casualties, a small Marine armored force overran the northern 4/5 of the island, including the capital city. In Mogadishu, soldiers died because no armor was available to rescue them. Our fine infantrymen on rapid deployment missions deserve armor fire support that can deploy with them.

Even our own armor scouts and battalions are disadvantaged by our failure to provide them an adequate reconnaissance vehicle. The scout HMMWV is a failure. No real armor; no turret; inadequate, add-on optics — the HMMWV was designed as a utility vehicle to replace the jeep, not as a scout car. Our scouts routinely lose the battle in training exercises because they don't have a vehicle capable of detecting the enemy before the enemy detects them. We can do better.

On page 7 of the April 1997 issue of *Soldiers,* I am appalled to find a story about the Military Police Corps' new Armored Security Vehicle. Wheeled, armored, and with turret-mounted weapons, the vehicle is in fact an armored car which an armored scout or cavalryman could use for any variety of missions. It looks remarkably deployable, ideally suited for providing armor support in Third World en-

vironments. I'm sure the vehicle has its limitations, but it also clearly affords capabilities not found elsewhere in the Army inventory. I am ashamed that the MPs are growing to fill the need we in the Armor community failed to meet. Task force commanders in need of light armor or ground reconnaissance can now call their Provost Marshal rather than their cavalry and armor commanders. Have we given away our seat at the table?

And as the MPs slap us in the face, what are we doing in the Armor Force to prepare for future missions? If *ARMOR* is any indicator — nothing! This magazine has become devoted to military history, extolling the pioneers of armor between the wars, reveling in WWII armor exploits, congratulating ourselves on the mature armor doctrines of the Cold War period, and then propagandizing us regarding high-tech heavy force warfare in the coming century. Rarely is an article in the magazine controversial or thought-provoking. (The letters are often worthwhile, however.)

I would suggest that *ARMOR* focus on the very real conflicts that engulf the world, and the wide spectrum of armored battle found in those conflicts. *ARMOR* should also debate the critical decisions facing Armor Branch during these truly revolutionary times in military affairs. The magazine should be forward looking, providing the intellectual and practical underpinnings for a redirected and revitalized Armored Force.

I remain convinced that armored warriors can prove themselves decisive on a great many battlefields throughout the world. However, we must have more versatile vehicles and organizations if we are to be effective in the full gamut of conflict. A vital and aggressive Armor Branch will enhance our national security. The Armor Center and *ARMOR* magazine can do a better job in keeping Armor Branch in the vanguard of the Nation's land forces.

STEPHEN L. MELTON
LTC, Armor
Professor of Military Science

ARMOR Needs a Forum For "Out of the Box" Thinking

Dear Sir:

As a recent re-subscriber to the magazine, I want to congratulate you on its growth. It was refreshing to see some challenges to systemic compliance in the form of MAJ Vandergriff's article on OPMS and MG Bautz' reminder that it's high time to return to principles, from the top down. There is a degree of sameness, though, that seems to have perpetuated itself over the years — fat tanks, big guns, and technical orientation.

Armor now, and for the foreseeable future, faces and will face unparalleled challenges. Among them are operational relevance in a much changed global geography, deployability as a part of a strategic combined arms team, and demonstration of any real grasp of

the meaning of the "information revolution" to forces, leaders, and the art and practice of war. There seems to be a lot of bandwagonitis — too little real jousting.

What suggests itself is providing a forum for thoughtful, not axe-grinding, men and women in, or interested in, the Armor Force to express "out-of-the-box" views. One means might be to have a "Cavalry Journal" section in each issue. My notion is to recapture the spirit of open discussion and argument of that revered periodical, perhaps omitting Patton's improvements to the saber and the like.

We have a lot of good minds out there. We need 'em all! Time is past due to give their thoughts exposure to the force rather than letting them atrophy from disinterest, poor politics, or the other Halon extinguishers of the "system."

BG (Ret.) JOHN KIRK
Lakewood, Wash.

Beef Up Armor Platoons, Don't Reduce Their Size

Dear Sir:

I read LTC Kevin C.M. Benson's article, "The Armor Battalion After Next: A Modest Proposal," with great interest. It seems ironic that while the Infantry School is examining the re-expansion of the rifle squad, the base infantry unit of maneuver, back to 11 men from its current 9 men, a noted Armor/Cavalry thinker calls for the reduction of the tank platoon, the base armor unit of maneuver.

I must weigh in against his proposal for a number of reasons. By reducing the platoon to a mere three tanks, he would eliminate the flexibility of the tank platoon to conduct split-section operations, a likely method of employment in a MOUT environment. Since infantrymen think about MOUT extensively, to include use of tanks, and it is quickly becoming the most likely terrain for future conflict, this is a not an inconsequential consideration. With only three tanks, someone does not have a wingman, likely the platoon leader. Without someone directly responsible for the tank platoon leader's security while he orchestrates the fight from the front, he is now forced to revert to a pure "command and control" role toward the rear, slightly out of harm's way. We now realistically reduce the tank platoon to only two effective engagement systems. Finally, while I am personally not a big "battle calculus" fan, if we take tank casualties, one tank destroyed or otherwise out of the fight reduces the platoon to 67% strength. Most units call for reconstitution at 70%, the point where units consider themselves combat ineffective.

I propose a return to the five-tank platoon. Additionally, in keeping with LTC Benson's desire to reduce the number of tanks in a battalion, let's go to two tank platoons in a company. This will still give the company twelve tanks, two less than now. Now we also have

two robust platoons, both capable of split-section operations and able to absorb some casualties, instead of three weak platoons. The platoon leader still does not have a wingman, but he does not need one. He can fight as part of the "heavy" section, the main effort, or he can revert to a more traditional "command and control" posture, slightly offset and in slightly less danger, but still have four effective engagement systems.

A further proposal is, instead of eliminating D Company, convert it into a LAV-equipped cavalry troop. Now, you have a superb reconnaissance capability with a fidelity for sustained operations the scout platoon never could achieve. Place the battalion mortars in this organization since they most likely get used in support of the scouts, anyway.

I question the combining of the battalion XO and the S3 into the X3. Are we really saying that we can have one man do both jobs? Most majors have enough on their plate trying to fulfill one of those jobs. They are both tough jobs. Furthermore, when does he sleep in a tactical operation? Or in garrison, for that matter? While the battalion staff needs reduction, a total elimination of the staff, especially the operations, plans, and training staff, is probably unrealistic.

CHRISTOPHER M. COGLIANESE
CPT, Infantry
Ft. Campbell, Ky.

LAV Unit Would Fill Gap Left by Disbanding 3/73 AR

Dear Sir:

The disbanding of the 3/73d Armor in 1997 has left the 82d Airborne Division, the world's premier large reaction force, in a situation where it has no organic, air-droppable, armor (or protected gun system) capability that can be inserted with the rest of the division by parachute. If you have a secure airfield to bring in armor, you'd send the 3d ID in the first place; if you need to secure that airfield, you may need armor on the ground with the initial assault force.

Is there a possible solution that does not require starting from scratch to give the 82d what it needs: mobile shock capability with cannon firepower that does not require a secure airfield to land? I believe so, and it exists now.

I'd build a wheeled light cavalry squadron around the GM Light Assault Vehicle (LAV) and several existing variants, currently used by the USMC. I'd use the Panhard VBL (Vehicle Blindee Leger or Light Armored Vehicle) for the smaller vehicle needs of the squadron. I'd base unit trailers, including those outfitted as work spaces for command/staff functions, on the Italian TANGRAM concept of enclosed amphibious trailers. The LAV and VBL are

COMMANDER'S HATCH

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

1998 Armor Conference

A Focus on the Leadership Challenge

The 1998 Armor Conference is rapidly approaching, and the Fort Knox team is in the final stages of planning this annual event. From May 17th through the 21st, the United States Army Armor Center will once again become the focal point for tankers and cavalrymen all over the world, for it is in this setting that the Armor Force conducts an open and honest discussion of the issues affecting mounted warriors. As is the standard at the Home of Mounted Warfare, we have come up with an outstanding program. The two-day Armor Trainer Update (ATU) will take place on May 17th and 18th, giving our Army National Guard and Army Reserve brethren the opportunity to discuss issues specific to their areas. The Unit Scheduling Conference will be held in conjunction with the ATU and will give units from all components the opportunity to schedule the Fort Knox training areas and the highly successful Virtual Training Program. The much acclaimed Armor Conference Golf Scramble will be held on the 19th, followed immediately by the garden party and Regimental Assemblies. The Armor Conference itself will kick off on the 20th. We have added a half day to the presentation schedule, so you can expect to receive two full days of briefings/discussions prior to our adjournment late on the afternoon of the 21st.

The Armor Center looks forward to welcoming an estimated 800 guests from locations all over the world. It's interesting to note that each year we see an increase in the attendance of soldiers and officers from allied nations. This is a testament to the quality and content of our conference presentations, and this year will be no exception. Numerous government contractors will once again set up displays in Skidgel Hall giving everybody the opportunity to see the latest military equipment and next-generation training devices. The planning and preparation for this event is enormous, and our continued success can be attributed to a post-level effort involving hundreds of people. I extend my heartfelt thanks to all those responsible for the presentations, social activities sponsored by the Armor Association, and overall support provided by the Fort Knox garrison. I encourage everyone to attend this first-class Armor Center symposium.

Past armor conferences have focused on emerging technologies, new equipment, digitization, and ever-changing mission requirements. The U.S. Army mounted force has the best equipment, the most highly-trained soldiers, and the most effective training programs in the world. All of our technology and new equipment is useless if not for our most valuable asset: well-trained, well-led, combat-ready soldiers. Thus, "leadership" will be the focus during the 49th annual Armor Conference with a theme entitled "The Mounted Leader Today and Into Tomorrow."

The Armor branch has produced some of the Army's most visionary leaders. Notable historical figures, such as Chaffee, Walker, Patton, Abrams, and Sullivan, were able to inspire and lead soldiers at all levels throughout some of the most turbulent times in our nation's military history. Periods of dramatic change, introductions of new equipment and technology, and changes in organizational structures were significant challenges for them to overcome. We find ourselves in the same situation today. If the Armor Force is to continue a tradition of excellence, today's leaders need to exercise the same qualities and foresight as those in the past have demonstrated. Today's leaders must not only be visionary, but also infused with the warrior spirit. In a peacetime Army, management skills are often those most recognized and rewarded. It is much harder to distinguish the true warrior leaders from those that are simply managers. It is our warrior leaders, who can capably lead soldiers and manage resources in peacetime, who will win our future battles and wars.

This is the challenge I pose to you: we must do everything in our power to attract, develop, and retain the best soldiers and officers who will lead the Armor Force into the next century. Technological advances and new equipment fielding are important, but we must not overlook some of the basic fundamentals of soldiering. We must recreate an environment where inspirational leadership, technological competence, and the warrior spirit can permeate throughout our force. We've seen what future conflicts and missions will look like, and we've seen that the small-unit leader with boots on the ground is the most important facet of a military operation. The speakers who will deliver Armor Conference presentations will include our senior armor/cavalry leadership and the senior leadership from the Infantry, Aviation and Artillery Schools, and each is cognizant of the fact that effective leaders will make or break our Army.

I highly encourage you to attend this event. I guarantee you will leave Fort Knox with a better understanding of the challenges we face, and with a shared vision of where we, as a mounted force, need to focus our efforts. See you at the Conference!

DRIVER'S SEAT

Repairing and Raising the Bar:
FM 17-12-1/-2 Revision

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

As you read this article, the new 17-12-1/2 is at the printer. In January, it went out to the force on disk. The manual has been improved as a training tool, and will make gunnery training more challenging. The bar has been repaired and raised a bit; more importantly, this manual sets the stage for raising the bar much higher over the next three years. It is an interim manual only; within three years, separate gunnery manuals for M1A1 and M1A2-series tanks must be published. These manuals must change gunnery training standards radically, to take even further advantage of our killing and training systems.

This manual should have been revised in FY 96. There has been a real need to combine M1, M1A1, and M1A2 gunnery into one standardized gunnery program. Once begun, the revision involved more input from the field than has been usual in the past. A Master Gunners' conference (the first in several years) was hosted by Crew Gunnery Doctrine Branch in November, 1997, and the presentations and discussions involving Master Gunner Branch, III Corps, USAREUR, U.S. Marines, and Army Reserves/National Guard were very useful in resolving issues and identifying critical updates and revisions. To all involved in the conference, thanks for helping the entire force. To our "stuckees" for this new manual, especially MSG Delabar, SFC Lipsey, and SSGs Pease and Machell: "Well done." Now, get back to work.

Following are the significant changes:

- Standardized Tables added for all Abrams tanks that incorporate up to four targets in an engagement.
- Delayed target presentations (between 10 to 25 seconds).
- All M1A2 gunnery employment techniques added.
- New scoring procedures developed. The same scorecard is used for the M1A1 and M1A2 tables (only the points for given times are different), which eliminate the need to use the old charts (times/points ON the score-

card). Once trained, you will find it much easier to use in the tower.
- Added requirement for IVIS/Digital traffic (for those vehicles so equipped) to qualify tank tables. A digital contact report must be sent after each engagement. Crews that lose the digital link during the engagement may complete the engagement, then pull off for maintenance. IVIS competency is a core crew competency and must be reinforced during Tables IV, VIII, and XII.
- New crew penalty for "not adhering to conditions:" 0 points for the engagement. No more "30 point for crew cut" for cheating. You lose the engagement.
- 30 point penalty for not engaging all targets in an engagement.
- 10% penalty from the TOTAL SCORE for killing friendly targets on TT XII.
- Minimum and maximum lateral spread for targets implemented. Based on range of targets, the goal is that two targets cannot be acquired in 10 pwr.
- Added "screening under extreme conditions" that gives guidance, tank-to-target range, and the target dimensions from 500m to 1500m in 100m increments. Intent is to use this information only when conditions make it impossible to screen normally, and should not be used because they might make screening "easier."
- Weapon planning for 120mm main gun increased from 2000m to 2500m. This advantages the increased killing distance of the gun when planning engagement/displacement.
- Deleted requirement to remove/install the breechblock on TCGST. Station 5 requirements are now: clearing the gun, function check, firing pin check, and firing circuit check.
- Eliminated stations 11, 12, 14, 15, 16 from the TCGST. They are performed in the UCOFT. Eliminated station 13, because it had nothing to do with vehicle/crew safety.
- Updated the COFT/AGTS prerequisites for live-fire training.
- Allows COFT/AGTS to be used in place of TT I through III. Specifies the

engagements which can replicate the tables. Units should still prefer to use the tables in order to train crew interaction on the actual platform.

Six additional improvements were made in this new manual:

- A screening test action checklist was added to guide "tower talk" during screening.
- Boresighting and zeroing techniques were added for tank-mounted machine guns.
- Chapter 4 (Fire Control System Calibration) and Chapter 5 (Screening Test) were combined into a new Chapter 4 (Fire Control System Calibration and Maintenance) for M1, M1A1, and M1A2 tanks.
- TCGST roll-up sheets were added for individual, platoon, and company.
- Tactical tables have been placed back in the manual.
- An Appendix B replaces FM 17-12-7, *Tank Combat Training Devices*.

The Chief of Armor has given us three years to devise new gunnery training standards and techniques. Future tank tables must test armor crewmen on their gunnery, tactical, and information management skills. Tactical Gunnery Training must eliminate canned scenarios and predictable engagements. Firing ranges, as well as vehicles, must be completely digitized. Alibis must be eliminated, and crews required to "fight through" malfunctions. The qualification "battlefield" must require target acquisition and engagement "beyond the fenders" (let's try spreading arrays out to the rear fenders) using TWGSS. This raises the possibility of two or more TTVIII qualification runs, one using TWGSS, in order to increase acquisition/engagement spread while ensuring safety. While there must be Armor-wide tasks (engagements), the range scenarios must be unit METL-driven; there should be several versions of TT XII, for example.

That should keep Crew Gunnery Branch busy for three years. Our force will benefit, especially if our entire force participates in the process.

Executing The Defensive Counterreconnaissance Fight

by Lieutenant Colonel (P) Chris Baggott

A successful defense depends on finding, targeting, destroying, or suppressing the enemy reconnaissance assets before they can report the unit's defensive positions.

FM 34-2-1

Security operations obtain information about the enemy and provide reaction time, maneuver space, and protection to the main body ... counterreconnaissance is an inherent task in all security operations.

FM 17-95

Counterreconnaissance is the sum of actions taken at all echelons to counter enemy reconnaissance and surveillance efforts through the depth of the area of operations. It is active and passive and includes combat action to destroy or repel enemy reconnaissance elements.

FM 17-95

Recent studies conducted by the Armor Center, TRADOC, and the RAND Corporation, as well as Combat Training Center (CTC) take-home packages, indicate that serious weaknesses exist in counterreconnaissance doctrine, organization, and training. There is a growing belief throughout the mechanized community that these weaknesses are solvable through a more focused reconnaissance and counterreconnaissance planning effort. Clearly, force-on-force results from the National Training Center (NTC) continue to be the catalyst behind these beliefs. This paper provides a conflicting opinion regarding procedures to resolve this perceived training shortfall. It emphasizes that security operations execution, discipline, and enforced standard operating procedures, vice increased planning or a revision of doctrine, will achieve required training standards.

A Typical NTC Battle and Synopsis:

Training Day (TD) 4, 1300 hours: 1st Brigade, 99th Division (BLUFOR) had just completed executing a movement to contact against the opposing force's (OPFOR) 32nd Guards Motorized Rifle Regiment (GMRR) in the NTC's central corridor. The brigade attack began at Hill 720 with movement oriented from east to west. Based on templated BLUFOR and OPFOR movement rates, it was anticipated that first contact would occur somewhere in the vicinity of Phase Line (PL) Red (vicinity Barstow Road). 1st Brigade reconnaissance forces identified the lead OPFOR motorized rifle brigade (MRB) formation approximately 20 kms west of PL Red (vicinity Crash Hill). The OPFOR's orientation focused at two predominant choke points (Brown and Debnum passes). The lead elements of both units gained contact at Hill 876. Although 1st Brigade fought tenaciously, the results were similar to many other NTC fights: a victorious OPFOR and a defeated 1st Brigade. Within minutes after the end of the battle, 1st Brigade was given a follow-on mission to conduct a defense in sector that included both the NTC's northern and central corridors. The 52nd Division (the NTC's notional higher headquarters) anticipated that the brigade would have approximately 36-40 hours to plan and prepare the defensive sector.

TD 4, 1700 hours: After a hasty mission and course-of-action analysis, a subsequent wargame, and leader's reconnaissance, the 1st Brigade commander issued guidance to his subordinate commanders. TF 1-2 (AR) would defend the central corridor while TF 3-4 (IN) (-) would defend the northern corridor. One armored team from TF 3-4 was designated the brigade reserve. Both task forces were responsible for counterreconnaissance operations in their designated sectors. Task force scout platoons were placed under the control of the brigade S2 and were positioned forward of the task forces with the mission of providing early warning of enemy reconnaissance forces prior to the maneuver battle, and to focus indirect fires during the battle.

TD 4, 2000 hours: TF 1-2 designated A Team (mech) as its counterreconnaissance force with a subsequent mission as the task force reserve. A Team established its counterreconnaissance positions along PL BLUE (Granite Pass to just west of Chod Hill). Fourteen combat systems were spread north to south along a frontage of approximately 10 kms (800-900 meters between vehicles). TF 3-4(-) also identified one mechanized infantry team (B Team) as its counterreconnaissance force, also with a subsequent task force reserve mission. The B Team (mech) commander positioned his forces along PL BLUE (vicinity Echo Valley from Granite Pass to Refrigerator Gap).

TD 6, 0600 hours: The 32 GMRR attacked. Both division and regimental reconnaissance forces had easily penetrated 1st Brigade's counterreconnaissance screen line during the previous two days. The OPFOR commander essentially had a 90-percent accurate read of the BLUFOR defenses. With limited forces to conduct the mission, the 1st Brigade had decided to economize his defensive preparation efforts along the north wall of the central corridor. Needless to say, the OPFOR commander fully understood the inherent weakness of the BLUFOR defense and attempted to exploit it. An MRB-size forward detachment (FD) was organized from available OPFOR assets and was given a terrain-oriented mission focused at Hills 876

and 780. Fundamental to this FD terrain objective was the implied task to fix (prevent BLUFOR maneuver against the regimental main body) BLUFOR forces in that proximity. Simultaneously, as the FD attacked in the south, the 32 GMRR main body attacked along the central corridor's north wall.

TD 6, 1000 hours: Change of Mission. The 1st Brigade defensive sector has been penetrated and two MRBs are consolidating on the OPFOR objective. The AAR will begin in six hours.

BATTLE ANALYSIS

OPFOR:

The success or failure of the OPFOR's attack against a defending enemy is always predicated upon the success of the reconnaissance effort or, to use a non-doctrinal term, the success of the OP-FOR's "reconnaissance pull." Recon-naissance pull emphasizes identifying and exploiting enemy weakness. This reconnaissance technique determines movement routes suitable for maneuver through an analysis of enemy disposition and composition and "pulls" the main OPFOR attacking force along the path of least resistance. Generally speaking, the OPFOR will never be able to mass suffi-cient combat power in accordance with doctrinal norms to attack a typical BLUFOR defense. At a minimum, the OPFOR commander would expect to have an overall 3:1 superiority when at-tacking a prepared BLUFOR defense. More importantly, and key to the focus of OPFOR reconnaissance efforts, is that, at the point of penetration, the OP-FOR expects to achieve a positional 9:1 force ratio advantage. The reality of the NTC is that, at best, numerical parity be-tween competing forces (BLUFOR de-fense to OPFOR offense) has become the standard. Thus, to gain situational numerical superiority at the point of penetration, the OPFOR commander is forced to attack on a narrow front. From the above discussion, it is obvious that OPFOR success is undeniably linked to its reconnaissance effort. When OPFOR reconnaissance fails, the OPFOR com-mander will be unable to identify the points or point of penetration and focus his combat power. Simply speaking, without adequate intelligence (a mini-mum read of 90 percent of the composi-tion and disposition of the BLUFOR de-fense), the OPFOR commander is forced to fight the complexity of a deliberate defense using a combat formation simi-lar to that he would employ during a regimental meeting battle.

Back to our example. Two nights prior to the OPFOR attack, divisional recon-naissance forces attempted to move through the BLUFOR defensive sector. Granted, continuous training and a thor-ough understanding of terrain is an un-disputed OPFOR advantage.

Starting at dusk, division reconnais-sance troops begin probing the BLUFOR defense, looking for possible holes along the counterreconnaissance line. The OP-FOR effort is staggered over time (wave technique) and not all reconnaissance troops will begin moving at dusk. Some will begin at midnight and others in the early morning. This is done, simply, to provide a continuous reconnaissance push with the belief that some time dur-ing the night some or all of the counter-reconnaissance troops will become less effective (sleep deprivation, loss of focus and situational awareness). In this case, by first light on TD 5, 50 percent of di-vision reconnaissance were on their re-spective reconnaissance objectives and 50 percent were dead. Throughout TD 5, division reconnaissance accurately re-ported the disposition and composition of each BLUFOR defensive position.

Regimental reconnaissance initiated movement at dusk TD 5. As regimental reconnaissance moved into the BLUFOR defensive sector, remaining division re-connaissance moved through the BLUFOR rear area. No link-ups or ex-change of information between recon-naissance forces occurred. Based upon the movement success of division recon-naissance the night before, regimental reconnaissance would use near-identical movement routes. Similar to the pre-vious night, regimental reconnaissance was 50 percent effective in passing through the BLUFOR defense enroute to their assigned reconnaissance objectives. Since the OPFOR reconnaissance plan assumed less than 100 percent success, there were sufficient redundant person-nel and systems to cope with a 75 per-cent attrition rate and still be capable of achieving the reconnaissance objectives.

The success of the reconnaissance ef-fort set the conditions for the OPFOR commander to exploit inherent BLUFOR weaknesses. The knowledge gained from division reconnaissance enabled the OP-FOR battle staff to identify the exact point of penetration. It also allowed the systematic and focused use of combat multipliers (artillery, close air support, EW, etc.) either to isolate or destroy en-emy forces at the point of penetration. To see the enemy in order to maneuver effectively against him, and ultimately destroy him, is not solely linked to the

reconnaissance effort. Prior to the mis-sion, the OPFOR commander refined the enemy situational template and con-ducted a thorough leader's reconnais-sance. These efforts enabled him to un-derstand the nature of the terrain in his area of operation and gain an apprecia-tion of the enemy that he would face. Not only did this allow him to develop an effective scheme of maneuver, it pro-vided focus to his reconnaissance, secu-rity, and direct and indirect fire plans that supported the maneuver plan. Thus, through effective reconnaissance, the OPFOR commander methodically either refined or discarded potential operational plans, branches, and sequels.

BLUFOR:

Simply speaking, successful counterre-connaissance will enable BLUFOR units to gain and maintain both initiative and maneuver dominance. Without question, most BLUFOR commanders generally understand the linkage and importance of the counterreconnaissance effort in achieving operational success in any de-fensive battle. Historically, however, most BLUFOR planning efforts are fo-cused on the close battle and, to a certain extent, the deep fight. Habitually, BLUFOR units will designate a counter-reconnaissance force from available ma-neuver units. Yet, there may or may not be any linkage to the overall BLUFOR reconnaissance and surveillance plan. Task force and brigade assets may work independently from the counterrecon-naissance force. During this specific NTC battle, the BLUFOR commander organized his defensive sector into three, almost mutually detached, specific com-ponents: reconnaissance and surveil-lance, counterreconnaissance, and the main battle area.

The brigade S2 conducted the intelli-gence preparation of the battlefield (IPB) analysis process and determined what specific intelligence had to be collected to answer the commander's critical in-formation requirements (CCIR). This IPB analysis resulted in the reconnais-sance and surveillance (R&S) plan, which attempted to integrate reconnais-sance forces into the overall intelligence-collection effort. Further, the R&S plan assigned specific intelligence acquisition tasks to specific units for action. During this battle, the R&S plan clearly identi-fied five named areas of interests (NAIs). The NAIs were designed to de-termine OPFOR avenues of approach through key maneuver choke points. Task force scouts, combat observation laser teams (COLTs), ADA scouts, and

minimum maneuver forces were integrated into this effort.

The brigade plan specified that each task force was responsible for counterreconnaissance within its assigned sector. TF 1-2 (AR) was designated A Team, while TF 3-4 (IN) was designated B Team. Additionally, both teams were designated as their respective task force reserve. Both A and B Teams assumed the counterreconnaissance line just prior to dark, thus no coordination occurred with forward brigade reconnaissance forces. A and B Teams maintained a 50 percent sleep plan. The rest of the brigade behind A and B Teams prepared orders and waited for first light to place obstacles and prepare fighting positions.

In addition to infiltration, OPFOR reconnaissance will conduct route reconnaissance for the subsequent main regimental body as well. BLUFOR reconnaissance, however, rarely conducts route reconnaissance. Instead, their focus is strictly infiltration (avoiding contact at all cost, penetrating enemy defensive positions and movement to a predetermined observation point). Throughout both nights prior to battle, OPFOR reconnaissance forces attempted to move throughout the enemy defensive sector.

Though detected at times, the OPFOR effort was largely successful. Since the BLUFOR counterreconnaissance effort was linear, all that the OPFOR was required to do was to penetrate the thinly held counterreconnaissance screen lines. At night, most of the rest of the brigade was asleep. Additionally, since both A and B Teams were alert at night, they were required to rest during the day. They conducted limited planning and virtually no rehearsals as the brigade reserve force. The BLUFOR commander's OPFOR defeat mechanism, his reserve, was unprepared to conduct its mission. Needless to say, during the battle, the reserve was neither at the right place, nor available at the right time, to support the BLUFOR plan.

An isolated battle at the NTC? Not really. Unfortunately, more and more times this has become a training standard. It doesn't have to be. Simple adjustments of counterreconnaissance and reconnaissance tactics, techniques, and procedures could remedy this training shortcoming.

Doctrine

An analysis of division through company doctrinal publications shows that the term or the mission of counterreconnaissance is rarely found. The logic behind this is simple. Counterreconnaissance, in and of itself, is not a mission. Rather, it is a component of defensive security operations. *FM 71-3 (Armored and Mechanized Infantry Brigade), FM 71-2 (The Tank and Mechanized Infantry Battalion Task Force),* and *FM 71-100 (Division Operations)* discuss the importance of countering enemy reconnaissance and surveillance efforts. It is a continuous process that is conducted throughout the depth of the assigned area of operations. Further, security operations consists of three distinct tactical operations: screen, cover and guard. The size and composition of the security force, and what type security operation is to be conducted, is always dependent on the commander's estimate, as influenced by the factors of METT-T. The concept of enemy information denial, or counterreconnaissance, is an integral aspect, or enabling task, in each of these missions. The type of security operation to be conducted is based upon the orders received, the commander's estimate, and how it is influenced by the factors of METT-T. Counterreconnaissance, in and of itself, is little more (though it may become a critical aspect in ultimate mission success) than a tactic or technique employed during security operations.

The genesis of BLUFOR security problems in either the offense or defense can be linked directly to poor planning, development, and execution of the security area. Frequently, BLUFOR units will task one or two companies/teams as the counterreconnaissance force, perhaps task-organize scouts, engineers, and COLTS with them, and assume that they have solved the enemy reconnaissance problem. In reality, what has actually occurred is the development of a linear "counterreconnaissance screen line" and the implied belief by the remainder of the brigade that they are relieved of any security or force protection operations. The OPFOR has simply to penetrate this screen line (a relatively easy task when you echelon the OPFOR reconnaissance effort over time) since the remainder of the BLUFOR is normally fast asleep.

When the situation is reversed, the success of the OPFOR counterreconnaissance effort rests with the universal clear understanding that security operations are everyone's responsibility, are continuous, and are fought throughout the depth of the defensive sector. Woe be it to an OPFOR leader, soldier, or unit who permits a BLUFOR reconnaissance force to penetrate any defensive position. Additionally, OPFOR counterreconnaissance tactics are not isolated to limited

visibility operations. During daylight, there is a incessant effort by the organization to identify, isolate, and eliminate any reconnaissance forces that happened to infiltrate the defensive sector. EW assets focus on identifying enemy reconnaissance radio transmissions. Heliborne forces, in concert with the ground maneuver commander, will patrol potential key terrain observation points in order to identify and ultimately destroy enemy units. Active dismounted patrolling occurs throughout the defensive sector. The OPFOR tactical operations center, under the direction of the chief of operations (OPFOR S3), manages the entire effort while planning and preparation for the next battle is conducted simultaneously. The synergistic effect of this combined effort will normally lead to one of two potential outcomes: the elimination of any BLUFOR reconnaissance threat or rendering the BLUFOR reconnaissance effort ineffective.

If a BLUFOR unit loses the counterreconnaissance battle with the OPFOR, the loss begins almost immediately after the conclusion of the last fight. The BLUFOR is most vulnerable to OPFOR infiltration and reconnaissance during the period immediately after change of mission (COM). BLUFOR units are guaranteed that, immediately after COM from the last fight, they must reconstitute (unit or individual), attend an after-action review (AAR), and prepare for a follow-on mission. Preparation for the follow-on mission includes both the planning for the maneuver fight and the counterreconnaissance battle, as well. Yet, there are techniques available to satisfactorily complete planning for the subsequent operation, reconstitute, and execute security operations simultaneously.

Planning the Security Fight

The normal counterreconnaissance technique employed (evident in the example given) by a rotational brigade conducting a defense at the NTC is to identify either a tank or infantry team as the security force. The team may be reinforced with additional combat, combat service, and combat service support assets. Normally, this team is also tasked as the brigade reserve. The brigade commander's final OPFOR defeat mechanism conducts security operations at night and is expected to rehearse as the brigade reserve during the day. Obviously, from a time management perspective, to satisfactorily complete one of these two tasks to standard is difficult,

but to expect that both can be mastered is absurd. Yet, we continuously relearn the same lessons. Perhaps the most telling systems failure is what this process tells the rest of the command indirectly: "A Team is solely responsible for counterreconnaissance." What this translates to are an unrehearsed reserve and a strong but shallow security crust. Once you are through, everyone else is fast asleep. What will further exasperate the problem is that the team identified as the counterreconnaissance force may or may not have conducted home station training in this capacity. OJT (on the job training) is normally not a good training technique at any of the three CTCs.

A technique to get through this security dilemma is not to identify a counterreconnaissance force in the first place and to attempt to ingrain the attitude within the command that security and force protection is continuous and everyone's responsibility. Consider that the execution of security operations is inherent in any defensive operation and the supporting task of counterreconnaissance will follow logically the exploitation, pursuit and consolidation phases of an offensive operation, or counterattack or consolidation in the defense. Planning for counterreconnaissance thus becomes a follow-on phase of an ongoing operation.

A tremendous guide to assist in the development and planning of the counterreconnaissance task is *FM 34-2-1 (Tactics, Techniques and Procedures (TTP) for Reconnaissance and Surveillance and Intelligence Support of Counterreconnaissance).* The title of the manual may be misleading. It does not, in fact, furnish counterreconnaissance TTP. Rather, it is a guide in the development of the R&S plan as a mechanism to focus security operations in general, and the conduct of counterreconnaissance specifically.

The key point is that the planning for security operations, and the enabling task of counterreconnaissance, logically flows at the conclusion of the immediate operation and its execution is, in fact, the operational linkage to any subsequent mission. Planning in this manner eliminates the concern or predicament that the unit will be forced to execute security operations without the benefit of either a mature or rehearsed plan. Granted, the battlefield conditions anticipated at the conclusion of the maneuver battle may not hold true, but the organization will have at least a 60 percent security plan ready for execution. A few adjustments to the plan may be all that is necessary to achieve a more acceptable 80 percent solution. Perhaps even more germane to this discussion, a security operations SOP, similar to that of the OPFOR, that follows the completion of any offense or defense, may rectify this potential battle dynamics dilemma.

As a unit transitions from the offense to the defense, the higher headquarters will normally provide defensive sector graphics. This may be little more than a forward and rear boundary and left and right limits. The brigade will assign task force sectors and the task force will assign company/team sectors or battle positions. This minimal information is more than enough to develop the unit's security plan. Within the various defensive sectors, a combination of security and defensive preparations should occur. Clearly, the unit must prepare its defensive positions skillfully, and must anticipate the threat of both day and night enemy reconnaissance movement.

Mounted and dismounted patrolling must be integrated into the entire effort. The task force and brigade command posts orchestrate the entire effort. Heliborne, EW, ADA, and indirect fires are integrated into the operation. Forward of the task force sector and well within the range of supporting indirect fire systems, scouts (to include COLTS, ADA, and engineers) are focused at potential infiltration movement routes. Care must be taken not to over-task these limited scouting resources.

Commanders must prioritize and curb their named area of interests (NAI) appetite. Specifically, a task force scout platoon cannot effectively monitor more than two or three NAIs. More often than not, there has been a tendency at the NTC to task a single scout platoon to observe in excess of five NAIs at any one time. The effect of this tasking is that none of these NAIs will be observed effectively. Additionally, to enhance effectiveness, NAIs must be developed and issued with a specific task and purpose.

Too often, BLUFOR scouts will go forward armed with little more guidance than to observe a piece of terrain. Terrain is important only in respect to what it could afford enemy or friendly forces. For example, when a scout is tasked to observe a critical maneuver choke point NAI, he must be able to identify and observe both TAIs (target area of interests) and triggers within the NAI. Additionally, the scout must have a redundant communications capability in order to work through any enemy jamming.

There are numerous other tactics and techniques that can be integrated into the overall security effort but the impact remains the same: an inherent awareness throughout the command of the importance of security operations, counterreconnaissance throughout the depth of the defensive sector, centralized command and control, and decentralized execution of the combined effort. In our example, the intricacies of security have been integrated as a logical concluding (phased) operation of an ongoing mission, and can yet be further refined to become little more than a task force or brigade SOP.

Training Implications

• **See the Battlefield** — *FM 100-5* (Final Draft, 5 August 1997) states that when conducting operations, Army forces must perform five fundamental actions when applying military power: see, shape, shield, strike, and move.[1]

Seeing is more than understanding your own capabilities and limitations, but it involves understanding those of the enemy as well. Unit commanders at all levels must understand basic enemy doctrine and tactics. This is not the sole responsibility of the military intelligence community. Commanders will often spend numerous hours developing ground maneuver courses of actions without a full appreciation of enemy capabilities or constraints. Tactical maneuver (OPFOR or BLUFOR) can be viewed as little more than the application of common sense to the terrain. Units should wargame against an uncooperative enemy. Too often during a war game, a course of action will be accepted without a full appreciation of the enemy. The brigade or battalion S2 (if he plays the enemy commander during the wargame) can be easily and often discounted by an energetic S3 or commander. The key point is that it is the responsibility of the unit commander to be well versed in enemy order of battle, doctrine, and potential tactics.

• **Visualize, Plan and Prepare Security Operations Throughout the Depth of the Defensive Sector.** Commanders should avoid the operational pitfall of executing a linear security or counterreconnaissance plan. This falls into the category of "easy say, hard do." The framework of the defense includes deep operations forward of the FLOT, security operations throughout the area of operations, the main battle area, reserve and rear operations. Too often as an organi-

zation, we will become completely focused on defensive preparations in the main battle area and give limited guidance and time to security and force protection responsibilities. In terms of an effective defense, these tasks must be more in balance. Command posts must be able to battle-track not only the preparation of the defense, but security operations as well. Security is an operational requirement and not the sole domain of the unit S2. Additionally, the use of scouts as a counterreconnaissance force must be weighed carefully against the mission and available resources. Often, scouts involved in counterreconnaissance will not be alive during the deep or main battle area fight. If the commander's operational plan includes scouts focusing indirect fires deep, consideration must be given regarding any additional tasks scouts can be expected to complete to standard during the security fight.

• **Simplicity is a Combat Multiplier.** We, in the Army, have institutionalized a common belief that any complex problem can be solved through better and more focused planning. Some suggest that the method to resolve the issue of faulty security execution is through the identification of an additional staff officer (chief of reconnaissance) to manage the task and the development of a reconnaissance order (to be planned prior to the subsequent mission order). They look at the OPFOR's regimental chief of reconnaissance as an example of this process. Not only are they wrong about the OPFOR, they are wrong about the creation of another staff agency or agent to execute the task and, most importantly, they have added more complexity to the issue. The OPFOR's chief of reconnaissance is the BLUFOR's brigade S2 by another name. They forget that the OPFOR has had the opportunity to plan each battle's reconnaissance and surveillance prior to the start of the maneuver rotation. They forget that the OPFOR is not only familiar with the terrain but practices its trade constantly. Granted, in terms of planning or execution, many security lessons can be learned from the OPFOR. But, to suggest that the solution to poor security operations is to further increase our planning efforts and institute another staff planning layer is, frankly, absurd. The answer to the task of counterreconnaissance is an awareness that security operations should be planned as the final phase of any operation (understanding that the plan will not be perfect and will have to be adjusted to comply with battlefield realities), that

the burden of counterreconnaissance belongs to the entire organization and must be conducted continuously throughout the depth of the battlefield, that it is managed by the unit commander and his battle staff (certainly not the domain of the S2), and that whenever possible it is conducted in accordance with established unit SOPs.

• **Rehearse, Sequence, and Resource the Security Effort.** The rehearsal is the most important part of the deliberate planning process, period. It is the last opportunity for the unit to deconflict, cross-check, and prepare. This statement will more likely than not cause an uproar with all clipboard-wielding OCs (observer/controllers) and planning zealots who have convinced themselves that if something tactical is broken, the key to its fix is more planning. I won't belabor the point. Unfortunately, the issue remains that we have a tendency to rehearse the battle through the task of offensive or defensive consolidation and reorganization and rarely expend any effort in follow-on security operations. Viewing security operations as the natural linkage that is sequenced between the last battle and next battle to be fought will ensure that you have at least a preliminary plan to execute, and if necessary adjust. Additionally, don't forget your combat multipliers. Orchestrate the effort with indirect fires, EW assets, ADA, logistics, etc. Have enough redundancy in the plan so that when a key unit or individual is not available (AARs, reconstitution) another can take his place.

• **Force Protection.** Don't ask your soldiers to do something in training that you wouldn't ask them to do in combat. CTC gamesmanship should be highly discouraged, and our leadership should always be on the lookout for it. Scouts positioned forward of the FLOT should be in range of friendly indirect fire systems. This includes not only those conducting ground infiltration, but also those conducting air insertions. Also, consider the duration of the mission assigned and the methodology to sustain and evacuate that force. More germane to this discussion is the fact that there is a direct correlation between force protection and how the unit conducts the task of counterreconnaissance that denies friendly information to the enemy. An effective security operation will take the initiative away from the opposing commander. The success or failure of the reconnaissance effort, regardless of the competitor, will normally predict the outcome of the imminent battle. Specifi-

cally, in this example, reconnaissance failures will force the OPFOR to attack under unfavorable conditions and will intensify overall BLUFOR survivability.

• **SOPs, Battle Command and Battle Tracking.** *FM 25-100* states that all activities within an organization should be conducted within a "band of excellence." Essentially, this performance band dictates that a unit should strive for the consistent "80 percent" product rather than attaining only a few 100 percent and many failures. Clearly, time is the limiting factor that prevents consistent excellence in all areas. Despite what is in our training doctrine, the environment of the CTCs have invariably placed units in the position of performance peaking only during the maneuver battle. At COM, key leaders are expected to participate in AARs from platoon level on up, conduct unit and individual reconstitution, decontaminate if necessary, and prepare for the next fight that will undoubtedly come within the next 48 hours. This period of time, from COM to the time that a unit is prepared to execute a follow-on mission, will often approach 12 or more hours. This cycle is also the time that a BLUFOR unit is most susceptible to OPFOR reconnaissance and infiltration. To solve this training problem is not necessarily easy, but it can be fixed. First, it must be universally accepted in the unit that the S2 can certainly facilitate conducting the task of counterreconnaissance, but security operations is everyone's responsibility. In the OPFOR, security is a command function. Battle-tracking of the security mission is conducted on the chief of operations (unit S3) situation map. There is a continuous dialogue throughout the security fight between the OPFOR commander and his subordinates. The entire unit is aware of its counterreconnaissance responsibilities, and with religious fervor comply with the unit security SOP. Enemy reconnaissance forces are tenaciously tracked, hunted down, and killed. While the leadership of the OPFOR is conducting AARs and other tasks, battle captains monitor and manage the security effort. The key to successful security operations resides in disciplined forces, focused battle command, simple but achievable plans, and battlefield awareness.

Concluding Thoughts:

Care must be taken not to take CTC battle results and assume that they are

OPFOR Counterreconnaissance At the National Training Center

by Captain Richard Randazzo

The success or failure of most National Training Center battles is determined long before the main combat forces leave the line of departure. An attacking force with good intelligence can effectively plan and maintain the initiative, while a poor intelligence effort often leads to haphazard planning and a blind, ineffective attack. With this in mind, the OPFOR places a fundamental emphasis on detecting and destroying the attacker's reconnaissance effort. This article will describe how the OPFOR conducts effective counterreconnaissance screens in order to provide ideas for BLUFOR commanders to refine the execution of their own counterreconnaissance missions, and to provide BLUFOR commanders with some techniques to defeat the OPFOR screen line when attacking. This article addresses each element of the Battlefield Operating Systems (BOS) and explains their synchronization within the OPFOR Motorized Rifle Battalion (MRB) counterreconnaissance effort.

Situation

Once a mission is received, the MRB commander, the MRB executive officer (XO), and the Motorized Rifle Regiment (MRR) scout platoon leader, will conduct a combined map reconnaissance to determine possible scout avenues of approach, possible support-by-fire positions, probable kill sacks, and positions for OPFOR vehicles. If time permits, the MRB commander, executive officer, and scout platoon leader will conduct a joint area reconnaissance to confirm or deny their initial map assessment. Once this initial planning stage is complete, and his intent for the counterreconnaissance battle is fully understood, the MRB commander will focus on preparing the main defense, and the MRB XO will assume responsibility for the counterrecon fight.

During the subsequent operations order, the MRB XO will issue the concept and intent of the counterreconnaissance

operation, including proposed locations, requirements for closing lanes in obstacle belts, and guidance for patrolling obstacle belts. The scout platoon leader will then brief his vehicle locations, which positioned themselves after the initial planning session, providing eight-digit grid locations, as well as task and purpose for each scout vehicle. He will also provide the scout platoon radio frequencies, engagement and disengagement criteria, and any newly gathered intelligence.

The MRB XO will generally position the Counterreconnaissance Patrol (CRP), consisting of three BMP2s and two BRDMs, in ambush positions along probable mounted infiltration routes 800 to 1,000 meters in front of the MRB tactical obstacle belt. The XO will also incorporate AT-5 and air defense systems into the MRB counterreconnaissance plan, placing them on key terrain near the MRB reserve/quick reactionary force. In addition to the MRB assets positioned by the MRB XO, each MRC will position its own individual screen line consisting of one T-80 tank and two BMPs 100-200 meters behind the tactical obstacle belt in the main defensive area.

The MRB creates a substantial four-belt counterreconnaissance screen with scouts, CRP vehicles, MRC screens, and AT-5s in position. Although each of these counterreconnaissance forces must also prepare defensive positions for the main battle, the OPFOR commander understands that denying enemy reconnaissance is the key to victory, and therefore, that is where he weights his defensive effort.

Command and Control

The MRB XO commands and controls the counterreconnaissance fight from his BRDM. This gives him the flexibility to quickly reposition himself and provides better communications than a tracked

vehicle. The enhanced communication proves vital to the XO as he must monitor both the scout's intelligence net and the MRB command net. As scouts send reports on the intelligence net, the MRB XO coordinates between the four counterreconnaissance belts on the command net, ensuring positive hand-off of enemy forces. If necessary, the XO will instruct the scout platoon to coordinate directly with a killer team, but he will continue to monitor and control the entire effort. All vehicles send spot reports on the command net to ensure attachments monitor the proceedings, but all engagements occur on internal frequencies.

To further facilitate command and control, the XO issues a specific task and purpose to each belt of the counterreconnaissance effort. Scouts are the forward eyes and identify and report approaching enemy vehicles, engaging the enemy only in self defense. Scouts will maintain visual contact with enemy vehicles until positive hand off occurs with the CRP or MRC screening forces. The CRP assumes responsibility of the enemy forces from the scouts and if it is capable, destroys them. If the force is too strong for the CRP, it will pass the enemy back to the tanks in the MRC screen line. The MRC screen line will then engage to destroy the enemy force before it locates the defense's main obstacle belt.

Positive hand-off between each reconnaissance belt is essential to help eliminate fratricide. Therefore, the OPFOR will conduct detailed counterreconnaissance rehearsals at the MRB, MRC, and MRP levels. These rehearsals stress the initial identification of the enemy vehicle and the tracking of that vehicle until it is destroyed.

Fire Support

During the planning process, the XO and the scout platoon leader plan illumination and HE targets. As the scouts and

CRP deploy following the initial planning process, they will confirm or adjust each target. They will also place VS-17 panels with chemical lights at the grid of each artillery target to further facilitate effective calls for fire.

Once the counterreconnaissance battle begins, the scouts will utilize illumination rounds to provide the CRP easy visual identification of enemy forces. If enemy forces stop, the scouts will destroy them with indirect fires, adjusting from either VS17 panels or chemical light TRPs.

Intelligence

The scout platoon, which consists of vismod BRDMs, BMPs, RKHs, GSRs and ERPs, deploys throughout the depth of sector. It usually sends two BRDMs and two RKHs to attempt identification of the enemy's line of departure prior to the attack. It positions the remaining forces along key terrain covering mounted and dismounted avenues of approach. To maximize the reconnaissance effort and ensure redundancy, each vehicle will also position a two-man dismounted observation post. Scout BMPs generally block mounted avenues of approach or are incorporated into the MRBs counterreconnaissance fight.

Air Defense

Dismounted SA-14 teams are employed on the high ground along the flanks of the main defensive area. Although they position themselves along the probable air mobility corridors, the scout platoon often identifies enemy air assets first; therefore, the ADA SA-14 teams must monitor the intelligence net to ensure they have a common view of the battle with the scouts. The air defense BRDMs will clear possible enemy landing zones and are quickly assimilated into the quick-reaction force/reserve.

Mobility/Countermobility

Both scouts and CRP vehicles emplace protective obstacles to aid in the destruction and detection of the enemy. Wire and mines are usually employed on the OPFOR side of an intervisibility line (IV) or after a turn on a single vehicle trail. Like the main obstacle belt, locations of the protective minefields must be reported higher and incorporated into the MRB's obstacle plan. Additionally, boulders and tank ditches are sometimes used to block the small avenues of approach along the flanks. When obstacles

are utilized, either a scout BMP or a CRP BMP will overwatch the obstacle.

Maneuver

As defensive preparations begin, the MRB commander allocates one third of each MRC's combat power into the MRB's third counterreconnaissance line. Although substantial forces are already forward (scouts, CRP) his maneuver forces must still dig in.

During daylight, one MRP from each MRC will conduct the counterreconnaissance screen while the other MRPs prepare their defensive positions. The screening MRP will identify the CRP vehicles to its front and any friendly scout platoon positions along its flanks. The BMPs dismount their crews and conduct dismounted patrols of high ground that can observe their battle positions.

During limited visibility, the positioning of the MRP screening force becomes critical as battle hand-off between CRP becomes more difficult. Each MRC commander positions his screening force where it can still observe main avenues of approach, but during limited visibility, he also ensures it possesses a clear hand-off from the CRP vehicles. If his sector includes a flank, MRC commanders will reinforce that area, placing two vehicles in a "backstop" position behind the existing CRP vehicle. The third MRP vehicle is responsible for the remainder of the sector and ties in with the flank MRP. All three MRCs will array in this format.

Backstopping the MRP screen lines are the AT-5 assets and the MRB reserve. Usually the OPFOR will place one or two AT-5s on a key piece of terrain to help identify any penetrating enemy vehicles with their thermal sights. The MRB reserve, made up of the MRB commander's tank and BMPs and BRDMs from the MRB, is a flexible force which reacts quickly to any penetrations of the screen line and to any threats in the rear or flanks.

Recommendations

The OPFOR is successful during the counterreconnaissance fight primarily because they echelon their counterreconnaissance forces. Unlike the BLUFOR, the OPFOR involves the entire battalion in the counterreconnaissance fight, therefore increasing the probability of detecting infiltrating forces. The four-echelon structure allows the OPFOR the flexibility to reinforce high-speed avenues of approach without risking other areas.

A second key to the OPFOR's success is centralized command and control. Having one commander who is responsible for the entire counterreconnaissance fight ensures that, not only is the mission planned, rehearsed, and executed, but it is also synchronized at the MRB level and includes all BOS elements.

The OPFOR will usually position the majority of its vehicles to cover the flanks, as they are the most likely infiltration routes leading into a sector. Therefore, "a way" the BLUFOR commander may penetrate an OPFOR screen line would be to infiltrate his scouts down the center of the defender's sector while a tank company attacks one flank. Although the terrain in the center is often open, and may not be conducive to unobserved movement, the BLUFOR will gain the element of surprise where the OPFOR is the weakest. The tank company should provide enough distraction to allow the scouts to penetrate the screen line quickly before they are detected. To improve chances of success in the center sector, scouts should also attempt to infiltrate dismounted.

A second technique to penetrate an OPFOR screenline would be to hold the LD times of infiltrating scouts until after 0200 hours. Although this would not guarantee the OPFOR is asleep, it would increase the chances of being successful.

Conclusion

The OPFOR allocates over 30 vehicles to detect and destroy enemy reconnaissance attempting to penetrate their defenses. Their four-echelon defense is very successful in destroying the enemy's reconnaissance effort. By preventing the BLUFOR attackers from acquiring the knowledge required to achieve success, the OPFOR consistently achieves decisive defensive victories.

KILL OPFOR:
The 3d Armored Cavalry Regiment at the NTC

by Captain Robert B. Brown

Even before tank turn-in is complete, the assessments are well underway. First, did we win? Second, though probably more important, what did we learn? As anyone with NTC experience knows, the won-loss record is always subject to debate, and no observer/controller has ever said: "You won big; don't change a thing." But the assessments of 3rd Armored Cavalry Regiment's recent deployment to the fictional land of Tierra del Diablo are more important to the Armor Force than mere bragging rights. A brigade combat team rotation speaks to the training level of the specific brigade, but does not evaluate the entire brigade/division model. Every ACR rotation serves to validate the existence of a heavy ACR: as an expensive, unique organization, we are expected to produce results. If the performance is not commensurate with the cost, the leaner Army can't afford to maintain an organization, regardless of its tradition and heritage.

As O/Cs everywhere will tell you, the battle record is less important than the lessons learned. The NTC is traditionally a place where we spend a lot of time focused on how to improve the things we did wrong. In this article, we want to take the opportunity to identify the things we did right. What can the Armor community, and the entire Army, sustain and improve upon, based on the successes of the regiment?

Some of the lessons are neither profound nor new, and are applicable to every unit that deploys to Ft. Irwin, but some successes are directly tied to the organization of the ACR. Of the former, the critical lesson is that there is no substitute for lethal platoons, troops, and companies. NTC battles are won and lost at the company/troop level by effective gunnery, small unit drills, and the tenacity of individual troopers who refuse to quit. The regiment must sustain the training plan that produced its lethal units.

That means giving junior leaders time in the field with their units, and it means focusing their training efforts on a limited number of fundamental, critical battle tasks that are trained again, and again, and again, until they can be executed routinely. We call these critical battle tasks the "Big 5" at each level. At the troop level, they currently include scout-tank integration, building an engagement area, hasty breach, reporting, and casualty evacuation. We evaluate both our mission essential task list (METL) and our "Big 5" annually at a two-day warfighting seminar attended by all troop commanders, first sergeants, and above. Once we agree on our training focus, we go to work. We live by the motto "Talkin' ain't fightin'."

In the regiment, troop commanders are allocated 25 OPTEMPO miles per quarter for troop-level training. Troop commanders plan this training, establish its basis against METL and "Big 5," brief it to the regimental commander at the QTB, and execute it. Most often, these troop FTXs are embedded in the unit's gunnery exercises. It is in these troop FTXs that junior leaders build the confidence necessary for independent, aggressive operations on the battlefield.

Being lethal in a training environment also means training with the multiple integrated laser engagement system (MILES). The regiment uses MILES during crew drills, platoon, and troop EXEVALs, and maintains a MILES gunnery program. Some may question the use of valuable training time developing "non-wartime" skills, but boresight discipline, whether trained with MILES or a muzzle boresight device (MBD), is critical to wartime success. The skills required to boresight with a MBD are generally not at issue, as they are proven at gunnery two to three times a year. The hard part is developing the drill to get it done in a tactical environment. Whether on Table VIII or at NTC, "killer crews" are equally deadly with sabot or MILES because their junior leaders take the time to understand the capabilities of their system, and are disciplined in maintenance and boresighting.

During continuous operations throughout the course of the rotation, individual tank companies and troops fought seven fights independent of the regiment's major training day battles. These included counterreconnaissance against MRC-sized recon detachments, screens to defeat MRB-sized forward detachments, and economy of force operations to defeat up to MRB-sized attacks. A testament to the lethality of the regiment's small units, the troops and companies defeated the OPFOR in all seven engagements. Sustaining platoon and troop proficiency in fire and maneuver means training under realistic conditions. Simulations cannot replace real terrain, where platoon leaders, platoon sergeants, and commanders are forced to deal with intervisibility lines, obscuration, and a live enemy that gets a vote on the plan. Prior to NTC, the regiment conducted platoon EXEVALs in the Ft. Carson training area, and troop and squadron EXEVALs at the Pinon Canyon Maneuver Site (PCMS). The exercise at PCMS was particularly important, as every platoon and troop enjoyed a minimum of eight mission iterations: three zone recon, three movement to contact, and two defend, with CSS tasks embedded in every mission. Multiple iterations provided the time to analyze mistakes and improve performance. Moreover, by increasing the capabilities of the OPFOR (force ratios) and changing conditions on the battlefield (limited visibility, NBC) from iteration to iteration, we challenged each troop in the regiment.

At PCMS, the regiment was able to train METL tasks on difficult terrain at near-doctrinal distances, ensuring we met the regimental commander's intent that we do nothing for the first time at the National Training Center. This included a full fledged deployment to an off-site training area, using rail, line-haul, JAAT, and road march. Deployment was trained using the Reception, Staging, Onward movement, and Integration (RSOI) model, complicated by civilians on the battlefield, a terrorist threat, and force protection requirements. OPFOR and O/Cs were resourced by the non-rotational squadron and other units

from the mountain post, including 1-12 Infantry and 43d ASG. A luxury in an era of limited land and OPTEMPO, this training opportunity represents the difference between winning and losing, whether at the NTC or on an actual battlefield.

All units must recognize that soldier attitude is a self-fulfilling prophecy. Some units enter the NTC overawed by the reputation of the OPFOR, and it shows in their performance. They attack tentatively, then stop and die when engaged. A frequent comment from O/Cs and the OPFOR was the surprising tenacity of 3d ACR troopers: they absolutely refused to die. Instead of relinquishing the initiative to the enemy, the regiment's crews, platoons, and troops carried the fight to the enemy, disrupting his decision cycle. Individual tanks and Bradleys would not accept defeat, and were confident in their ability to outshoot, outmaneuver, and outfight the OPFOR. There is a reluctance in many BLUFOR units to talk about winning, and yet the OPFOR's motto remains "Kill BLUFOR." We adopted the philosophy that "if somebody's keeping score, we want to win." During each training event, we also worked to develop a distinct dislike for being "killed." Although it is MILES, and we can re-key, we never want our troopers to be complacent about losing a confrontation with an enemy on the battlefield.

An ACR, even with two ground squadrons, possesses inherent organizational advantages over a standard BCT package. Obviously, the 166 combat systems (82 M1A1s, 84 M3s) deployed with two ground squadrons outnumber the 116 assigned to a two-battalion BCT. But doctrinal distances and cavalry missions reduce numerical advantages. Rather than massing fires of multiple battalions, as a BCT does, an ACR is designed to fight multiple squadron engagements over a broad front. It does not synchronize fires on squadron objectives or engagement areas, but allocates resources to weight the main effort, and uses artillery and attack aviation "deep" to attrit enemy formations. The regiment, with two ground squadrons and one aviation squadron, fought the entire battlespace of the National Training Center. In most battles, this battlespace included the Valley of Death, the central, and northern corridors. In the final battle, the regiment fought from the Drinkwater Valley to the "turtle fence." The responsibility for four major avenues of approach forced the regiment to disperse reconnaissance and

security assets, then to maneuver quickly to mass killing fires, demonstrating the flexibility of the ACRs "hunter-killer" organization and organic air-ground integration.

At every level, the regiment is designed to find, fix, and destroy the enemy using hunter-killer teams. Regimental assets "hunt" the enemy, and squadrons "kill" it. At the regimental level, the MI company possesses an Analysis and Control Element (ACE) with real-time downlinks from strategic assets, as well as a Collection and Jamming Platoon and EH-60 (QUICKFIX) aircraft to provide initial intelligence. Regimental Colts and ADA Sensor Scouts confirm ELINT hits and trigger initial fires of attack aviation, direct support, and reinforcing artillery. For the squadrons, first contact is made by the OPCON Air Cavalry Troop Scout Weapons Team (SWT), with the OH-58C as the hunter, and the AH-1 as the killer. The SWT, in turn, is the hunter for the cavalry troop. The cavalry troop uses habitual scout platoon-tank platoon hunter-killer teams to develop the situation for the squadron, which maneuvers the tank company to kill elements identified and fixed by cavalry troops.

Air-ground integration provides the flexibility to fight across extended frontages. As the situation dictates, the regiment uses habitually task-organized air cavalry troops to provide recon pull, or uses the entire aviation squadron forward for security and early warning. Attack aviation can quickly react to penetrations or flank threats, attriting enemy formations and providing time to reposition ground assets. During the rotation, the aviation squadron was often augmented with a ground cavalry troop, and assigned a maneuver corridor as an economy of force. During one such mission, this air-ground team delayed an entire MRR for 90 minutes, enabling the regiment to reposition forces and defeat the MRR attack well forward of its objectives with no penetration.

While the Army has long accepted such advantages of task organization and "fighting as a combined arms team," it can be argued that the BCT organization sacrifices readiness for dollar efficiency. Centralizing armor, infantry, aviation, and artillery saves money by reducing redundant support systems, and appeals to branch parochialism by allowing officers to be rated by others in their own branch. The cost in readiness is the time required to develop teamwork, esprit, and confidence once task-organized.

While at home station, individual battalions will train task-organized during major events, but will always operate under distinct training schedules, conflicting SOPs, and different agendas that reflect the personalities of their commanders.

The regiment does not suffer these problems. With the exception of DS artillery and engineer battalions, the tankers, scouts, artillerymen, and CSS belong to the squadron and troop commander with whom they deploy. Every daily fight, from command maintenance to squadron EXEVALs, is fought with organic combined arms. Personalities, SOPs, and battle drills are understood long before deployment begins, eliminating the growing pains experienced by BCTs when they initially deploy. By entering the NTC at a higher training level, the regiment can avoid that first confused, embarrassing defeat that can sometimes snowball into a rotation which fails to meet training objectives.

None of these comments suggest that the 3d ACR enjoyed a flawless rotation. The regimental and squadron staffs struggled with synchronization and massing effects of CAS, indirect, and direct fires, achieving success after several battles of trial and error. Tellingly, we climbed a learning curve when integrating our DS artillery, engineers, signal assets, and other off-post units. We identified holes in our SOPs and training. We steadily improved initial shortcomings in obstacle planning, preparation, and reporting. We learned that FM communications across doctrinal distances do not just happen. But there is a common feeling in the 3d ACR that, for all the mistakes and room for improvement, we know "what right looks like" in an armored force, and it looks a lot like an armored cavalry regiment.

CPT Robert B. Brown was commissioned as an Armor officer with a BA in Political Science from Trinity University, San Antonio, Texas. He is a graduate of AOBC, SPLC, AOAC, CLC, and Ranger School. He served as a tank platoon leader, scout platoon leader, and adjutant with 4-67 Armor (Bandits!), Friedberg, Germany. He is currently assigned as assistant regimental S3 (Plans) for 3d ACR, Ft. Carson, Colo., and will take troop command in February 1998. The author wishes to thank COL Martin E. Dempsey, MAJ Paul E. Funk, and CPT Charles Lombardo for input and advice in the preparation of this article.

National Training Center on Wheels

by Major Ron A. McMurry

Army National Guard and U.S. Army Reserve maneuver units, as well as some foreign nations' armed forces, may soon see a significant upgrade to their force-on-force and force-on-target training capability. New technology is already in place, and successfully providing Army trainers with a Combat Training Center (CTC) level of quality training.

Maneuver training for the United States Army requires astute management of the interaction of a complex set of factors. Among others, these include equipment, maintenance, ammunition, weather, troops available, time and, of course, leadership. Reserve and National Guard units must train to the same standards as the Active Component, yet the Reserve Components (RC) often are burdened by the additional factor of geography. RC commanders have to consider that a given brigade or battalion command's subordinate units may be separated from each other and their maneuver training sites by hundreds of miles.

Finally, for RC commanders who have long been frustrated that their training is a factor of how much money they have for buses, a solution is at hand.

A new system, combining MILES II and GPS, is now available that has the capability to rapidly turn any available 10-acre tract into a precision maneuver training site that will rival facilities of the National Training Center (NTC).

As technical improvements transformed MILES (Multiple Integrated Laser Engagement System) to MILES II, navigational technology quantum-leaped to unearthly precision using orbiting satellites. The marriage of MILES II and the Global Positioning Satellites (GPS) was first implemented as a fixed-site system at the NTC in Fort Irwin, California.

In 1985, long before Southwest Asian hostilities, MG Crosby Saint, III Corps commander at Fort Hood, began looking for a system that would bring NTC-level training to the RC and active units. His insight eventually led to the awarding of Army contracts to LORAL, the company that developed and manufactured the original MILES equipment in 1975.[1]

The Electro-Optical Systems Division of LORAL (now a part of Lockheed Martin), developed MILES II to increase the capabilities of the original MILES.[2] By integrating GPS, and configuring wheeled vehicles and trailers for mobile control centers, video/graphics production, and an air conditioned classroom for AARs, the system was complete. Testing began in 1988, and the final contract was awarded by the U.S. Army Simulation and Training Command (STRICOM) to LORAL in 1993. It was accepted by the U.S. Army in 1995 to support training at Fort Hood, Texas.[3]

In the last two years, the Precision Range Integrated Maneuver Exercise (PRIME) has been used by units of the 1st Cavalry Division, the 4th Infantry Division, a brigade of the Louisiana National Guard, and the 3d Brigade, 49th Armored Division, Texas Army National Guard. Two platoons of German infantry, representing the Bundeswehr's Jagerbattaillon 642 in Brunholder, Germany, were attached to the 49th Armored Division for annual training in June of 1996. The German platoons also used the mechanized infantry lanes of the PRIME system. German trainers echoed the accolades of their U.S. counterparts in their reviews of the PRIME armor and mechanized infantry lane exercises.[4]

The PRIME system's high "quality assurance" attribute is a result of its ability to eliminate cheating. Playback review of actual video maneuver graphics and through-sight gunnery video supports honesty in training evaluation, and may be used for focused retraining. Learning from mistakes becomes an exciting AAR discussion among troops when shown "who shot who when" on color monitors.

Prior to the original MILES, as used in the old Tactical Engagement System (TES), troops were often lulled into thinking that they were training to standard when, in reality, they were nowhere near combat ready. Inherent weaknesses of TES included cardboard targets that could not shoot back, controller subjectivity of troops firing blanks, and a general lack of accurate data that could be processed by the "honest broker" trainer.[5]

NTC training proved that MILES II and GPS could be integrated to eliminate cheating and allow for precision in identifying strengths and weaknesses.

With PRIME, each squad leader and each vehicle is outfitted with equipment that transmits precise identities and positions to the control van. This data is up-dated automatically every few seconds. The MILES II system will not allow a "dead" soldier to fire his weapon, but another "live" soldier can use a "dead" soldier's weapon, thus allowing the most casualty-producing weapons to remain in the battle. PRIME targets have "shootback" capability, using a computer to designate hits or misses based upon weapon trajectory and position information. As the problem progresses, color video monitors, with standard military graphics, display precise GPS positions. Enemy coordinates, minefields, etc., are also displayed and recorded for AAR playback.

An on-board vehicle video system tapes through the gunner's sight picture and records audio from the crew's intercom. Although PRIME is promoted as a maneuver training system, these features make it a formidable gunnery trainer as well.

FM 25-100 and *FM 25-101* revised how the U.S. Army trains. PRIME takes the principles of these manuals and allows for a CTC-level of force-on-force and force-on-target training that can be set up in less than 24 hours in any available local training area. In effect, the training mountain is brought to Mohammed. The resulting enhanced monitoring of training effectiveness greatly reduces subjectivity, promotes honesty of the trainer and trainee, and provides a significant upgrade to the after-action review.

Notes

[1]From an interview with Mr. Al Zimmerman, Director, Training and Simulation Systems, Lockheed Martin, Electro-Optical Systems, Pomona, California, 17 Jun 96, at Fort Hood, Texas.

[2]Schirmer, James, "Making MILES Work For You," *ARMOR*, Nov-Dec 1995, p. 30-33.

[3]Zimmerman interview, 17 Jun 96.

[4]Interview with MSG Reiner Redel, Bundeswehr Jagerbattaillion 642, 15 Jun 96, Fort Hood, Texas.

[5]*TC 25-6,* Training with MILES, September 1982, p. 1-0.

MAJ Ron A. McMurry is assistant S3 of 3d Bde, 49th Armored Division, TXARNG. Also contributing to this article were MAJ Louis F. Goode and LTC Larry D. Rutherford.

Press the Attack:

A 5-Step Technique For Offensive Planning

by Lieutenant Colonel Douglas Slater

Your outfit fought a successful defense against a determined enemy. With his offense stalled, the enemy force has fallen back into a defensive posture. You are still assessing the damage from this recent battle when a warning order comes in from your headquarters — prepare to attack. You immediately set to work getting your unit moving toward accomplishing this new mission, faithfully following the steps of the troop-leading procedures, as you have been trained. You complete your estimate of the situation, properly considering all the pertinent points. Now you are ready to develop friendly courses of action, a few different concepts of operation to press home this attack, which you will then compare and analyze before selecting the best. Now is when the problem occurs. You know this is not Duffer's Drift and you will only have one chance to get it right. Where can you turn for assistance in quickly framing your plan of attack?

There is a time-consuming disconnect here because, while the troop leading procedures are an excellent tool for arranging your thoughts and activities, they are only a means to an end. They cannot help you make that intuitive leap between developing the situation and developing courses of action, conceptually assigning tasks toward what FM 71-2 terms "the visualization of how the enemy is to be defeated and of the battlefield after the mission is accomplished." There is surprisingly little literature available to illustrate how courses of action for offensive operations are conceived. The intellectual underpinnings for this effort are clearly laid out in BG (Ret.) Wass de Czege's *Five Essential Elements of a Plan of Action*, but this lacks the level of detail necessary when dealing specifically with offensive actions. My quick survey has found that, except for a helpful section on the offense in FM 7-8, *Infantry Rifle Platoon and Squad*, most are either inconclusive checklists on the back of things such as the Infantry Leader's Reference Card, GTA 7-1-31, or the Tanker's Beale Wheel, GTA 17-7-1, or must be deduced from the subtasks of offensive ARTEP Mission Training Plans (MTPs). This is often because it is felt that either planning an attack is an obvious affair, or from the desire not to stifle or suppress innovative and creative thinking. My argument, however, is that any aid which helps get the offensive planner started with developing courses of action will save precious time and is thereby welcome.

For the defense, there are several handy guides to help visualize the battlefield and prepare courses of action. Most notably is the 5-Step Technique to Build the Defense, a straightforward, one-page, visual aid to the defensive planner. This is generally attributed to then-LTC Dave Gross and is found in several publications (Ft. Leavenworth's TCDC and Ft. Knox's AOAC Battle Books for example) and was recently updated by LTC Ben Santos in his article appearing in the March-April 1997 edition of *ARMOR* Magazine.

Five Essential Elements of a Plan of Action
BG Huba Wass de Czege
ADC(M) - Big Red One

- *Find and track the enemy (before he finds you throughout the battle).*
- *Prevent the enemy from finding and tracking you (until too late to influence the action).*
- *Fix the enemy in depth with supporting efforts (with minimum required to prevent repositioning or maneuver against your main effort).*
- *Maneuver so the main effort engages the enemy from a position of relative advantage (with overwhelming power at the point of decision).*
- *Follow through (to the next action).*

These simple, yet thorough, checklists clearly help the commander with his five decisions (mission analysis, task organization, combat support and combat service support priorities, and battlefield geometry). There are, conversely, no generic 'how-to's for offensive planning.

I would be the first to admit that no two situations are exactly alike. Moreover, we should not suppress initiative by directing a prescriptive, cookie-cutter approach to the development of offensive courses of action. I propose, nonetheless, that there is a certain utility in having a simple methodology to fall back on to assist leaders at all levels and types of organizations wrestling with the problem of how to "hit the other fellow as quick as you can, and as hard as you can, where it hurts him the most, when he ain't looking." The many 'playbooks' in use among tank and infantry units, usually originating from Combat Training Center experiences, do not always meet this need, as they tend to be too tied to a particular CTC situation. What follows then are the five steps you should consider, the five questions you must answer, as you develop your course of action to press the attack.

To start with, you must determine the defender's vulnerabilities. You must be able to answer the question — where is the enemy weak point? I could quote Sun Tzu here, but it seems pretty obvious that you do not want to attack into the defender's strength. Finding this weak point is naturally the hard part and will require some homework. It involves thorough and extensive offensive intelligence preparation of the battlefield (IPB), integrated with reconnaissance and surveillance (R&S) activities and related measures, passive and active, to secure your force. You should look to identify flank or isolated positions and, if possible, deduce a trace of the approximate geographical extent of the defender's kill sack or engagement area (EA) and the obstacles emplaced to support it, so as to know where not to go.

COMMANDER'S INITIAL CONCEPT SKETCH

Figure 2

Seek to locate the defender's own R&S forces positioned to secure his force, finding them before they find you. You may even go so far as to audit the defender's key direct-fire weapons, especially those assets most dangerous to you (tank reserves, machine gun platoons, antitank systems, etc.), factoring in ranges to determine where you are least exposed to the effects of mutually supported, interlocking fire or timely reinforcement. In effect, this may require you to perform the battlefield calculus in reverse.

Once the enemy picture is clear, or working with whatever you have at this point, you must find a way to sneak in on the defender. As you develop each course of action you should ask, "What is one way to attack it?" You should array your forces along this axis backwards from the enemy's weak point, through the line of departure, to the assembly area or hide positions from where the action will commence. This axis should follow covered and concealed routes which avoid the defender's strength, i.e., the EA he is planning to invite you into.

Your aim here is to select an axis which allows you to maneuver your force, mounted or dismounted, to mass at the weak point you decided upon in answering the first question. By mass you can forget all this three-to-one stuff. As a generally accepted rule of thumb, an attacker should have a three-to-one advantage over a defender. It is also a generally accepted rule of thumb that a defender can contend with being outnumbered three to one. The logical consequence of the three-to-one attacker meeting the one-to-three defender, all other things being equal, is that all battles will be a draw or a stalemate — which is as good as a win for the defender. Your course of action must up the ante on the defender in order to ensure success. You are trying for at least a six to one advantage at the point of impact — two platoons against a squad, two companies against a platoon, two battalions against a company, etc. To control this much force, you should start putting pen to paper (or to acetate). Your course of action will literally start to take shape as you add objectives, basic graphics, and offensive fire control measures. Additionally, you should spend some time examining how the friendly force will move along the axis with an eye to both preventing fratricide and avoiding piecemeal commitment.
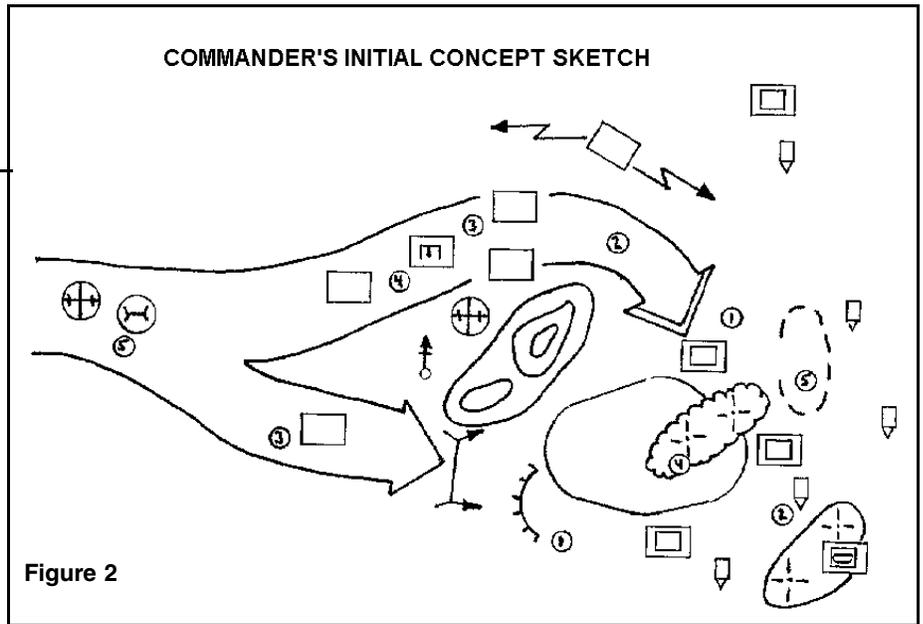
For the next step you will want to consider how to gang up on the defender; that is, address how to task-organize a force to overwhelm the weak point? The aim here is to assign the correct task to each of your subordinates. Often, their specific requirements will fairly well mandate their composition. You could start with the reconnaissance forces who will find the enemy, simultaneously confirming your template. They should then move to a position to provide security and early warning to the force if this was not implicit with step one. Secondly, you may need to nominate support forces that will move to a position to overwatch and suppress the defender. Their purpose is to fix the enemy. They may also be involved in a deception effort. Finally, you must decide which part of your force will conduct the main attack. This force, moving along the axis chosen above, will likely be required to breach the defender's tactical or hasty protective obstacles, plus assault through those objectives resulting from step two. Reserve and follow-on forces may also be allocated in concert with this main attack.

PRESS THE ATTACK: A 5-STEP TECHNIQUE FOR OFFENSIVE PLANNING

1. **Where is the enemy weak point?**
   - Thorough offensive IPB integrated with R&S activities; security
   - ID flank or isolated positions; CSOPs and armored reserves
   - Extent of enemy EA and obstacles; audit enemy AT systems

2. **What is one way to attack it? (Ar ray backward from OBJ to LD/AA)**
   - Utilize covered routes, mounted or dismounted; avoid enemy EA
   - Maneuver to mass at the weak point, seek 6:1(+) force ratio
   - Objectives and fire control measures to prevent fratricide

3. **Task organize a correct force to overwhelm that weak point.**
   - Reconnaissance forces find the enemy, confirm template; protect
   - Support forces fix enemy; suppress, overwatch, and deceive
   - Main attack finishes enemy; breach, assault, and reserves

4. **Integrate combat support arms with priority to the main effort.**
   - Multiply combat power; AD, AV, CAS, EN, EW, FA, MP, etc.
   - Isolate the weak point; suppressive and obscuration fires
   - Survivability, observation, displacement plan; FIST, key assets

5. **Plan for sustained operations against an uncooperative enemy .**
   - Sectors for consolidation; branch plan to continue attack
   - Establish reorganization criteria, priority; rearm, refuel, refit
   - Casualty evacuation; EPW and NBC contaminated personnel

Figure 1

BUILD THE DEFENSE: STEPS

1. **Where do you think the enemy is going?**
   - From IPB
   - Commander's Estimate

2. **Where do you want to kill him?**
   - Engagement Areas (EA)
   - Physical recon is best

3. **Position forces to kill him with direct fire.**
   - Walk engagement area with element leaders
   - Point out battle positions to commanders
   - Best killing ground (EA) should be main effort

4. **Position obstacles to support killing him there.**
   - Force enemy into your killing ground
   - Engineers must understand that's what you want to happen

5. **Plan indirect fires to support killing him there.**
   - Mass at the critical plan (EA) at the right time
   - Maintain control by establishing priorities

COMMANDER'S INITIAL CONCEPT SKETCH

Figure 3

You know your opponent to be a determined foe. Your course of action must, therefore, follow through the attack. Have you planned for sustained operations against an uncooperative enemy? At the very least, you should assign sectors for consolidation or a general axis or orientation for a branch plan to continue the attack. Anticipating at a minimum the need to reorganize on the objective, you may have criteria and assets for rearming or refueling, etc., and for the handling of EPWs. Anticipating worst case, you may need to superimpose a redundant casualty evacuation scheme and provide for chemical decontamination. It is the follow through which will posture you at the desired end state of your attack, where you visualized your course of action would take you.

The goal of this 5-step approach to press the attack, compiled at Figure 1, is to capture the elements inherent with offensive planning. Those that find a picture a useful medium to communicate the planning and development of courses of action will see that Figure 2 also contains all these elements. In tandem, they are a handy aid, with a snappy title, to carry around in your kit bag and turn to when you do not know where to start. This technique is just as relevant for hasty as for deliberate attacks, and for all echelons. For a truly hasty attack, where time is of the essence, this technique is all you will need to organize your thoughts. It can certainly give you a good framework with which to build upon — a template, if you like, to generate the appropriate instructions in order to get your outfit moving. Steps two to five can also be adjusted to accommodate changes to your answer to step one, as either the defender's picture is clarified or options against different enemy courses of action are weighed. Offensive operations are very complex, but at their heart almost all have addressed or answered these five basic questions.

Remember that at this point you are still developing courses of action, dealing largely with concepts and major muscle movements. Do not get side-tracked with the details of specific events, such as clearing the objective. This type of precision work, critically important to a successful outcome, should wait until after you have settled on a scheme of maneuver for the attack.

Having gotten through steps two and three, you should now look for ways to crush the defender. Can you further multiply combat power against the weak point? Step four entails the integration of combat supporting arms, with priority to the main effort. You are seeking to isolate that weak point with suppressive and obscurative fires, either electronic or high explosive, targeting at a minimum known enemy locations to allow for concurrent activities by the fire support coordinators.

Your course of action should also account for observation and displacement plans for these key assets to ensure their participation and survivability for the duration of the mission. Once the weak point is identified, it should serve as a central focus for all other functions, whether it's MPs doing battlefield circulation control or engineers working on route development. To really crush the defender, everyone in the force must have a task and purpose toward that goal, from beginning to end.

LTC Doug Slater is a 1979 graduate of the U.S. Military Academy. He currently commands 2d Squadron, 16th Cavalry at Ft. Knox, Ky. Previous Armor assignments include S3, 4-66 Armor, 3d ID, Aschaffenburg, FRG; S3 and XO, 3-37 Armor, and as a G3 (Plans) Officer, 1st ID, Ft. Riley, Kan. He also served as an Exchange Officer with the Royal Armour Corps, Warminster, England.

A Crisis of Confidence in Armor?

by Mike Sparks

The First Crisis:
Yom Kippur War, 1973

First-generation, wire-guided Sagger antitank guided missiles (ATGMs) operated by joystick control are fired by Egyptian infantrymen at Israeli tanks operating without infantry support, taking a heavy toll on the armored forces counterattacking the Egyptian surprise attack and invasion of the Sinai across the Suez Canal. Later in the war, IDF tankers learn to turn and fire towards the firing signature of the Sagger missiles, disrupting the Egyptian infantrymen's aim. They learn also to dodge their tanks at the last second to evade the missiles. One tank came home after a mission with over a dozen Sagger wires draped over its hull.

One of the results of that war was creation of tactics, techniques, and procedures (TTP) that integrated infantry in M113 armored personnel carriers to clear out ATGM positions ahead of tanks. Another result was the development of a better protected tank, the very low silhouette Merkava I, which proved invincible against first generation ATGMs and RPGs in the later war in Lebanon in 1982.

The Second Crisis:
South Lebanon, 1997

Second-generation, Russian signatureless ATGMs like the 9K111 Fagot (AT4 Spigot in the West) are being used by Hezbollah to knock out the once-invincible Merkava IIs in mountainous and urbanized Southern Lebanon. After 28 missile hits, Hezbollah guerrillas have been reported as having learned which are the weak areas of the Merkava II and fire two missiles in rapid succession at that spot. Three Merkava II tanks have been knocked out, resulting in two dead soldiers. Without a firing signature, the Fagot (semi-automatic command line-of-sight) SACLOS ATGM can be controlled until it hits the specific spot on the tank aimed by the firer, who holds the crosshairs there and is free from the tank's counterfire. The tanker doesn't know he's under attack until the ATGM

hits his tank. The IDF is considering pulling the Merkava IIs out of Lebanon and have dispatched the legendary General Tal, creator of the Merkava MBT, to the scene to solve the problem.

We owe a great deal of debt to the Israeli Defense Forces (IDF) who, on the front lines for freedom, are encountering the latest weapons made in both the former Soviet Union and the West. What they learn the hard way, we need to heed in our future armored vehicle designs and in our own TTP.

When the tank as we know it receives some setbacks in battle, there will always be a chorus of those who proclaim that the tank is dead. This shrill message is delivered with an arrogant attitude that suggests we are somehow "above" having to use extreme physical measures to fight battles today and certainly in the future. What these people really oppose is the reality that, in war, EXTREME physical measures are needed to win. The modern battlefield is covered by fire, and to advance forward requires armor protection, or else casualties will mount, as we saw in both World Wars, Vietnam, and more recently in Somalia. These critics of the tank invariably offer us no solutions or alternatives, other than fighting on foot without tanks or from the cockpit with "wunderweapons" of the air. Their goal seems to be killing the tank as an end unto itself. What these individuals fail to realize is that, in war, there is a constant ebb and flow of weapons and countermeasures. The minute you develop an advantage, a counter weapon is created. To stay on top, you have to keep advancing new ideas. Those that want to give up the tank simply want to call it quits, and give up, which will be disastrous on the next battlefield. In war, the side that decides to stick to bows and arrows gets wiped out by the side with firearms.

If the tank is now endangered by the antitank guided missile, firing beyond visual ranges without signatures, then the tank must adapt to regain the edge. The critics of the tank are partially right: traditional tankers who do not want to adapt to the modern battlefield are making the tank obsolete, so we must change

the tank paradigm or else it will be changed for us by our misinformed detractors.

The world is rapidly urbanizing; people cause wars, and people live in cities. Tanks will not only be required to lead stampedes in open rural desert areas, à la Desert Storm, to defeat other tank armies in third-generation maneuver wars, but they must fight in closed terrain and assist in stability operations in defensive posture situations like Bosnia and South Lebanon. Tanks must lead the way into the cities, but avoid a replay of fighting infantry-pure, as in Somalia, or tank-pure, as the Russians did in Chechnya. Tanks will be vital to withstand enemy fires and lead assaults by *shock action*. Supporting the tank will be shock infantry in their own armored personnel carriers; some with a large-caliber, fire-support cannon to blast buildings/bunkers, others with a telescoping boom ladder with a capsule to take fire teams to the rooftops or selected windows or floors by mouseholing, instead of the predictable helicopter rooftop assaults. We'll need other vehicles with fire fighting modules or trailers to put out building fires before the city we are trying to save burns down. If tanks cannot swim, at least the APCs should be capable of this without preparation in order to secure river crossings for combat engineers to bridge. However, once the area is secured, maintaining control of urban areas will require the defensive use of tanks.

Some of the best ideas to defeat precision guided munitions/missiles come from the Russians — I suggest reading the recent article in *Military Parade* magazine at the internet address: http://www.milparade.ru/19/102-105.htm and especially the schematic at http://www.milparade.ru/19/105-f.gif.

The following are descriptions of devices the future tank will need to prevail in the city fight. When the future tank ventures into the open, the fight will often be beyond visual range — missile versus missile. This tank must be air-droppable, so it can be deployed along with airborne forces from the drop zone. America is a strategic *air power*, as England was once a sea power. Our security
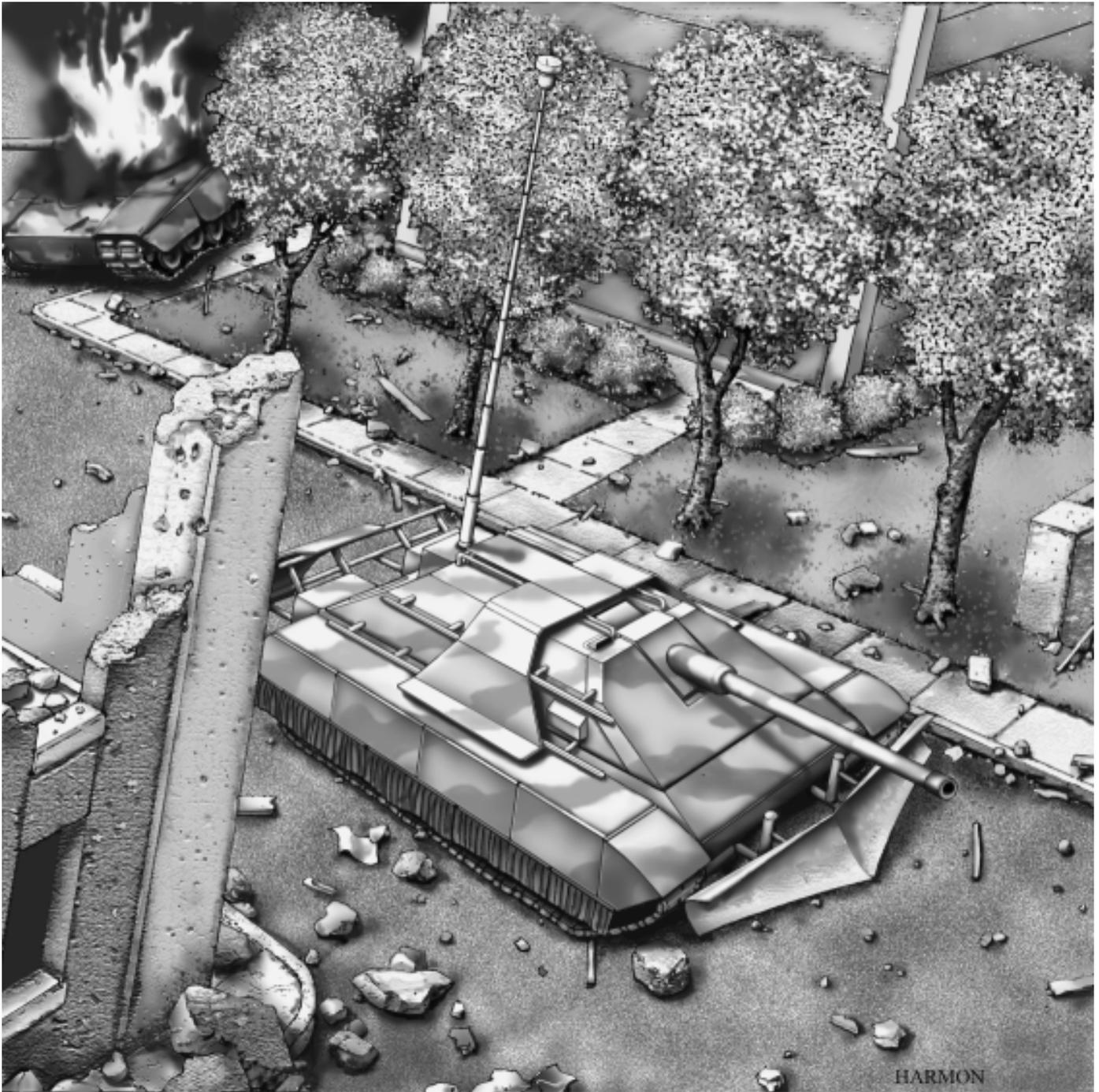
interests require significant forces that can move decisively within hours — not days, weeks, or months.

The future tank crew must fight laying down so the entire vehicle can be scaled down to a size no larger than a HMMWV. This is a modern equivalent of the "belly flopper" concept tried in the 1930s with the low-tech automotive technology then available. It didn't work, but it did give birth to the incredibly successful Jeep and is on display in the National Infantry Museum at Fort Benning, Georgia. The future tank must be less than the height of a standing man because height is the chief visual giveaway on the battlefield.

The future tank should be armed with a large-caliber cannon for direct-fire engagement of other tanks, as well as a means to reduce enemy strongpoints in the attack. The tank commander should still be able to look out from the highest spot and command his tank.

Working along with the future tank's small size is that its power plant and tracks are silenced to evade enemy detection, as German Army M113s have been modified. The engine has its exhaust routed and cooled to preclude de-

Conceptual drawing by *ARMOR* artist Jody Harmon illustrates some features of a future tank favored by the author.

tection of its infrared signature. A heat-reflective tarp can be rapidly pulled over the top of the tank to hide it from view and detection. A dust skirt could prevent dust from spewing out the rear as the tank travels across dry ground. Camouflage strips are integral to the tank to break up its outline and blend into sur-

rounding vegetation. Auxiliary power units (APUs) must be organic to the tank so it can operate its FLIR and image intensifiers, etc., without having to turn the main engine on.

Stealth must be valued within the Armor community. The days of brazenly operating in the open, based on the belief that Chobham armor makes the tank invincible, are over. It doesn't work at NTC Fort Irwin, and it certainly doesn't work anymore in Southern Lebanon, even with the superbly armored Merkava MBT. The Armor community must embrace stealth in design, tactics, and procedures, or they will by inflexibility doom the tank in the U.S. to obsolescence while other countries adapt their AFVs and make them work on the 21st century battlefield. What would Generals Abrams and Patton be advocating today?

Every tank should have a dozer blade to dig its own defilade fighting positions and clear barricades and obstacles. We should not have to wait for a separate unit to do this for us. Just as the individual soldier has an e-tool to scrape out a depression and then a fighting hole from a temporary stop position, the future tank must be able to entrench itself quickly to withstand enemy attacks.

One writer in a 1972 issue of *Infantry* magazine, reacting to the mines encountered in Vietnam, noted that the future armored personnel carrier should have its tracks outside the vehicle hull, not underneath, so mines explode away from the body. We should do this on the future tank as well as mold the hull in a V shape, as the South African Defense Forces do with their mine resistant vehicles, to create a very hard, sturdy, mine-resistant tank. Armored vehicles will be key in keeping supply and communications roads open into cities during conflict by warring sides.

Trying to stop bullets at the chest with flak jackets is too late, and so is trying to stop ATGMs at the tank hull. What is needed is a moving shield that can position itself to meet an incoming missile threat and pre-detonate the warhead a safe distance away from the tank. That front shield should be the dozer blade. A shield on the turret could prevent destruction by top-attack missiles like our own Javelin, TOW IIB, and the Swedish Bofors BILL. A shield on the rear, and on each side, covers the rest of the tank. These shields are controlled by computer to move into position and swat incoming ATGMs and RPGs, just as they impact, so their warheads do not impact the tank itself. These stand-off shields would also

protect against road-side bombs similar to those being used by Hezbollah against IDF armored vehicles keeping supply lines open to their bases in southern Lebanon.

The IDF tankers do not know they are under attack until the second-generation Russian ATGMs hit them, thus they are not able to dodge the missiles. What is needed is a very low power electronic umbrella that can warn the tank that missiles are flying towards it. The device can alert the crew to move the tank as it launches smoke grenades and decoys to foil the aim of the ATGM firer and fool the missile.

If the tank is static with the engine off, the shields should be able to move to cover the tank and swat the missiles, sacrificing themselves to save the tank and crew. The shields themselves must be easily replaceable in the field.

Like the superb Merkava, the tank must have space in its rear to carry some escort infantry, supplies, extra ammunition, or a vertical launch missile module, the latter being lowered into place by a small crane organic to the tank like the HMMWV LOSAT system has. The vertical missile tubes would be armed with fire-and-forget ATGMs like the Javelin or the Enhanced Fiber Optic Guided Missiles (EFOGM) for extended range targets.

All fuel for the tank should be outside the hull at the rear of the vehicle, like the M113A3, to prevent a fire if the vehicle is hit.

The IDF pioneered use of the Unmanned Aerial Vehicle (UAV) as a reconnaissance tool. However, it's been overused and, not unlike our use of helicopters in the Vietnam War, has become an obvious signal to the enemy that we intend to fight soon in the area where the UAV flies. The failed September 5 IDF Flotilla 13 naval commando raid, where 12 men were killed, has been directly attributed to UAVs overflying the target area and alerting the enemy to prepare an ambush. Situational awareness must not be a two-way street — we should see the enemy, and he must be in the dark.

One way we could do this is by employing a fiber-optic periscope from the tank itself, extending up to 30 feet high to spot the enemy with sensors and visual images *before* they can fire ATGMs. Tanks can kill the enemy first with their own or trailer-mounted anti-personnel EFOGMs. With a mobile observation tower that retracts like a submarine peri-

scope, the tank can stay hidden in the terrain.

The next step might be to have a helium balloon that can be inflated and unreeled aloft from the tank periscope to an even greater height than the 30-foot pole, say 100-200 feet — a tethered UAV — that stays over friendly territory so the enemy is not alerted to our reconnaissance efforts, yet can see for miles over the next hill. This would be a high-technology version of the observation balloon used so effectively in WWI to adjust artillery fire into the trenches. With such a capability built into the future tank, armored crews can call for supporting arms or use their own beyond-visual-range weapons to silence the signature-less ATGM threat.

One thing we might do to help fix the situation in South Lebanon would be to loan some M1A2 Abrams MBTs to the IDF to give them time to redress the Merkava II's armor problems. This will also give us technical feedback on how our tanks fare against the latest ATGMs.

We could also loan the IDF some HMMWV-mounted EFOGM firing units so they can use them in concert with their UAVs to suppress Hezbollah ATGM firing positions.

Ultimately, we should develop a Mobil-Trac trailer with wheels-tracks (the bed trailer being used for the U.S. Army's Explosive Stand-off Minefield Breacher-ESMB-system) with vertical launch EFOGM missiles and a telescoping periscope or tethered observation balloon with fiber optic links to the tank towing it. This would enable the IDF crews to see Hezbollah terrorists first without having to overfly a UAV.

We must also develop, as soon as possible, an anti-personnel EFOGM that uses fuel-air explosives technology to clear out enemy infantry firing signature-less ATGMs. This warhead must be able to penetrate bunkers, buildings and fighting positions with overhead cover.

We are kidding ourselves if we think we can go cheap and fight with only light forces on foot supported by aircraft. If we want to fight our enemies in an even strength, or even from numerical inferiority, we can give up on the armored vehicle and suffer the consequences. We do not have, in a 10-division Army, the option of trading casualty for casualty with a Third World country

Global Cavalry

by Captain William S. Riggs

Author's light armored cavalry concept would be based on LAVs or similar vehicles.

The U.S. Army lacks a rapidly deployable mounted force with the necessary firepower, mobility, protection, and supportability to meet America's worldwide commitments.

Since the collapse of the Soviet Union and the ensuing "peace," the armed forces of the United States have participated in over 25 major deployments in a 7-year period, as opposed to 10 major deployments during the 40 years of the cold war (Army Vision 2010).

Current Military Capabilities (USMC, Light, Heavy)

The Armed Forces of the United States in the post-cold war era are constantly required to do more with less. This applies to all aspects of our Defense Department and greatly affects our ability to carry out national policy. In an ever-changing world with greater volatility and a reduced U.S. military capability, American defense planners are having to re-look theories of power projection and force composition. Reviewing the types of possible missions, three come to mind with the early deployment of force central to all. 1) Major Regional Conflict (MRC), 2) Stability and Support Operations (SASO), and 3) Forced entry operations in support of either 1 or 2. All three mission types require the early introduction of credible combat units that are able to support/secure follow-on forces or take direct action themselves. Regardless of statements made by other services, ground forces (i.e., the Army) ultimately are required to win conflicts and demonstrate American resolve, which argues that future conflicts must be truly joint operations maximizing the strengths of each service. The Air Force and Navy can gain air superiority over most nations, and in most types of terrain can limit the enemy's ability to re-

position large formations. However, their ability to secure drop zones, airfields, and port facilities are limited. Army forced-entry operations revolve around securing airfields, while Marines focus on port facilities, each designed to facilitate the deployment of follow-on forces. This presents a potential enemy with few options to counter in his defense against the introduction of U.S. forces (airfields and ports). With these considerations in mind, what ground forces does the country possess that can actually carry out rapid power projection operations?

The Marine Corps is equipped, organized, and trained to be the country's expeditionary force. The Marine MEU (light infantry battalion-sized unit) possesses the ability to seize limited objective from the sea as long as the objective is relatively near an ocean. If objectives are in land-locked countries, or located far from the sea, the Marines are severely limited. In addition, with the procurement of advanced missile technology by many nations, the employment of Marine forces places considerable risk on the ships bringing them ashore.

Consider the problems and losses faced by the British in the Falklands against Argentinian defenses. The Marine Corps is currently working on equipment and doctrine for extended projection operations from ships over the horizon that would enable small forces to move up to 500 miles inland for short periods of time on specific missions. However, in the end, the ability to project credible ground combat power into a theater is not a Marine Corps function.

The Army's rapid deployment light forces (82nd Airborne) are billed as "strategically mobile," yet possess limited combat power and mobility once on the ground and, thus, are not a realistic solution to forced entry operations in

other than situations where the enemy lacks a cohesive military and/or armored force. Light forces also must be dropped within walking distance of their objectives, thus their employment is quite predictable for a defending enemy. The method of dropping airborne forces onto airfields revolves around the assumption that the enemy does not possess sufficient antiaircraft gun and missile defenses to defend their key airfields and ports.

Due to the limited tactical mobility and firepower of American airborne forces, their ability to quickly expand air-heads and initiate offensive operations is severely limited. (Note: This is why Soviet airborne forces were mechanized.)

Heavy forces have two realistic options for deployment. 1) Forward-deployed units (Germany, Korea, and Kuwait) can rail, barge, or HET into theater, as seen in Bosnia, or 2) Pre-positioned ships. The movement and sustainment of heavy forces of any useful size by air is not a realistic option and therefore not considered in this article. With either forward-deployed forces or pre-positioned ships, the movement of heavy forces is slow and cumbersome, not to mention the tremendous amounts of logistical support required once in the theater of operations.

The use of pre-positioned ships depends on a multitude of factors, ranging from having a secure port to disembark vehicles to air-heads that will support troop transports flying in soldiers to link up with their equipment. All of this assumes that the enemy has not sunk the pre-positioned ships prior to their arrival at a port facility. Therefore, the use of heavy forces in support of power projection operations is limited to their ability to be shipped and is therefore, realistically, not a good option if time is a factor.

Role of the Army and Force Projection Missions

The Army is faced with the unpleasant but necessary task of restructuring while retaining the ability to win future conflicts. Army Vision 2010 outlines seven major missions for the Army. The majority of these missions discuss the employment of light forces, special operations forces, and information systems. The employment of heavy forces is limited to major conflicts and limited SASO-type missions.

This article revolves around this issue: the nation doesn't have a rapidly deployable mounted force able to get where it is needed (within hours) and have credible combat power once on site. If this capability existed, the mounted force could set the conditions for the follow-on forces to be successsful in their missions.

The days of large field armies of massed tanks facing the Soviets at the Fulda Gap are much less likely now. In Desert Storm, we were given the "war of choice," one in which we were allowed months to build up forces; a war our equipment, organizations, and doctrine were specifically designed to fight. In addition, the campaign took place on the best possible armored warfare terrain.

Today, we cannot clearly identify our future foes. Possible enemies range from thugs and bandits armed with AK-47s in Haiti, to hodgepodge armies in Bosnia, to manpower-intensive armies like North Korea and China, to the most modern and best equipped armies of the Middle East. The current threat is whomever the national policy makers decide it is and, thus, we must be prepared to meet all levels of threat with the best possible force mix available today within the constraints of allocated resources. Clearly, based on the past ten years, operations in the future will revolve around missions like Bosnia, Albania, Zaire, Rwanda, Haiti, and Somalia. This is not to say that we should not plan on fighting a large conventional land army with advanced technology, but rather that we acknowledge the reality of our world and plan for it.

To some extent, larger conventional threats will be kept in check by global political and economic pressure and by our unquestionable ability to wage high-tech conventional warfare through the use of precision munitions and electronic means. Countries that are not part of the global economy will be the scenes of future conflict due to the inability of world organizations to influence them. In a world of "haves" and have-nots," most future Army operations probably lie with the "have-nots."

Requirements

The Army fights and wins ground wars. The problem facing us today is our ability to get to those wars quickly with the correct mix of forces. The question faced by the mounted force today is, can we get to a conflict with a credible force in a timely manner and influence events in our favor? With a smaller overall force structure, we need to refocus the employment of the force to ensure that we get the most bang for the buck, as well as maximizing the strengths of our emerging technologies and our sister services. The Marines have a niche market for what they do. The Army has the ability to win most wars if it can get to them. The "can get there" issue is the dilemma. If a large conflict develops, we must call up National Guard and Reserve forces to round out the Army, train units, prepare for deployment, deploy, receive equipment, move into theater, and start operations. The commitment of credible U.S. ground forces is a time-phased issue, which may lead to an unfavorable resolution for the nation due to the Army's inability to physically influence events on the ground in a timely manner.

The force required would have to possess some traits not found in today's Army. The force envisioned should be deployable, mobile, lethal, survivable, supportable, and employ the latest information technology.

- *Deployable*: The organization must be instantaneously deployable by all Air Force cargo aircraft in force packages that can accomplish a variety of missions.

- *Mobile*: The organization must possess the mobility necessary to self-deploy once in theater, operate across all types of terrain, to include river crossings with light bridges, as well as the ability to operate over long distances with minimal support.

- *Lethal (Firepower):* The organization must have organic firepower that will enable it to defend itself, as well as realistically present a threat to the enemy force.

- *Survivable (Protection)*: The equipment should provide a level of protection to the crew equal to or greater than the current BFV. Protection for vehicles should include electronic and information-sharing technologies as well as conventional armor.

- *Supportable*: The force should be totally supportable by air. The organization should have very limited logistical requirements and be able to operate without supplies for two to three days.

- *Technology*: Every vehicle in the organization should share a common appliqué-type information system. The organization should also have access to theater and national intelligence assets.

Deployability: The rapid deployability of the organization is key and should be viewed as strategic mobility. In addition, the force should be permanently task-organized to facilitate immediate deployment and training as a combined arms team. The entire organization should be deployable by C-130 aircraft or larger.

Mobility: There are three major types of mobility — strategic, operational, and tactical. The proposed organization must maximize mobility in all three areas.

- *Strategic:* With the shift from forward-deployed forces to CONUS-based forces, the Army should maintain a rapidly deployable, task-organized or modular-packaged mounted force at all times. This force should be deployable by all U.S. Air Force cargo aircraft and should be immediately available once on the ground. The current use of airborne and Ranger units to seize airfields is extremely dangerous and presents great risk to the infantry commander once on the ground with enemy armored forces. Strategically mobile mounted forces could present the enemy with multiple challenges. No longer could he focus his forces on likely U.S. entry points (ports and airfields), but he would have to watch every road and dirt track capable of supporting a C-130 or C-17. Once mounted forces were on the ground and able to influence the enemy, introduction of conventional infantry and armored forces becomes much simpler.

- *Operational:* Operational mobility is best described as the *organization's* ability to operate over extended distances in support of operational objectives. The immediate movement of the organization from a port, airfield, or landing area to the area of operations is critical. Currently, HET or rail support is necessary to move heavy units from the port of entry to the battlefield. Operational mobility also includes the ability to cross unimproved bridges and water obstacles unaided to position the force when and where it is needed. A major factor seldom considered is the constraint on mobility imposed on heavy organizations by the extensive logistics tail required for sustained operations. Combat vehicles

can cross rough terrain, while supporting logistical organizations cannot. Supporting logistical organizations can move great distances with organic assets, while the combat vehicles cannot. Logistical support requirements must always be considered as part of a unit's overall mobility.

- *Tactical:* When discussing the mobility of a vehicle, most people picture tanks crossing a World War I-type "no-man land." Mobility should take into consideration all aspects of the vehicle AND the overall organization's mobility requirements. Mobility should be viewed as a vehicle/organization's ability to cross open terrain, bridges, water obstacles (rivers), factoring in distance, speed, and logistical support. Overall, the organization should possess better mobility than HMMWV-based units.

Lethality **(firepower):** The organization must possess the same or better firepower than found in today's mechanized infantry battalions. However, firepower should not be restricted to the size of the gun carried by a particular vehicle but rather the effects that the organization can bring to bear. The organization should possess the latest precision munitions and have the ability to direct munitions from other systems and services to maximize the lethality and flexibility of the unit.

Survivability **(protection):** The system should possess equal or greater protection than the Bradley Fighting Vehicle. Today's weapons systems bring into question traditional ideas of survivability. In the past, designers of armored vehicles focused on the ability of a vehicle to withstand a hit, within the front 60-degree arc, from the highest caliber or most dangerous antitank weapon of the day. However, with advances in mine warfare (smart mines, top attack mines, etc.), precision guided munitions, hand-held antitank charges, top attack missiles, hyper-velocity or kinetic missiles, and kinetic energy tank rounds, most armored vehicles are obsolete before they roll off the production line.

Future concepts of protection will revolve around a mix of armor and active defenses to protect the vehicle. With that in mind, we must re-evaluate our concepts of survivability and focus on all aspects of protecting a vehicle. If almost any antitank type of munitions can penetrate an armored vehicle (with the exception of select Western main battle tanks), what remains? Mobility! The vehicle should take advantage of all available electronic detection and warning devices (laser, mine, NBC detection/warning de-

vices), crew survivability measures (spall liners, fire suppression, mine blast protection, and mobility following a mine strike), mobility (the ability to move faster than an enemy can acquire, track, and engage), and information systems (digital network allowing situational awareness). The concept of adding armor packages to a vehicle, like the ill-fated Armored Gun System, presents a false sense of security while increasing the vehicle's weight and decreasing its mobility.

*Supportability***:** The organization should require limited logistical support relative to that of heavy forces. The limited logistical concept supports the limitations of forced entry operations and the amount of logistics that they are able to move, as well as the requirement to support the unit by air. Logistical support from the air is not seen as the primary method of resupply, but rather as a viable option during initial entry operations and long-range reconnaissance missions. The force envisioned would operate from a single vehicle chassis, drastically reducing the number of different parts that must be carried, while significantly increasing the number of parts that can be carried for the common family of vehicles (FOV). The single FOV concept also reduces the number and type of mechanics necessary to fix the vehicles. Fuel economy must be similar to that of a truck or BFV and the entire organization should be able to travel two to three days without any external logistical support. The organization's logistical support equipment must be fully integrated into all digital networks and possess the ability to go wherever their supported unit goes (i.e., no LOGPAC; logistic vehicles use digital networks to maneuver independently over extended distances, water obstacles, and around enemy positions to deliver supplies).

*Information Systems***:** The envisioned organization should maximize all available information technologies (digital information/communications network, long range radios, secure mobile phones, TACSAT, TELE-MEDICINE, ASAS, UAV, and access to theater and national intelligence assets (J-STARS, AWACS, and satellite imagery), as well as the capability to expand as new systems become available. All vehicles in the organization should possess digital information/communications packages that enable independent operations at all levels (scouts through CSS operations). Radios must be multi-functional SINC-GARS/UHF/VHF for long range communications over rough terrain and with other services. Communications systems

must also enable the organization to communicate for support or to pass intelligence in a joint and/or coalition environment. When considering communications and information systems, we should attempt to maximize all available assets, to include commercial off-the-shelf systems.

This article proposes giving the U.S. Army a truly "full spectrum force," capable of rapid global deployment, with the firepower, mobility, protection, information, and logistical ease of support necessary for a range of missions. The organization would not take the place of heavy units, but would rather be a mounted force that specialized in rapid deployment/forced entry, SASO, and theater-level ground reconnaissance during Major Regional Conflicts (MRCs).

The critical argument is that of time; most agree that the HMMWV is not the ideal reconnaissance platform, nor was it designed to be. On the other hand, can we afford to wait until 2010 for the development of an FSCS type vehicle designed to optimally operate in open country (NTC), as opposed to its more likely employment environments (urban and restricted terrain) as seen in all global conflicts other than the Gulf War? The proposed organization is not intended to take the place of the FSCS, which is a superb concept, but rather meets an existing requirement that — since the death of the AGS and other light systems — has gone unmet. Many will scoff at the idea of fielding an organization that does not fit traditional "Armor" or "Cavalry" structure, or conduct traditional roles. These arguments have been heard many times before with the advent of the machine gun, the tank, the airplane, and the all-helicopter division. Of concern is a growing fascination with technologies that reduce the number of soldiers required while the experience of each deployment brings cries from joint force commanders for more infantry and tanks. Also of concern is that a technologically inferior, yet competent, enemy may nullify our advantages by changing battlefield conditions (note U.S. experiences in Vietnam and Somalia, and Russian experiences in Afghanistan and Chechnya). The current trend is to do more with fewer soldiers; however, we should look for realistic ways to balance technology with combat realities. The answers for the Army do not all lay with technology, but rather with a healthy balance of the two, erring on the side of the soldier. Recently, technology has aided the fight, but has not reduced the actual need for more and more soldiers with the ability to apply

physical force to decide the final outcome of a situation or collect intelligence through the Mark I eyeball (HUMINT).

Certainly, this mounted rapid deployment force is not the "be-all, do-all" force, nor will it solve all of the Army's problems. This article attempts to generate professional discussion within the force by highlighting current weaknesses within the mounted force and outlining a possible solution.

Concept of design

When setting out to design the "objective" organization, all aspects of a force were examined. The design attempted to incorporate ideal manning levels, weapon systems, command relationships, logistical requirements, and operational employment theories, regardless of political, financial, or branch bias.

The organization design focuses on the concept of self-contained packages while giving the commander all necessary assets to accomplish a range of missions. All organizations are permanently task-organized to maximize effectiveness and to establish relationships as we actually fight. Headquarters were designed to command and control only; they were stripped of control of all units other than those organic to subordinate maneuver units (i.e., no engineers or MI company at regimental level because these assets are broken down to the troop and squadron level).

The General Motors (GM) Light Armored Vehicle (LAV) Family of Vehicles (FOV) is the platform proposed for employment in the "medium" ACR concept. The proposed LAV organization can be fielded today with equipment available "off the shelf" and serve as a valuable addition to our force structure while meeting the needs of the Army.

Traditional procurement procedures can be radically reduced if testing and evaluation data are accepted from other countries currently operating the vehicle. Vehicles can be leased, and select DS and depot-level maintenance can be contracted. Why not send the vehicle back to GM for depot-level work, rather than creating an infrastructure to support the system? In times of limited funding, we must develop innovative ways of resourcing to maximize benefit to the operational forces, not Army infrastructure and the defense industry.

The ageless argument of wheels versus tracks will not be discussed, as data can be presented to support either case. However, military employment of wheeled vehicles around the world clearly indicates the effectiveness of these systems to meet a range of missions across all types of terrain.

Overview

The proposed LAV-based unit is organized along cavalry regiment lines and is designed to operate on a non-linear battlefield and during SASO. The regiment integrates the latest technology in communications, surveillance, and intelligence collection systems with ground troops, aviation troops, UAVs, and joint systems. The organization crosses traditional branch boundaries to incorporate the best systems available, while maximizing the overall effectiveness of the unit. With the advent of the tactical internet, satellites, JSTARS, UAVs, LRAS, laser warning devices and other advanced systems, we must reexamine our methods of employment and collection, as well as our ability to support/conduct actual maneuver warfare.

The units (from troop level up) are designed to be deployable packages or modules. Each troop can receive data from joint and national assets while deployed independently of the squadron.

Employment Scenarios

Rapid Deployment/Forced Entry Support: The LAV cavalry organization is exceptionally well-suited to support rapid deployment and forced-entry operations. The LAV cavalry troop is a self-contained (modular) package with the mobility, firepower, protection, and logistical structure necessary for the support of light forces. Since the deactivation of the 82d Airborne Division's 3-73rd Armor, the mounted force has failed to provide a rapidly-deployable mounted force in support of the light infantry. The Javelin missile has been designated as the stopgap for the loss of the Sheridans, however, it is not designed to blow large holes in buildings, nor is it well-suited for rapid armored maneuver against enemy forces. Traditional methods of air-dropping LAVs can be employed, if required, to support landing zone operations. However, the LAV offers an option to traditional airborne employment of vehicles. Why not land the unit along a remote road or strip, then

move off to collect intelligence or to fight the enemy on terms favorable to us? The C3I capabilities of an LAV troop may also aid the "operational ground commander" as light forces lack advanced digital "situational awareness" and communications packages. The relatively light logistical impact of an LAV-based unit is also of value as initial entry forces do not have the support structure necessary to support large logistical requirements.

SASO Employment: The LAV organization is particularly well suited for SASO environments. The organization has the ability to operate independently across extended distances with the protection and firepower necessary to deter and defend. The LAV organization is well-suited for SASO in that it can operate immediately in a logistically "immature" theater of operations, thus providing the necessary protection and presence for the introduction of conventional forces. With a digital communication system that provides "situational awareness," the troop/squadron commander has the ability to monitor a much larger area than previously possible with conventional forces. Major tasks for mounted units in SASO environments include: convoy security over long distances, checkpoint operations, observation point duties, and quick reaction force (QRF) operations. Fast, wheeled organizations lend themselves well to these tasks, as seen by wheeled organizations employed in Bosnia by European nations during UN and later IFOR operations. Wheeled units have the ability to cross small bridges, (the majority of bridges in the Third World) which are incapable of supporting armored vehicles, as well as the ability to travel extended distances, at road speeds, with the supported unit.

Major Regional Conflict (MRC): (Theater reconnaissance) The proposed organization is not designed to "fight" like a traditional ACR, due to its enhanced mobility, lack of armor protection, and improved "situational awareness." The organization will focus on the theater commander's Critical Information Requirements (CCIR) that cannot be effectively answered/detected by electronic means. Based on this concept, the organization will operate as small, semi-independent section/platoon-sized units across the battlefield to collect specific intelligence for the commander. The employment of this type of organization

PROPOSED LAV ACR
LAV TROOP
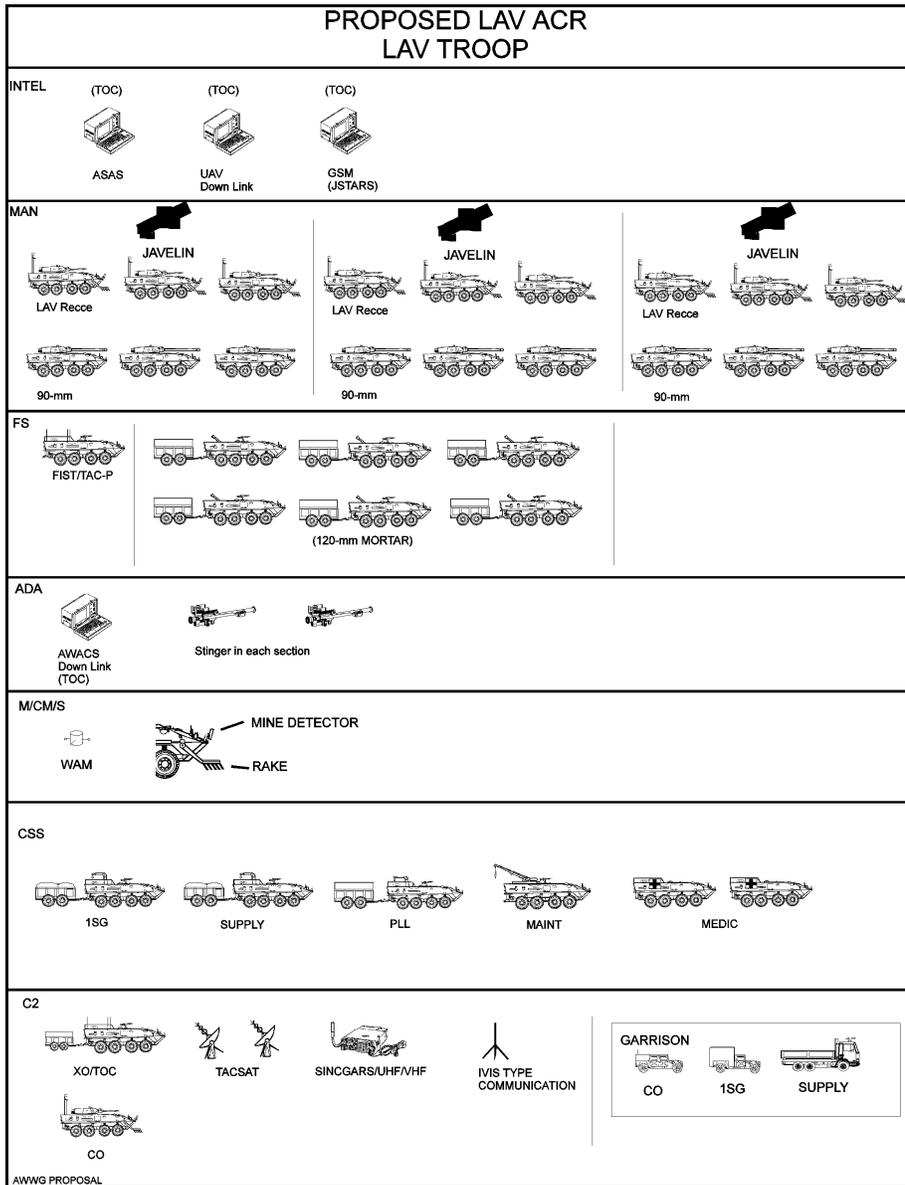
also enables the commander to simultaneously attack targets throughout the depth of enemy territory, thereby giving him a mounted "Deep Strike" capability, as was required in western Iraq to hunt SCUDs during Desert Storm. One of the principle features of LAV-based units is the human aspect of reconnaissance. Modern electronic systems provide exceptional and timely battlefield information but lack the ability to collect HUMINT-type intelligence by talking to locals, interrogation of prisoners, physical inspections of sites and equipment, and route and area reconnaissance.

Testing of New Equipment: Due to its unique abilities, the LAV ACR offers an excellent platform for testing new technologies. In addition, it may form a link to the development of doctrine for the Army After Next. However, testing should be "field testing" by troops, not AWE type testing with umbilical cords tied to contractors' test benches. The unit must retain its rapid deployment capabilities.

For the purpose of this article, only the LAV troop and LAV squadron will be addressed.

The LAV Troop

Intelligence: Each troop has the capability to receive intelligence data from multiple sources. J-STARS down-link, All Source Analysis System (ASAS), and UAV down-links may be options, but to maximize the troops' capabilities, they must have the ability to see the "whole" picture. These assets are normally found in brigade and higher echelons; however, due to the troops' requirement to deploy quickly in immature theaters and operate over large distances, these systems are needed at the lowest level. This enables individual vehicles/ sections to avoid enemy concentrations and seek only the information required by the commander.

Maneuver: The LAV cavalry troop is designed as a "complete package" with the assets necessary to conduct a range of operations. The unit organization is designed to stand alone or operate as part of a squadron. The troop consist of three scout platoons of three reconnaissance LAVs and three 90mm or 105mm LAVs. The reconnaissance LAV (Canadian "Coyote" recce vehicle) is equipped with a Long Range Acquisition System (LRAS) suite (GSR/FLIR/thermal sight/ camera/laser) on a 10m telescopic mast or ground-mounted, laser detection/ warning, munitions guidance laser, 25mm cannon, Javelin ATGMs, and an appliqué-type digital information/communication package. Each section consists of a reconnaissance vehicle and an LAV 90mm/105mm. The LAV 90mm/ 105mm, as the wingman, provides the necessary protection for the recce vehicle.

Fire Support: Traditional "high explosive" artillery support is not employed by the LAV unit. Scout sections rely on troop-organic, breech-loading 120mm mortar fires for HE and smoke support. When targets of interest to the theater commander are located, the unit calls for CAS, Army Aviation, MLRS, or ATACMS. Each scout LAV and select others have laser designators and the ability to digitally call for Hellfire support. Hellfire missiles can be fired from LAV-based Hellfire vehicles, or from OH-58D helicopters. Mortar LAVs may operate independently of their platoon in support of scout platoons/sections.

Air Defense: No dedicated ADA vehicles move as part of the troop. The troop has an organic ADA capability with an AWACS down-link, and each section-sized unit is issued STINGER missiles. With the ability of each vehicle to "see the battlefield" through the appliqué system, air battle management can effectively be coordinated and directed. The troop XO's C2 LAV has an AWACS down-link capability. During forced entry operations and long range reconnaissance operations, air defense becomes a critical asset. The ability of the unit to maintain situational awareness of air operations is significant when considering the troop's reliance on CAS/Army aviation support. During forced entry operations, the troop has the ability to quickly

expand the SHORAD air defense umbrella over friendly forces and air fields.

Mobility/Countermobility/Survivability: Troop mobility is provided by vehicle-mounted light Israeli rakes and magnetic pre-detonation/detection devices. Countermobility is provided by MOMPS/ WAM mines. Organic, engineer type, survivability equipment is not necessary due to mobile nature of the organization. If survivability positions are required, theater heavy engineers can be requested. NBC protection/detection is provided by organic chemical detection equipment. In an NBC environment, LAVs could locate contaminated areas and pass their locations via their digital information/communications network.

CSS: The key to the LAV organization is its ability to operate with limited logistical support. However, to maximize the troop's capabilities, the CSS systems must be capable of providing long range support, primarily fuel, independently, over all terrain. The LAV squadron CSS system would not operate a traditional LOGPAC but rather would independently maneuver forward through the use of digital communications to exchange fuel/water and ammunition trailers. The 1SG, XO, and supply sergeant LAV each tow a trailer (1SG=fuel, XO=fuel, Supply=water/fuel). Sections or individual vehicles link-up, when necessary, with the 1SG/XO/supply sergeant for fuel, water, and rations. When the 1SG/XO/supply sergeant's trailers become low, squadron CSS LAVs maneuver forward and exchange full trailers for empty ones. Ammunition resupply is conducted on an as-needed basis.

The key to independent operations of LAV resupply vehicles, as opposed to central control, is the ability to use appliqué type systems to avoid enemy concentrations, minefields, and built-up areas. The troop has two medic LAV ambulances. Troop medics should be trained to 18-series standards and be able to employ digital TELE-MEDICINE technologies. The section's leader should be a PA, at a minimum, to provide critical medical treatment forward. The two medic LAVs give the troop the necessary medical support to operate over extended distances and on a wide frontage.

The maintenance/recovery LAV is able to repair minor faults/damage forward as well as cannibalize damaged LAVs. If required, it can recover damaged LAVs

back to squadron maintenance collection points.

A PLL supply LAV carries a robust PLL capable of supporting the troop's Class IX requirements with limited external support for an extended period. A significant advantage of a single FOV is the ability to carry an increased PLL for one type of vehicle, the ability to cannibalize damaged/destroyed vehicles, and the requirement for only one type of hull mechanic. An additional benefit of the LAV FOV is the ability to use commercial truck parts for repairs.

C2: The principle feature that enables the LAV organization to conduct independent long range operations is the appliqué type digital information system. Every vehicle is given the whole picture, "situational awareness," and is able to operate independently within the framework of an interconnected communication system. The troop commander is provided with a recce LAV to enable him to move forward and "see" the actual battlefield through his own sights/eyes. The XO is mounted in a C2 LAV (TOC) which is the troop's combat information center with an ASAS, Ground Station Module (GSM)/J-STARS down-link, and UAV down-link. The vehicle contains all necessary electronic systems to enable the troop to conduct independent operations. The troop has two TACSAT communication systems and all vehicles have an integrated SINCGARS/UHF/VHF radio/data system.

Garrison: Two HMMWVs and an FMTV are provided for garrison operations. These vehicles are not intended for deployment.

The LAV Squadron

Intelligence: The intelligence platoon of the squadron consists of an S2 C2 LAV, a DF/Jammer LAV, four UAV LAVs (4 UAV, 2 control stations), and a Trojan Spirit LAV. The squadron commander has a CTT (Commanders Tactical Terminal) LAV assigned as his vehicle. The S2 LAV contains an ASAS, GSM (JSTARS) down-link, and a UAV down-link. Once the squadron is deployed, the intelligence platoon provides all "intelligence" related inputs into the common digital appliqué-type system, thus providing all vehicles with a common picture of the battlefield. The DF/Jammer LAV supports the reconnaissance effort in locating enemy electronic

signatures and jamming when required. The UAV section flies missions in support of the reconnaissance effort, as well as finding routes through difficult terrain or around enemy positions for the ground troops.

Maneuver

AT Company: Squadron ground "killing" capabilities are in the form of the Hellfire AT company. Employed as a company or in platoons, Hellfire vehicles maneuver in support of the reconnaissance troops. The company consists of three platoons of four vehicles each and a HQ platoon consisting of the CO, XO, 1SG, supply, maintenance, and medics. All vehicles have digital communication systems and the ability to operate independently in support of the squadron or troops.

Aviation Troop: Once deployed, the LAV squadron gains an aviation troop consisting of OH-58Ds (Warrior). The aviation troop is employed in support of squadron/troop reconnaissance objectives or to provide Hellfire missile support.

Lift Platoon: Once deployed, the squadron gains a UH-60 lift platoon, consisting of four utility aircraft and two medevac helicopters.

Fire Support: Squadron fire support consists of an ALO/Tactical Air Control Party (TAC-P) LAV, and an FSO LAV. The squadron should never be in a position where it has the need for massed conventional artillery. CAS and Army Aviation are the squadron's primary methods of engaging targets throughout the depth of the enemy rear. Division and Corps MLRS and ATACMS are used on select targets, based on target importance.

Air Defense: As with the troop, air defense is provided by all squadron vehicles coordinated through the common digital information/communications network. The air defense fight is managed by the TOC C2 LAV with an AWACS down-link. The ability of the unit to maintain situational awareness of air operations is significant when considering the reliance on CAS/Army aviation support. During forced entry operations, the ability to quickly expand the SHORAD umbrella over friendly forces and airfields is critical.

Mobility/Countermobility/Survivability: The squadron engineer platoon consists of six squads of engineers mounted in

LAV APCs with light Israeli mine rakes and vehicle-mounted magnetic pre-detonation devices. Mobility is provided by the mine rakes, vehicle-mounted magnetic pre-detonation devices, and MICLICs, while countermobility is provide by Volcano/MOMPS/WAM mine systems. Engineer survivability assets are not included in the LAV regiment due to the nature of the organization and types of missions foreseen. If digging assets are required, they can be attached from corps. The squadron's mobility assets are primarily reserved for critical mobility needs. Countermobility equipment can be used to quickly establish obstacles to delay enemy forces or to aid in the establishment of a squadron, CAS, or aviation engagement area.

CSS: CSS is coordinated through the digital appliqué network, but is operated as semi-independent sections/vehicles.

Medical Platoon: Two LAV aid stations (MAS/FAS) are each manned by a surgeon and 18-series medics. Each aid station has TELE-MEDICINE capabilities. Platoon equipment includes six LAV ambulances, and two attached UH-60 ambulances.

Support Platoon: Capabilities include the ability to move supplies forward, through enemy territory, and on to the troops. The support platoon consists of a HQ section (PL and PSG) mounted in two CSS LAVs, a fuel section consisting of 12 CSS LAVs with fuel trailers, and a cargo section consisting of 12 CSS LAVs with cargo trailers. The fuel section transports all squadron bulk fuel in trailers, while water and other supply items are transported in the LAV's internal cargo bed.

The ability of each vehicle to "see" the battlefield through the digital network enables independent movement forward, cross-country, and across water obstacles, while avoiding enemy contact. The support platoon must also be able to set-up and execute Forward Area Arming and Refueling Points (FAARPs). Attached aviation lift aircraft give the platoon flexibility in methods of resupply as well as providing general lift support to the squadron.

Maintenance Platoon: The maintenance platoon consists of a HQ element, a recovery section, a maintenance/PLL section, and a Maintenance Support Team (MST) that is organic to the squadron. The HQ element consists of the SMO and SMT mounted in an APC LAV. The recovery section is mounted in three recovery LAVs and assists in recovering troop and squadron vehicles. The recovery section is also responsible for the maintenance of squadron and HHT vehicles. The maintenance/PLL section consists of three CSS LAVs with cargo trailers. The maintenance/PLL LAV section performs general maintenance for the squadron, stocks PLL, and processes the squadron's Class IX requests. The squadron PLLs must be robust enough to support all squadron vehicles, for an extended period of time, without relying on the RSS Authorized Supply List (ASL).

The MST: The MST is organic to the squadron to provide direct support maintenance capabilities. The MST consists of a turret LAV, a missile LAV, and two Communications and Electronics (C&E) LAVs.

C2: The squadron command group is mounted in three C2 LAVs (SCO, SXO, CSM). The commander is mounted in a C2 LAV with the CTT communication package for the overall BC of the squadron. The S3 has two C2 (CTT) LAVs, one for himself (TAC) and one for the "battle captain" (TOC). The TOC C2 LAV is the squadron combat information center with an ASAS, a GSM (J-STARS) down-link, and a UAV down-link. The squadron S1 and S4 are also mounted in C2 LAVs. The squadron is authorized a permanent S5 and CA team also mounted in an LAV. The communications section consists of two LAV C2 vehicles which aid in squadron communications. The squadron is authorized two TACSAT communication systems.

HHT: The HHT commander and XO each have an APC LAV. The 1SG and supply sergeant are mounted in CSS LAVs with fuel trailers. The mess section is mounted in two CSS LAVs with cargo trailers.

Conclusion

The concept of fielding a new "specialized" organization of wheeled vehicles in direct financial competition with future systems may not seem practical. Arguments can be made that we should not buy an "Okay" system but rather we should hold out for the "perfect" system. The LAV-based organization does not meet the needs of the heavy TF reconnaissance platform (FSCS) due to increased size and other concerns when operating close to heavy conventional units. The current force mix of light infantry forces or heavy mechanized forces does not give the Army much flexibility during deployments, nor does it support actual warfighting requirements. Either the U.S. sends light infantry (low cost, low return) or it gears up TRANSCOM and deploys a heavy mechanized force with excessive logistical requirements (high cost, limited return). There is no middle ground.

As a mounted force, we must ask ourselves one question. Do we want to remain relevant? If we rest on the glories of Desert Storm and wait for the next "big one," we will see more and more reductions in our force. This has started with the reduction of four tank companies to three in the heavy battalion.

We must sell ourselves to the Army and the joint community as a critical element in any operation, not just major conflicts. We must become the first ground asset a CinC demands upon receipt of mission.

The LAV cavalry regiment meets the needs of the Army today as well as acting as a stepping stone to the Army After Next. To ensure that the mounted force remains a valuable and desired player in the evolving roles and functions of the nation's armed forces, we should explore all options available in pursuit of the optimum force.

For more information on the proposed LAV regiment, please refer to the AWWG web page at:

http://www.awwg.org/docs/currentproj/index.html#2acrlav

CPT William S. Riggs received his ROTC commission in 1986 from Wentworth Military Academy. He has served as an M60 tank platoon leader, 5/112 AR, TXARNG; M60A3 tank company XO, 2/72 AR, Camp Casey, Korea; M1 tank company XO, 1/32 AR, during Desert Storm and BMO, 1/32 AR, Ft. Hood, Texas; and squadron asst. S3, 3/11 ACR and brigade asst. S4, 1 Bde, both in Germany. Additionally, he commanded an M1 tank company in 4/67 AR in Germany, then served as TF assistant S3 with 4/67 in Bosnia. Prior to his current assignment as a small group instructor for AOAC, he was a doctrine writer for the Directorate of Training and Doctrine Development, Ft. Knox. His military education includes AOBC, AOAC, CLC, CAS3, and the Air Assault Course.

TASK FORCE REMAGEN:
Sustaining a Heavy Task Force via Aerial Resupply

by Major Mark A. Olinger

At the beginning of 1969, some of our nation's hardest fighting units were assigned to the XXIV Corps, commanded by Lieutenant General Richard G. Stilwell. Major ground combat units assigned to this corps were: 3d Marine Division, 101st Airborne Division (Airmobile) and the 1st Brigade, 5th Infantry Division (Mechanized).

With this size of ground force, Military Assistance Command-Vietnam (MACV) felt confident that XXIV Corps could defend the Demilitarized Zone (DMZ) while simultaneously executing major operations into North Vietnamese Army (NVA) base camps located along the remote western areas of the country. Major operations against NVA base camps, once safe havens for the enemy, were part of MACV's strategy of destroying the NVA logistical system.

No longer would U.S. and allied forces be content to sit back and allow NVA forces to make the first move.

In early January, the NVA reopened Route 922 from Laos into the A Shau Valley, and anti-aircraft guns were installed both in Laos and in the valley. As traffic expanded to 1,000 trucks per day, allied aircraft ran into intense fire from the NVA guns that took a heavy toll. MACV intelligence indicated that NVA forces probably would be moved into the Da Krong River area, and possibly into the mountains west of Hue and southwest of Quang Tri. Once in these positions, the NVA would be postured to launch surprise attacks against populated areas as far south as Da Nang. In late January, XXIV Corps began conducting a series of regimental-size operations near the rugged Laotian border. These operations had the task and purpose to deny NVA units' access into the populous coastal lowlands by destroying his forces and interdicting access to main supply routes from Laos. The 4th Marine Regiment, 3d Marine Division, operated in the Khe Sanh region during Operation

Scotland II. While the 9th Marine Regiment, 3d Marine Division, initiated Operation Dewey Canyon against Route 922. Route 922 entered South Vietnam from Laos and became Route 548 that curved through the Da Krong River area and entered into the A Shau Valley. It was the NVA's most important main supply route in I Corps.

During the initial phase of the operation, starting on 19 January, the 9th Marine Regiment, 3d Marine Division, established fire bases to support later maneuver operations. The second phase involved patrolling around the fire bases to eliminate NVA pockets of resistance. On 11 February, the third phase began with a three-battalion, regimental offensive pushing towards the Laotian border with supporting aircraft and artillery. This offensive lasted for seven weeks, covering more than 30 miles of enemy territory. By the end of the month, the 9th Marine Regiment, 3d Marine Division, had

nearly run out of terrain. They had swept south to the Laotian border, eliminating a majority of the enemy resistance. When Operation Dewey Canyon was officially terminated on 18 March, the 9th Marine Regiment, 3d Marine Division, had captured over 525 tons of weapons and ammunition, including 12 large 122mm cannons. These 122mm cannons were the first ever seen inside of South Vietnam. The 9th Marines, 3d Marine Division could justifiably claim a major setback had been meted out to the North Vietnamese.

Prior to the ending of Operation Dewey Canyon, XXIV Corps directed the very innovative employment of the 1st Brigade, 5th Infantry Division (Mechanized). The brigade was task-organized with the following major units: Headquarters and Headquarters Company, 1st Brigade, 5th Infantry Division (Mechanized); 1st Battalion, 77th Armor; 1st Battalion, 11th Infantry; 1st Battalion, 61st Infantry (Mechanized); 5th Battalion, 4th Field Artillery (155mm, Self-Propelled); and the 75th Support Battalion. The brigade's commander was directed to send a mechanized heavy task force to conduct a reconnaissance of Route 9 to the Laotian border. This reconnaissance would also protect the northern flank of U.S. and allied forces in the Da Krong River area and the A Shau Valley. Colonel James M. Gibson, Commander, 1st Brigade, 5th Infantry Division (Mechanized), formed Task Force Remagen around the 1st Battalion, 77th Armor. Task Force Remagen was named in honor of the 7 March 1945 crossing of the Remagen Bridge over the Rhine River by the 9th Armored Division, which spearheaded the breakthrough into Germany during World War II.

Task Force Remagen was composed of Headquarters and Headquarters Company, 1st Battalion, 77th Armor; two mechanized infantry companies; a tank company; a self-propelled 155mm artillery battery; armored engineers; and self-propelled anti-aircraft guns. Later the 1st Battalion, 61st Infantry (Mechanized), replaced the 1-77 Armor as the controlling headquarters. On 16 March, the 1,500 soldiers of Task Force Remagen departed Ca Lu down the dirt roadway toward the Khe Sanh Plateau.

Leading the task force was an engineer-reinforced scout platoon that slowly cleared its way through the antitank mines on the upward winding road. This mechanized force built bypasses around wash-outs, maneuvered through the narrow defiles, and crossed streams with their armored vehicle launched bridges (AVLB). Since there were no available forces to secure the defiles and stream crossings, the AVLBs continued with Task Force Remagen after crossing. Lifting of the bridges prohibited the advancing task force from using ground lines of communication for resupply, causing it to be completely sustained by an air lines of communication. Sustaining a mechanized task force entirely by aerial resupply for an extended time period hadn't been accomplished during the Vietnam War. Under normal conditions, logisticians would have been kept busy delivering ammunition, general supplies, and repair parts to the task force, along with providing the required maintenance support.

On 19 March, Task Force Remagen reached the abandoned Khe Sanh Plateau. Allied forces at Khe Sanh had been withdrawn the previous summer to Ca Lu. They encamped for the night, and the next morning M113 armored personnel carriers and M48A3 tanks maneuvered west through the abandoned Special Forces camp at Lang Vei. Task Force Remagen reached the South Vietnamese/Laotian border and established positions.

Looking across the Laotian border at the sinister Co Roc, a granite ridge running along the Laotian side of the border and overlooking the Khe Sanh Plateau. The task force would prowl through the region until the end of April, encountering light resistance. However, the task force was continually harassed by accurate mortar fire from the Co Roc ridge. Unlike Operation Dewey Canyon, where General Creighton Abrams granted authority for limited Marine attacks across the border, this permission was never given to the Task Force Remagen commanders. For 47 days, this task force operated in rugged terrain along the Laotian border demonstrating that even remote base areas were vulnerable to attack by a mechanized force. Operating in country long thought to be impenetrable to armored vehicles, this combined arms

team again demonstrated the advantage of mounted forces in a jungle environment. Concurrent with Task Force Remagen, the remainder of the brigade was supporting Operation Montana Mauler in late March, west of Con Thein along the DMZ under 3d Marine Division operational control. Task Force Remagen would return to its base camp at Ca Lu ending operations along the South Vietnamese/Laotian border on 29 April.

Significant to operations in South Vietnam was the use of helicopters in the logistic support role. Their use freed Army commanders from a complete dependence on ground transportation. The helicopter became an indispensable link in the forward area of operations because of its ability to operate in virtually any weather condition, day or night, with little or no preparation of landing zones. Before Task Force Remagen would terminate operations on the Laotian border, they would be delivered such diverse types of cargo as hot food, medical supplies, ammunition, consumable supplies, and repair parts.

For 47 days, Task Force Remagen operated at distances between 40 to 60 kilometers from its base camp and relied entirely on aerial resupply. U.S. Army and U.S. Marine cargo helicopters airlifted all material and supplies to Task Force Remagen. Requests for supplies and repair parts were forwarded from Task Force Remagen to the Forward Support Element, which in turn forwarded the requests to the 75th Support Battalion Logistics Operations Center at Quang Tri. The requested supplies and repair parts were assembled overnight and either flown or sent by convoy to the Forward Support Element for further delivery to the task force by helicopter. A unit trains concept was used to support the task force forward, consisting of tracked maintenance personnel, supply soldiers, and wheeled vehicles. All supplies and repair parts were flown to the task force in their field locations; repair parts were exchanged for the defective parts, and installed on the spot. Defective parts were returned to the Forward Support Element for repair. Major repairs and overhauls were accomplished under arduous field conditions and included replacing 12 engines weighing over 4 tons, 18 sets of tracks, and 7 transmissions. Fresh water was placed in

"Over 59,000 gallons of bulk fuel, 10,000 rounds of artillery ammunition, and 1,000 tons of general supplies were moved by helicopters from the Forward Support Element at Vandergrift Combat Base during the course of the operation."

containers ranging from 3-gallon collapsible drums to empty shell casings. Over 59,000 gallons of bulk fuel, 10,000 rounds of artillery ammunition, and 1,000 tons of general supplies were moved by helicopters from the Forward Support Element at Vandergrift Combat Base during the course of the operation.

During this operation, Task Force Remagen received an average of 13 helicopter sorties per day. It was estimated that with an average of 30 minutes per round trip, four helicopters could have met the task force's average daily resupply requirements. The majority of these missions were carried out by UH-1, CH-46, and CH-47 aircraft. The UH-1s operated forward to the platoon level, while the CH-46s and CH-47s transported heavier and more bulky loads to the task force and company trains. Task Force Remagen demonstrated the feasibility and effectiveness of an intensive aerial resupply campaign in support of a heavy task force.

What are the doctrinal lessons learned from Task Force Remagen that are applicable to commanders and staff officers in today's Army and into the 21st Century?

- Heavy forces are effective in a low-intensity conflict environment.
- The combined arms team is a winner and, when properly task-organized, can mass firepower against our enemies where they least expect it.

- Heavy forces can be sustained over an extended period of time by aerial resupply.
- Army Aviation in the logistics support role is a true combat multiplier.
- Use of the Forward Logistics Element or Forward Logistics Base concept is feasible as demonstrated by the 75th Support Battalion.

We must ensure the lessons learned are adopted. This will prevent us from repeating the mistakes of the past.

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MAJ Mark A. Olinger was commissioned an Infantry officer in 1983 from California State Polytechnic University, Pomona. He served as a platoon leader, company XO, S3 Air with 3rd Battalion, 327th Infantry and brigade S3 Air, 1st Brigade, 101st Airborne Division (Air Assault) prior to attending the Quartermaster Officer Advance and Aerial Delivery and Material Officer Courses. Key military schooling includes: Marine Amphibious Warfare School, CAS3, Operations Research Systems Analysis Military Applications Course I, and the Command and General Staff College. Other assignments include group supply maintenance officer and detachment commander, 5th Special Forces Group; company commander, 528th Support Battalion (Airborne); Deputy J-4, Joint Special Operations Task Force/Special Operations Command South; support operations officer, 528th Support Battalion (Airborne); operations research analyst, National Security Agency; support operations officer, 201st Forward Support Battalion, 1st Infantry Division (Mech); and support operations officer, 125th Forward Support Battalion, 1st Armored Division. He is currently serving as the Forward Support Battalion S2/3 observer/controller at the National Training Center, Fort Irwin, Calif.

The Wheel Versus Track Dilemma

by Paul Hornback

With the development of any new Army combat vehicle, the question, "Which is better: a wheeled vehicle or a tracked vehicle?" surfaces again and again. In order to answer this question, the U.S. Army has tested and studied the merits and shortfalls of wheeled and tracked combat platforms for the past 30 years. Results indicate that no single criterion can be applied that will answer the wheeled-versus-track issue for all situations and missions. In fact, the underlying premise in resolving the wheeled-versus-track dilemma is deeply rooted in the complex variables regarding the platform's combat mission, terrain profile, and specific vehicular characteristics. Tests and studies, however, established a set of criteria to determine a platform's optimal configuration. Although most of this information is over ten years old, the basic factors which impact the physics of mobility have not changed and are still relevant.

MOBILITY. Mobility, as defined by the 1988 Mobility Analysis for the TRADOC Wheeled-Versus-Track Study, is the ability to move freely and rapidly over the terrain of interest to accomplish varied combat objectives.[1] Mobility is thus measured by a system's freedom of movement (percent of the terrain over which the vehicle is mobile) and its average speed or travel time over that terrain. A platform's gross vehicle weight and its footprint (the area of track or tire which impacts the ground) determine the resultant ground pressure that the platform imparts on the soil. The soil strength, coupled with the vehicle's characteristic ground pressure, determine a parameter entitled Vehicle Cone Index (VCI), which is a key first-order discriminator of a platform's mobility. The higher the VCI, or ground pressure, the less mobile the platform becomes. Figure 1 shows that, as ground pressure increases, so does the percentage of No-Go Terrain (terrain over which a combat platform is immobile) due to traction loss in wet, temperate areas.

A vehicle's mobility is impacted by its tractive ability over various soil types (dry, wet, sand, or snow-covered) and its ability to maneuver over obstacles, cross gaps, and negotiate varied vegetation. As a general rule of thumb, a lower VCI not only equates to better soft-soil mobility but also indicates better performance on slopes, in sandy terrain, over obstacles/gap crossings and when overriding vegetation.[2] From a mobility perspective, *tracked vehicles offer the best solution for a versatile platform that is required to operate over diverse terrain, including extremely difficult ground,* because tracks inherently provide a greater surface area than wheels, resulting in a lower VCI.[3] Recent operations in Bosnia have demonstrated the inherent weaknesses of wheeled vehicles with regard to mobility and protection.[4] When operations were conducted on roads, wheeled vehicles demonstrated excellent mobility and speed; but when off-road usage was required, and wet or snow conditions prevailed, mobility suffered.

Wheeled vehicles inherently attain faster road speeds and, therefore, offer the best solution where unrestricted mobility is not the primary mission driver and on-road usage exceeds off-road usage. So, vehicle weight and off-road usage constitute two key criteria for mobility. Figure 2 compares the average 100 km mission travel time for both wheeled and tracked platforms as off-road usage increases (recall that mobility was defined as both freedom of movement and travel time over the terrain).

As off-road usage dominates the vehicle's profile, tracked configurations provide significantly better mission travel times. Consequently, Army studies indicate that when a vehicle's mission requires off-road usage greater than 60 percent and gross vehicle weight exceeds 10 tons, a tracked configuration is preferred for combat roles.[6] However, when the gross vehicle weight exceeds 20 tons and off-road usage remains above 60 percent, a tracked configuration is required to guarantee the best mobility for unrestricted, all-weather tactical operations.[7]

SURVIVABILITY. A combat platform's survivability is dependent on numerous criteria, to include mine and ballistic protection, size/silhouette, and stealthiness. Tracked vehicles, by design, are inherently more compact than wheeled vehicles.[8] The primary reasons for a tracked vehicle's compactness are reduced suspension clearance, wheel turning clearance, and the absence of multiple transfer cases and drive shafts that are integral to the design of multi-wheeled vehicles. Army studies have indicated that, for a comparable VCI (or ground pressure) at the same gross vehicle weight, wheeled platforms require up to six times more volume for drive train and suspension components than tracked platforms. This results in up to a 28 percent increase in vehicle volume if the same interior volume is maintained.[9] Survivability analyses clearly indicate that a larger size is more readily seen and subsequently hit and destroyed. Additionally, as a combat platform's size increases, so does the gross vehicle weight (provided the same ballistic and mine protection are maintained), which tends to degrade vehicle mobility and deployability.

In general, wheeled platforms are more vulnerable to small arms fire and grenade, mine, and artillery fragments, due to the inherent weakness of wheeled suspension designs, components, and tires.[10]


Figure 1

*Generally as Vehicle Ground Pressure Increases, Cross Country Trafficability Decreases*
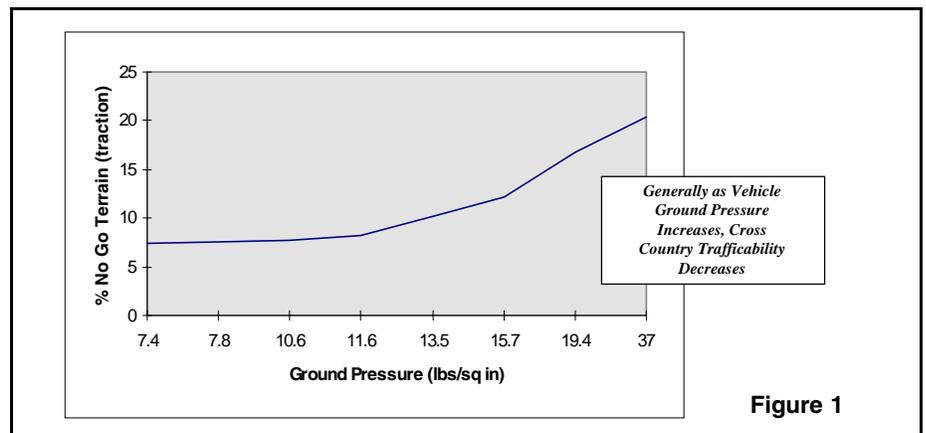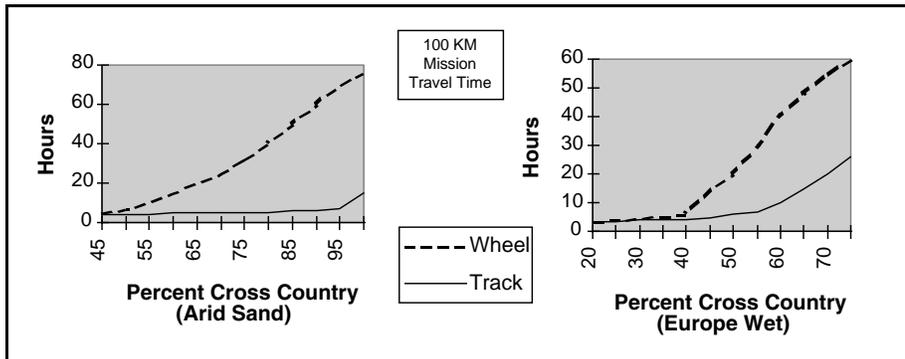
Figure 2[5]

Wheeled vehicles may now be able to continue movement for limited distances at reduced speeds when tires are punctured by small arms rounds, battlefield debris, or shrapnel, due to the advent of run-flat tires. Run-flat tires typically contain a hard rubber insert (some with nitrogen filled cells) inside the tire. The insert bears no vehicle load until the tire is punctured, at which point the load is transferred to the insert and vehicle movement may continue for a limited distance and speed.

On the plus side, wheeled platforms provide a reduced noise signature while moving, primarily due to less vibration and metal to metal contact on running gear. Improvements in track technology (i.e., Roller Chain Band Track) and decoupled running gear have decreased noise signatures for tracked vehicles, but not to the level attained by wheeled platforms.

Tracked platforms do provide a skid-steer capability which allows the vehicle to pivot steer (or neutral steer) and virtually pivot in place. This unique maneuver capability enhances survivability by permitting a 180-degree directional change when confined or built-up areas are encountered, and while traveling on narrow road surfaces.

From a survivability perspective, *tracked vehicles offer smaller silhouettes, reduced volume, enhanced maneuverability, and better ballistic protection, providing a balance that equates to a more survivable platform.*

SUPPORTABILITY. A combat platform's supportability is dependent on numerous factors, to include fuel usage, reliability, and O&S costs. Wheeled vehicles traditionally offer better fuel economy due to the reduced friction losses inherent in wheel/tire suspensions and running gear. The better fuel economy translates into smaller on-board fuel storage requirements or greater operating ranges for wheeled platforms.

Previous articles and studies have concluded that wheeled vehicles are intrinsically more reliable than tracked vehicles and, therefore, require less maintenance and supply support (spare parts). However, one must bear in mind that wheeled vehicles generally have a higher percentage of on-road usage while tracked vehicles incur more off-road usage. Obviously, the more severe cross-country terrain results in reduced reliability for the tracked vehicle. A recent test of the Up-Armored HMMWV, running a scout profile with 68 percent off-road travel, resulted in significantly lower reliability when compared to the same platform running at a tactical truck profile of only 40 percent off-road.

Given that wheeled platforms offer better fuel economy and reliability (to an extent), then Operating and Support (O&S) costs are lower than those demonstrated by tracked platforms. This makes wheeled platforms excellent candidates for support roles where overall mileage is high and primarily conducted on-road.

CONCLUSION. Figure 3 presents an overview of the

key advantages demonstrated by wheeled and tracked platforms based on thirty years of Army tests and studies.

Wheeled and tracked vehicles each exhibit advantages that can be optimized for the 21st century battlefield, provided the platform's combat mission, terrain profile and specific characteristics are carefully assessed. For combat vehicles, vice combat support or combat service support vehicles, Army studies unanimously conclude that a tracked configuration is the optimal solution for tactical, high-mobility roles (off-road usage greater than 60 percent), gross vehicle weights in excess of 20 tons, and missions requiring unrestricted terrain movement, continuous all-weather operations, smaller silhouettes/dimensional envelopes, and greater survivability.

Notes

[1]"Mobility Analysis for the TRADOC Wheeled Versus Track Vehicle Study, Final Report," Robert F. Unger, Geotechnical Laboratory, Department of the Army, Waterways Experiment Station, Corps of Engineers, Vicksburg, Miss., September 1988, 1.

[2]Ibid, 26.

[3]"Wheels or Tracks," *Military Technology*, Vol XVIII, Issue 7, Jul 1994, 14.

[4]"Is There Any Future for the APC," *Military Technology*, Vol. XXI, Issue 3, March 1997, 103.

[5]"Mobility Analysis," 48.

[6]"Wheeled Versus Track Vehicle Study, Final Report," Studies and Analysis Activity, Headquarters U.S. Army Training and Doctrine Command, Fort Monroe, Va., March 1985, 1-99.

[7]Ibid, 1-92.

[8]Ibid, 1-62.

[9]Ibid, 1-62.

[10]"Wheels or Tracks," 11.

Mr. Paul Hornback is a general engineer with the federal government. He is presently assigned to the HQ TRADOC Combat Development Engineering Division, Fort Knox Field Office, which provides reliability, maintainability, and systems engineering support to the Directorate of Force Development, Fort Knox, Ky. He holds a Bachelor of Science in Mechanical Engineering and a Master of Science in Industrial Engineering, both from the University of Louisville. His military experience stems from a six-year tour as a UH-1N helicopter pilot in the U.S. Marine Corps.

| Study Results	Tracked Vehicles	Wheeled Vehicles
Route Flexibility	✔	
Cross Country Mobility	✔	
Traction on Slopes	✔	
Road Speed		✔
Logistics		✔
O&S Costs		✔
GVW, Volume, & Payload	✔	
Maneuverability/Turning Radius	✔	
Transportability	✔	
Weight Growth Potential	✔	
Gap & Obstacle Crossing	✔	

Figure 3

*A Unit Tries to Improve
The Venerable 577 for
Better Commo, Battle Tracking,
And Mission Support*

by Captain Walter B. Sturek Jr.

The battle tempo of today's mechanized forces requires command and control capabilities flexible and mobile enough to keep pace with the fight. The current configuration of the M577A2 lacks the capability to effectively communicate with the force while moving. This article focuses on how to substantially improve the M577A2's capabilities, utilizing equipment and supplies currently available. To facilitate this discussion, I will utilize the heavy cavalry troop's TOC mount, the M577A2, as the base vehicle. The fast-paced nature of cavalry operations requires that this TOC be capable of performing its duties on the move. All modifications discussed are also directly applicable to the task force and brigade.

The basis for all modifications was the establishment of capability goals based on past experiences. These goals focused all modification efforts. Each modification made to the M577A2 had to meet the following criteria:

• Deployability/Durability - Each addition must be easily removable as a unit and withstand shipment and re-installation in pre-positioned equipment.

• Maintenance - Crew members and mechanics must have unrestricted access in order to conduct vehicle maintenance.

• Command and Control - Each modification must enhance the crew's capability to track battles while maintaining pace with the force.

• Planning - Modifications must enhance the crew's capability to mass-produce orders (without external power support) and provide a semi-sterile environment for the commander to plan while maintaining noise/light/litter discipline.

• Load Plan - Modifications must enhance the vehicle's load plan to minimize crew difficulty in accessing personal equipment while ensuring that personal equipment does not clutter available working space.
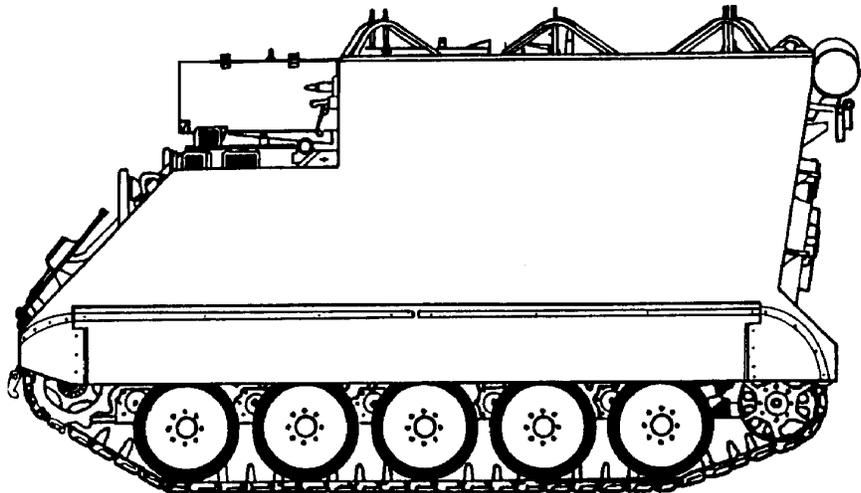
Modernizing the M577A2

• Mobility - Modifications must improve TOC set-up and tear-down times.

Considering these criteria, modifications focused on improvements in the vehicle's communications equipment, mission support equipment, and battle-tracking equipment. This article discusses each modification and concludes with a cost and time estimate.

Communications

The current M577A2, equipped with a standard VIC-1 configured with four SINCGARs radios (VRC-92x - Long-range/Long-range), inhibits the crew's capability to track the battle while moving. With all four radios on, each crew member connected to a C-box station constantly hears traffic on all four radios through his CVC helmet. To fight this problem, my crew constantly employed quick commo modifications. The set-up of each modification depended on whether we were moving or stationary. Every time we reconfigured, we incurred a temporary loss of communications. After suffering through a squadron-level exercise with this system, we researched

current vehicular communication systems available in the Army supply system to fix this problem. We found the solution in the field artillery's FIST-V (M981). Its VIC system enables each crew member to monitor any combination of radios through each C-Box. The following figure depicts a simple schematic of this interface.

The black circles represent toggle switches that control the input/output of each radio to the CVC. This system enables each crew member to monitor any combination of nets. This is especially beneficial for the cavalry troop XO, allowing him to focus on any net, based on information requirements. These special C-boxes are not compatible with the TOC's standard 1780. The complete system requires the installation of the special M981 1780 and C-boxes. Installation entails simply replacing the M577A2 1780 and C-boxes with the M981's 1780 and C-boxes.

Complete communications security in an assembly area requires land line communication with the TOC via switchboard. In order to facilitate quick establishment of the troop "hot loop," we mounted the switchboard inside the TOC. This versatile wooden mount provides a permanent location for plugging in WD-1 wire leads from platoons. This modification also reduces the time for TOC setup/teardown and establishment of the "hot loop."

The final modification made to TOC communications was a net recording capability. Installation of voice-activated tape recorders not only enables the crew to review key messages/FRAGOs for

Coffin Bench

Sets in center of the TOC on the floor, bolted into the floor

15"

15"

60"

Figure 2.
Coffin Bench

LIGHTS

1523 | VA | 1523 | VA | TAPE RECORDER
1523 | | 1523

C-BOX

1780

SENSITIVE ITEMS

22.5"

FMs, TMs, DA FORMS

C-BOX

REAR

SWITCHBOARD

REPORT | REPORT | REPORT | REPORT | REPORT

FRONT

18"

54"
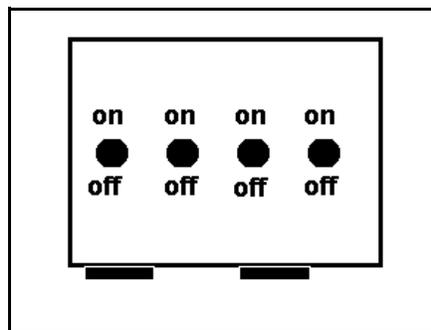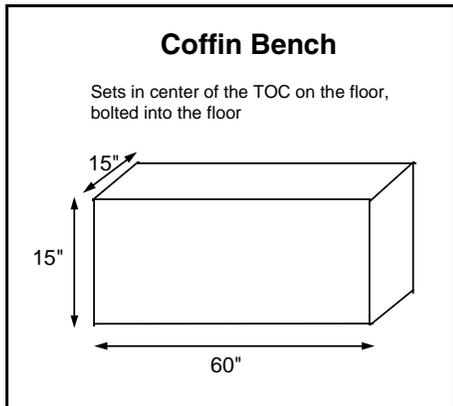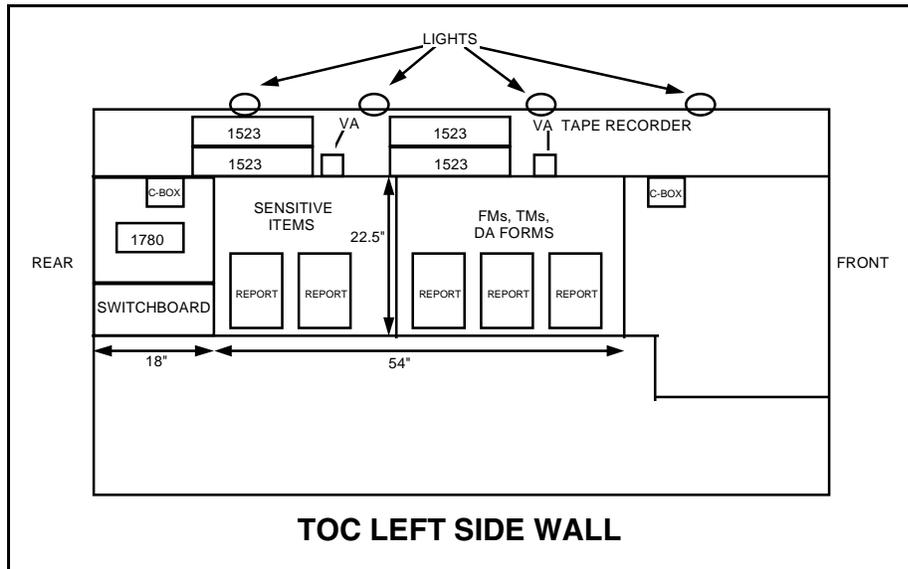
Figure 3.
TOC Left Side Wall

TOC LEFT SIDE WALL

LIGHTS

INVERTER

C-BOX

FRONT

MAP BOARD & CLASS II STORAGE AREA

38"

REAR

BOX - 53"

BATTERIES

MAP BOARD - 75"
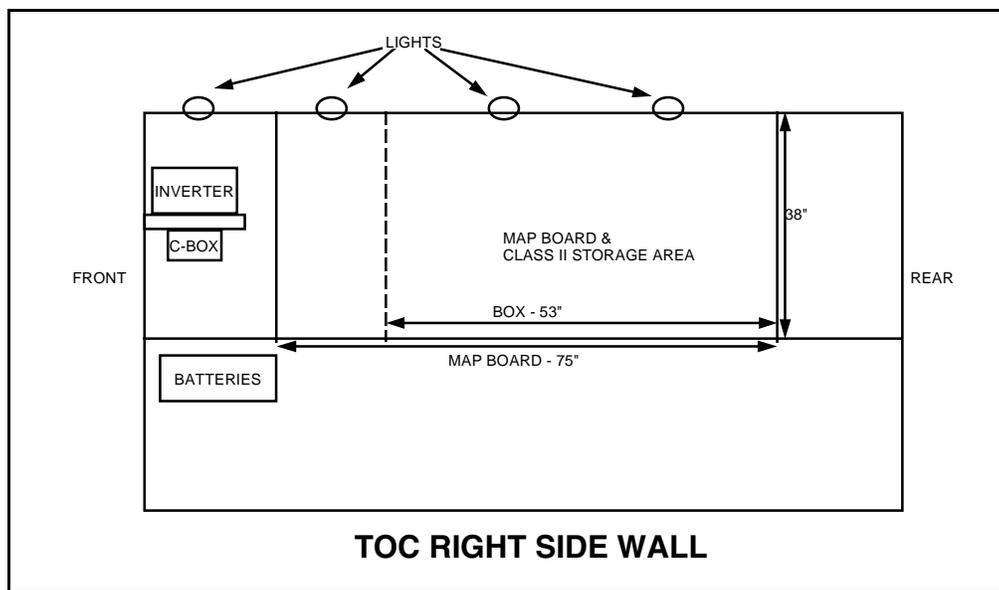
TOC RIGHT SIDE WALL

Figure 4.
TOC Right Side Wall

FRONT VIEW

SIDE VIEW

22"

12"

WOOD SCREWS

36"

38"

75"

4"

53"

24"

MAP BOARD/CLASS II STORAGE BOX DIMENSIONS
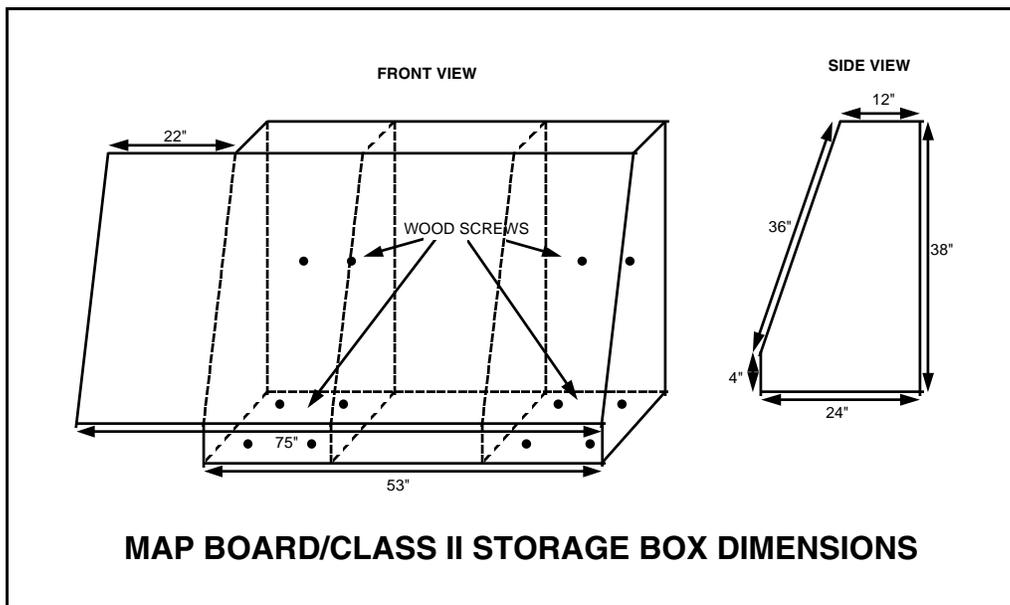
Figure 5.
Map Board

"The modifications discussed enhance the capabilities of the M577A2 to perform its mission as a tactical operations center."

Cost Estimate

> Amplifier, Audio frequency (1780) - - NSN 01-144-5970	$4,045
> Cable, Splitter - x 4 - NSN 01-348-2264	$1,156
> Control Intercom Unit (Charlie Box) x 4 - NSN 01-144-5995	$9,756
> Inverter	$ 724
> Copier Machine w/Toner	$ 820
> Plywood (2) 4x8 sheets	$ 50
> Wood (3) 2x4	$ 10
> Cork Board	$ 24
> Voice activated Tape Recorders x 4	$ 160
> **Total cost for (1) Troop/Company TOC =**	**$16,745**

Figure 6. Cost Estimate

clarification but also facilitates AARs. In order to eliminate background noise from within the TOC, the recorders must directly interface with the radio mount. To do this, splice the microphone cord from the tape recorder with a connector of an old hand mike, and then plug the hand mike connector into either the speaker connector of the radio mount or directly to the RT.

Mission Support Equipment

Mission support equipment modifications modernized the TOC's planning process and decreased the time for producing an OPORD. Current TOC configurations utilize the SICUP extension with AC-powered fluorescent lights. Powering these lights poses no problem for the battalion task force or brigade equipped with generators. Organic power provided by the M577A2 only powers DC equipment. The solution to this problem was the purchase and installation of a power inverter. The power inverter we installed was a 24-volt system producing 1800 watts. A 24-volt inverter reaps the benefits of the M577A2's 24-volt system and has easily replaceable 40 amp automotive fuses. This amount of power facilitates the use of a laptop computer with printer, as well as a copier, without requiring external power assets. The laptop computer and printer provides the commander an interface for filling in a shell troop OPORD format and produces a legible hard copy order. The copier machine enables the TOC to mass-produce hardcopy OPORDs for issue. The copier machine also proved invaluable in copying small overlays (8½ x 11) produced by the commander. The commander's HMMWV solves temporary storage problems by transporting the copier when the TOC is on the move.

Internal modifications to the M577A2 consist of a new map board, book shelf, and storage box (coffin). The internal map board mounts on the right wall and shelf of the TOC. Hinged at the top, this map board installs as a complete unit with approximately seven screws and provides internal storage space for supplies and BII. Its design facilitates easy access to the TOC's battery compartment while mounted. Its ease of installation/removal makes it easily deployable. The map board's large surface area for maps, and its angled front, allows the user (especially the commander in the planning process) to modify graphics. The angled map board accomplishes this by providing a user-friendly slightly horizontal surface. Glued to the map board underneath the map are 12"x12" cork panels. The cork facilitates the use of colored pushpins for tracking unit/vehicle locations. Mounted on the left sidewall is a bookshelf for storage of FMs/TMs and supplies. Finally, the crew's gear mounts on the sides of the TOC by attaching two steel cables (ramp tiedown cable for rail-loading) along both sides of the vehicle. Mounting the crew's gear in this fashion eases access to TA-50 and frees space on top of the vehicle for stowage of the extension and other equipment.

Tracking the Battle

The modifications discussed enhance the crew's ability to track the battle while maintaining pace with the troop. Even with these modifications, battle tracking in the M577A2 requires a sound SOP and a well-trained cohesive crew. Effective battle tracking during offensive and defensive operations requires a four-man crew consisting of a dedicated driver with three RTOs: troop XO (monitors troop and squadron command), NBC NCO (monitors O&I), and the commo chief (monitors A&L). In order to minimize internal vehicular noise during halts, the commander's HMMWV slaves to the TOC. This minimizes internal noise for the RTOs and eliminates the need to start the vehicle for battery charging. When the commander's HMMWV is available during the planning process, this technique also eliminates the need to utilize the M577A2's noisy generator and engine.

Cost Analysis

All modifications discussed are available through the supply system or obtainable through local purchase. Figure 6 details the costs.

Although somewhat costly, the communication modifications comprise the most critical enhancements to the M577A2. Most units fielding the new VIC-3 system are only fielding it with the M1A1 tank and M2 Bradley. The M981 VIC system is available now (CL IX). Local purchase items include the copier machine, tape recorders, inverter, and cork boards. Plywood and 2x4s are available on most installations. It takes approximately 20 hours for complete construction/installation of all modifications (2-3 hours for the commo system, 17 hours for the map board and bookshelf). Removal of the bookshelf/map board takes approximately 15 minutes.

The modifications discussed enhance the capabilities of the M577A2 to perform its mission as a tactical operations center. Although focused at the cavalry troop TOC, the criterion of deployability, ease of maintenance, durability, and communication enhancement applies to both battalion- and brigade-level TOCs. Offensive operations require a mobile and efficient command and control node. The modifications discussed above transform the standard M577A2 into this essential platform.

CPT Walter B. Sturek Jr. is a 1993 graduate of the the United States Military Academy. He has served as a tank platoon leader, scout platoon leader, and cavalry troop executive officer in 3/3 ACR. Key personnel in development of these modifications were CPT Richard D. Moon, 1LT Ernest Litynski, SSG Mark Kastner, SPC Daniel Sumners, PFC Marotz, CPT Neil Corson, and SFC Lawrence Eversole.

The Modernization of Austria's Mechanized Forces

by Walter A. Hamburger

Shortly after this article was accepted, Walter Hamburger passed away, according to colleagues at his Vienna law firm.

Until the collapse of the Soviet Union, Austria stood between two large military blocs, NATO and the Warsaw Pact, a situation that did not seem without danger to the country. But during those years, the Social Democratic Party leading the coalition government was convinced that there would be no war in Europe soon, and that conclusion, along with the fact that Austria was a neutral country, resulted in her army getting the smallest military budget (less than 1 percent of the GNP) in Europe.

One result was that the military could not buy much in the way of heavy weapons. Instead, something called the small-unit defense concept was developed. Key zones were identified, avenues of approach that any aggressor would have to pass through, and these zones were fortified. Old Centurion tanks were bought at scrap prices and the turrets, with their excellent 105mm guns, were mounted in concrete bunkers. In this way, the nation obtained a large number of antitank bunkers, well displaced in the terrain, for the scrap price of some worn-out MBTs.

When the Eastern Bloc fell apart at the end of the '80s, Austria's geopolitical situation changed. The possibility arose that the four independent states that came into being along her borders might become involved in warlike disputes. In fact, such an event occurred much sooner than expected. In 1991, the Yugoslav war of secession brought fighting to Austria's southern borders. Serbian grenades hit Austrian territory, and airplanes overflew Austria as far as Graz, a provincial capital. These flights, which stopped when Austrian interceptor planes appeared, were partly for reconnaissance purposes, but some were attempts to attack Slovenian positions along the Austrian border from behind.

As a consequence, the Austrian General Staff developed a reorganization plan for the armed forces. On the one hand, it focused on antitank and antiaircraft defense. It also shifted the Army's focus toward defense of Austrian territory closer to the nation's borders. It was designed to allow the Army to be in a position to react faster, which also meant that troops would need greater flexibility and mobility. Given this new defense concept, the chronic lack of modern heavy weapons had to be addressed, and the purchase of such arms became an urgent priority.

Fortunately, Austria was in the market for heavy weapons at the same time many of the Cold War combatants were greatly reducing the size of their armies, so surplus arms were available at very low prices. The decision was made to purchase these surplus weapon systems and upgrade them, partially with modifications manufactured in Austria. This would allow a great improvement in capability at a low cost, and also help to lower the rate of unemployment.

First, 112 M109A2 and A3 self-propelled howitzers were purchased from a downsizing British Army of the Rhine. These, together with M109s which were already in the Austrian artillery arsenal, will now be brought to the Austrian M109A5 ÖE standard. These refits include new Austrian hydraulic rams and primer magazines, which allow the rate of fire to be doubled, new barrels that extend the firing range to about 30 km, and navigation upgrades that will allow the howitzer crews to set up in their firing positions autonomously. In addition, the modified howitzers will be able to carry a larger quantity of ammunition and will be equipped with a reinforced hydraulic system, as well as being able to provide higher electrical and engine output. Before the offer relating to the British howitzers became known, 54 M109s had been ordered in the U.S.; these will also be modified to the A5 ÖE type.

Austria is now testing a battle area radar and artillery reconnaissance and firing system. These systems will be able to detect and distinguish mobile targets on the battlefield, day and night, in any weather conditions. They will be able to detect the firing of artillery, heavy mortars, and rocket launchers up to a battlefield depth of 15 km with a precision of 100 m in azimuth and 10 m in range, as well as being able to control friendly artillery fire.

The M109A5 ÖE navigation system will enable each individual gun crew to determine the coordinates of its firing position, transmit them by radio to the computer, and act independently. The systems will make the guns almost "semi-autonomous," and thus minimize reaction times by speeding position reference and surveying.

The electronic artillery fire control system consists of an artillery computer, a data input-output unit for the observers, and a data input-output unit for the guns. With this system, it will no longer be necessary to transmit the full wording of firing orders or requirements by radio or wire from the artillery to the computer. Fire control decisions can be transmitted by pushing a button. This shows how much the transmission of firing orders is accelerated by the introduction of this system.

As a result of the purchase of the various models of the M109 howitzers and their modernization, it was possible to take all towed artillery pieces, most of them World War II models, out of service. Thus the Austrian artillery is to be equipped with refitted, but very up-to-date, armored self-propelled 155mm howitzers at a very reasonable price. The Swiss Army has joined Austria in this artillery upgrade project, and since both countries have a relatively large number of these systems, almost 500 of the armored self-propelled 155mm howitzers of the latest standard will exist in Central Europe in the near future.

While a recently planned modernization and reinforcement of air defense is on the drawing boards, acquisition has now been postponed for one to two years. Instead, money will be spent on armored vehicle acquisition, a package of 585 vehicles. It includes new armored vehicles of Austrian design and refits, in Austria, of second-hand foreign tanks,

Austria is buying 114 used German Leopard IIs, above, from the Dutch Army.

About 90 Jaguar antitank missile carriers, at right, came from the German Army. They are built on the Marder chassis and mount the HOT K3S antitank guided missile.

The Ascod tracked IFV, above, is a joint Austrian-Spanish collaboration. Its turret mounts a 30mm Mauser dual-feed automatic cannon.

Also entering the Austrian inventory has been the Bofors BILL antitank guided missile, which is capable of shaped-charge top attack of vehicles hidden in defilade positions.

again to create employment opportunities. The cheaply-purchased surplus vehicles will be brought up to the latest standard, a great step forward for the Austrian Army.

The armored vehicle acquisitions include about 90 Jaguar missile-armed tank destroyers that will be purchased from the German Army to replace Austria's Kürassier cannon-armed tank destroyers used by the antitank defense companies in the armored infantry battalions. The Jaguars are equipped with launchers for the HOT/K3S, a 4000m-range missile which has a tandem warhead able to penetrate 1300mm of RHA, even if the target is equipped with additional reactive armor. With these systems, the Austrian Federal Army will have, for the first time, antitank weapons of the most modern type and long range. Eight missiles are stored in a drum magazine and can be reloaded automatically. The missile's hit probability is greater than 94 percent and the rate of fire is also remarkable. The Kürassiers will be used to reinforce the antitank defense units of the rifle brigades, with each brigade getting 16 of these systems. The fighting power of the Kürassiers will also be considerably increased by a refitting program.

To strengthen and modernize its armored forces, Austria is getting 114 Leopard IIs from the Dutch Army. These MBTs, which are one of the most modern, replace M60A3s. With their 120mm gun, low silhouette, and powerful engine, the Leopard IIs have a fighting capacity three times higher than that of the M60A3s with which the Austrian army has been equipped until now. The Austrian Leopard IIs will also undergo a refitting which might be similar to the upgrades done by the German Army. After this, the Leopard IIs will be like new, but at a low price, and will constitute a considerable reinforcement of Austrian mechanized troops.

As a first installment for hardening the rifle brigades, an order was placed some time ago for 68 wheeled armored personnel carriers. These Pandur APCs, which will be used by Austria's UN peacekeeping forces, are being built by the Austrian Steyr company. When the delivery of this Pandur lot is completed, production will begin on the 269 Pandurs which will be part of the Army's armored vehicle upgrade package. Beyond

The Pandur armored car, in the reconnaissance version, above, and in the armored personnel carrier role, at right.

that, another buy of 200 Pandurs is expected.

The Pandur's three, equally spaced axles effectively spread its ground pressure, and the two pairs of front wheels are steerable, to permit tighter turns while allowing the driver to continue steering even if one of the front wheels is damaged. The independent wheel suspension results in extremely good cross-country mobility and allows a low silhouette, with the top of the hull reaching only 1.81 m with a road clearance of 42 cm.

A built-in control unit allows adjustment of tire pressure, even during action, to permit selection of the optimum ground pressure in any type of terrain. All wheels are provided with "run-flat" tires which permit continuation of the mission for another 50 km, even if the tires are damaged. Extremely good springs and shock absorbers allow high speed both on the road (100 km/h) and across rough terrain. The armor protects against armor-piercing ammunition of 7.62mm caliber, as well as against fragments of 155mm shells. Protection can be increased across the frontal arc against 12.7mm and 14.5mm ammunition.

The 269 Pandurs will be in several variants, 224 armored personnel carriers equipped with 12.7mm machine guns, and 45 armored reconnaissance vehicles with two-man turrets carrying 30mm Mauser machine cannons with dual-belt feeding. Later additions will include carriers for battlefield surveillance and between 30 and 40 vehicles armed with HOT 4000 missiles as tank destroyers. Kuwait decided to purchase the Pandur after testing it in the desert, but the provisions of Austrian law do not permit the delivery of war materiel to areas of tension, so these APCs are to be assembled by a U.S. subsidiary of the Austrian

Steyr company and will be armed with 30mm Bushmaster machine cannons. Moreover, the Belgian Army ordered quite a number of Pandurs, and Slovenia will also build them under license for her army.

The last item in the armor acquisition package is the Ascod tracked armored infantry fighting vehicle, which was designed and built by the Austrian Steyr company in cooperation with the Spanish Empresa Nacional Santa Barbara, with the predominant share of the components being manufactured in Austria. The Spanish Army has already ordered a number of these vehicles. The Ascod is equipped with the same two-man turret, mounting a Mauser 30mm machine cannon as well as a coaxial 7.62mm machine gun, as the Pandur. Because of the seven track rollers, the pressure on the ground is only 64.9 kPa. The road speed of the IFV Ascod is 70 km/h. It seems that at least some Ascods per unit will be equipped with long-range antitank rockets. At critical points, the armor will withstand 3 cm projectiles.

What appears remarkable and what makes the Ascod one of the best IFVs is that its engine power is almost the same as that of the M60A3 MBT, but with only half of its weight (M-60 471 kW and a weight of 50.2 t, compared with 441 kW and 27.3 t of the Ascod which, moreover, has an automatic six-speed gearbox. The electrically-traversed two-man turret of this IFV is equipped with a thermal sight for the commander and the gunner and a laser rangefinder. The 30mm Mauser machine cannon is stabilized and has a rate of fire of 800 rounds per minute. Both high explosive and subcaliber projectiles feed alternatively from the left or right, with the latter able to penetrate RHA steel of 120 mm from a distance of 1 km.

In addition to acquiring the armor systems, Austria will also substantially strengthen its antitank defenses within infantry brigades, a decision spurred by the changing geopolitical situation in Austria's neighborhood. The number of Swedish Bofors "Bill" antitank missiles, top-attack weapons with a 2000m range, is to be increased by new purchases so that each brigade will receive 30 systems. At the same time, they will replace the 106mm recoilless rifle systems, which will be taken out of service. Also envisaged is the future purchase of a large number of light antitank rockets, probably of the Panzerfaust 3 type, capable of substantially better performance and the ability to be fired from indoors.

How carefully the Austrian Army handles its limited budget is shown by the fact that it did not buy the M578 armored recovery vehicles along with the M109 howitzers from the British Rhine Army because these were apparently too expensive or in a bad condition. Rather, 30 of these vehicles were acquired at a scrap price from the Dutch Army and brought to an almost new condition by the Austrian military repair workshops.

With this acquisition plan completed, Austria's armored forces and antitank troops will enter the beginning of the new century meeting a new and higher standard.

Walter A. Hamburger was a native of Austria and had a degree in Electrical Engineering. As a student of military history, he wrote numerous articles for, among others, the British Army Review, and two booklets with the titles "Österreichs Wehr - und Sicherheitspolitik im Visier" (A critical look at Austria's defense and security policy) and "40 Jahre Österreichisches Bundesheer" (40 years of the Austrian Federal Army).

Spain's Armor Force Modernizes

From U.S. M48s and M60s To the Leopard Family and a New IFV, Spain's Armored Force Is in Transition

Spanish Army Leopard 2 A4s parade in Madrid on Spanish Armed Forces Day.

by Lieutenant Colonel Antonio J. Candil

The Armor - 2000 Program

The Spanish armored force's ambitious modernization program started in 1991-92, when redundant American equipment became available as a result of the TLE (Transfer of Limited Equipment) Treaty. The redundant American equipment, deployed in stocks all over Germany, was to be transferred to some of the less well-equipped NATO armies. Spain received some 400 M60A3 MBTs, a big improvement for an armored fleet then mainly composed of M48A5s and upgraded AMX-30s. While the M60s were a significant improvement, they were not considered adequate for the 21st century. The Spanish Army made its case to the Ministry of Defense, which was the origin of the Armor 2000 program. It calls for Leopard 2 A5 MBTs, with a plan to introduce them by the end of the century.

The Birth of a Project

The acquisition of the Leopard 2 weapons system grew into a Spanish Army General Staff program to integrate modern armor into the Spanish Army. *"Programa Coraza - 2000"* (Program Armor - 2000) was created in March 1995 by order of the Army Chief of Staff and after approval of the Defense Minister.

Coraza - 2000 has not yet reached its maturity, but has already managed not only the beginning of the Leopard 2 ac-quisition, but also other important developments as well, like the procurement of the newly developed Ascod infantry/cavalry combat vehicle, nicknamed "Pizarro" in Spain. This new tracked armored vehicle, jointly designed by the Spanish company SBB (Santa Barbara Blindados) and Steyr, the well known Austrian manufacturer, promises to become a successful product and could likely be adopted by other armies in Europe and elsewhere.

Since its creation, Coraza - 2000 has focused on the initial steps needed for the integration into the Spanish Army of the Leopard 2 A4 tanks received from surplus stocks of the German Bundeswehr, while preparing the industrial and military effort required to produce the Leopard 2 A5 tank, or Leopardo 2E as it will be called by the Spanish Army.

Coraza - 2000 grew out of the previous and existing program that, since 1992, had been managing deliveries, reception, and integration of the M60A3 MBTs, M110A2 8-inch, self-propelled howitzers, and other various armored vehicles, such as M113 APCs and M548 cargo/ammunition carriers. The program is responsible not only for procurement of all this equipment, but also for support, including logistics, training, allocation of resources, and budget management. As anyone familiar with these issues can imagine, a day at work within Coraza - 2000 can be a hectic and thrill-ing experience. The program is organized as a management directorate with authority to submit instructions and directions to all the Army subunits concerned. It includes general management, logistics and general support, training, technical specifications, budget control, administration, and personnel.

Logistics and general support takes into account transportation and, in particular for those involved in the Leopard 2 Project, procurement of spare parts and maintenance support. It is also involved in the definition of technical and general criteria for the maintenance of the Leopard 2 A4 tanks recently issued to operational units. Training refers to the general organization of courses, preparation of technical and field manuals, procurement of training aids and simulators, and support to training centers.

These days, all this activity focuses on three main weapons systems: the Leopard 2 MBT, the Ascod/Pizarro AIFV, and the Auxiliary Armored Vehicles projects, which include the combat engineer vehicle, a new armored bridge-launching vehicle, and an armored recovery vehicle, all based on the M60.

Coraza - 2000 works under direct orders and supervision of the Director for Procurement of Equipment and Armament (DIAM) at the Army Logistics Command (MALE), a two-star general. The program is led by a brigadier gen-

The Leopard 2 A5s, above, will be the backbone of the Spanish Armored Force. Also joining the force will be the new Pizarro AIFV, a joint Spanish-Austrian project, armed with a 30mm autocannon.

eral belonging to the combat arms, assisted by a chief of staff with the rank of lieutenant colonel or full colonel, also from the combat arms. Officers and NCOs working at the program belong either to combat arms — mainly Armor and Infantry — or to the Technical Engineers Corps, which is equivalent to U.S. Army Ordnance.

The LEOPARD 2 Project

The aim of the Leopard 2 Project is to guarantee the smooth integration into the Army of the Leopard 2 A5 as the main battle tank of the Spanish Army in the next century. Under a leasing agreement, the German Army has provided the Spanish Army with 108 Leopard 2 A4 tanks. So far, these tanks have equipped two mechanized infantry brigades integrated into the mechanized division that is Spain's contribution to the multinational army corps-size unit, EURO-CORPS, formed by France, Germany, Belgium, Spain, and Luxembourg, with its headquarters presently located in Strasbourg, France.

The leasing of these 108 tanks is linked to an agreement calling for Spain to start production in 1998 of at least 200 new Leopard 2 A5 tanks. The Army has received approval from Spain's Ministry of Defense to procure a total of 320 MBTs, along with 23 Buffel 3 armored recovery vehicles. These tanks are going to be produced by Krauss-Maffei of Munich, under some kind of industrial cooperation agreement with Spanish companies. Negotiations have been taking place for several months and a formal contract is due to be signed.

The Ascod/Pizarro AIFV Project

On February 9th, 1996, the Spanish Council of Ministers finally gave the green light to the procurement of the Ascod Pizarro, a newly developed infantry and cavalry combat vehicle. More than 400 will be provided in the next ten years, completely replacing old M113 APCs in the mechanized infantry units and cavalry formations.

This new armored combat vehicle will form the backbone of the main defense forces, together with the Leopard 2 A5, well into the next century. Several different versions of the Pizarro are expected to be developed, including a CP version, a mortar and fire support vehicle, and an ambulance, all due in the short run.

The Austrian Army has already selected this vehicle for its mechanized units as well, and an initial batch of 112 Ascod vehicles will be procured to start replacement of the Saurer 4K4E/F APCs still in service. Recently, the Austrian Army has also started procuring surplus Leopard 2 A4 MBTs from the Dutch Army to replace M60A3 tanks.

The Ascod/Pizarro AIFV has a combat weight of 24 metric tons, is armed with a Mauser 30 mm cannon, and carries up to six infantrymen. It took part in a recent competition organized by the Norwegian Army, together with the U.S. M2 Bradley and the Swedish CV 90, and performed very well, even though the Swedish vehicle won the contract.

Auxiliary Armored Vehicles Projects

As M60A3 TTS tanks will still remain in service for several years, in second-line units or mobilization forces, Coraza - 2000 will continue keeping an eye on their status and operational readiness. Nevertheless, as the combat value of the M60 has faded, several projects have begun to adapt them into a family of auxiliary armored vehicles, always very much needed by the combat forces.

Started already is the development of a new armored vehicle launching bridge (AVLB), based on the M60A1 chassis and equipped with the new MLC 70 class Leguan bridge, which is capable of supporting the new Leopard 2 A5 tanks, as well as any other tanks and armored vehicles in the Spanish inventory. For the time being the Army has contracted for an initial 12 vehicles. A new combat engineer vehicle based on the M60A1/A3 tank is also being developed; this has an external appearance similar to the U.S. M728 CEV, but without the 165mm demolition gun, to be replaced by a special backhoe. It will also have a front-mounted dozer blade. An initial batch of 38 vehicles is being procured now. Both projects are conducted in close liaison with Engineers at the Army Logistics Command.

An armored recovery vehicle has been developed, also using the chassis of upgraded, but old, M47 E2 tanks, (these tanks in fact were upgraded to M60 conditions and most of its parts are interoperable with M48A5 and M60 parts), thus obtaining a cheap and efficient recovery vehicle capable of working with most light armored vehicles and MLC 60 vehicles. It can also haul self-propelled artillery howitzers and guns of the M109 and M110 types, but is not capable of hauling the new Leopard 2 A5 tanks, which is the reason the Leopard 2 project will procure an initial batch of 23 "Bergepanzer 3 Buffel" of MLC 70, that will be coproduced in Spain, too.

In the longer run, other projects could come as well, including self-propelled armored antiaircraft vehicles, with both guns and missiles, and a new SP artillery, based on 155/52 long-range guns.

"The Defense of Kozda"

Situation

Enemy. The S2 reports that within the brigade's area of operations, the 13th MRD is conducting an attack to seize Kodza Airport a key logistical site, that will allow enemy forces easy access into the theater of operations. Within the battalion's area of operations, the 3rd MRR is conducting an attack to seize the city of Kodza. This will allow the regiment to seize additional logistical sites (hospital, stores, and water) that will support the division.

The most probable course of action is for the 3rd MRR to attack along Avenue of Approach 1, enveloping the TF from the west maximizing their combat power. The most dangerous course of action is for the 3rd MRR to attack with two MRBs abreast, forcing us to fight in two directions and deny us the ability to concentrate our combat power.

Friendly. TF 3-37 defends BP 22 at 260630SEP98 to destroy enemy forces in EA Crush in order to protect the western flank of the brigade's main defense vicinity of the Kodza Airport.

Company Situation. You are the commander of Charlie Team (tank heavy), TF 3-37. You are the main effort of TF 3-37 that is defending in sector. The brigade commander wants the task force to protect the west flank of the BDE main effort TF 2-10 AR, which is defending a key logistical site (Kodza Airport) east of the city of Kodza. Delta Company has been attached to TF 2-10. TF 3-37 is arrayed with two companies forward and one back. Bravo Team is occupying BP 1, oriented on TRPs 2 and 3. Alpha Team (mech) is occupying BP 3, oriented on TRPs 2 and 4. The TF commander's intent is to destroy the enemy in EA CRUSH by establishing a deliberate defense on BP 22, reinforced by extensive obstacles in the engagement area; this will deny the enemy from seizing the city of Kodza (See Figure 1).

Your team consists of two M1A1 tank platoons and one infantry (BFV) platoon and a MANPACK Team. You have priority of mortars and are responsible for triggering artillery targets AB001
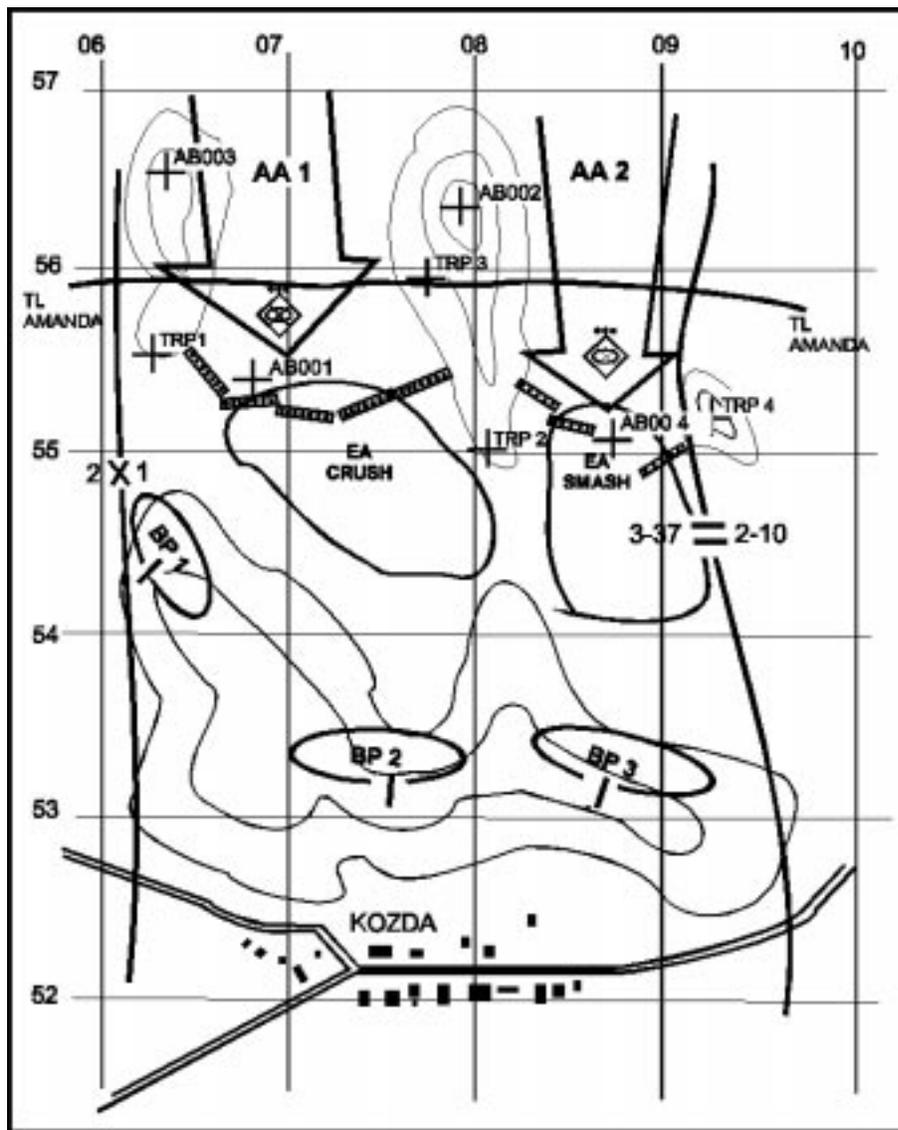
Figure 1. Mapboard for the defense of Kozda.

through AB003. Currently, the company is occupying BP 2, oriented on TRPs 1 and 2 and is backed down in turret down positions, having withstood an initial artillery bombardment. However, you have taken some losses.

1st Platoon (mech) is down to 3 BFVs, while 2nd Platoon reports that one tank has received heavy track damage and another suffered severe gun tube damage.

3rd Platoon reports no damage to any of their tanks.

Bravo Team has just made contact and destroyed three BMPs, and the TF scouts in the west report that the MRB will be in their sector within the next 15-20 minutes. As you are monitoring these reports, you hear Terminator 6 (TF commander) trying to raise the Alpha Team commander or his XO. He has lost all

radio communications with Alpha Team, and the last transmission the A Team commander sent was that he was engaging three armored vehicles and was down to 9 vehicles. The TF commander now believes that the MRR is attacking with two MRBs abreast along Avenues of Approach 1 and 2. The TF scouts in the east confirm this by reporting that an MRB is moving fast along Avenue of Approach 2 and will be in Alpha Team's sector within the next five minutes. The TF commander believes that the enemy will successfully penetrate Alpha Team's position, leaving his flank exposed. He orders you to block penetration of Alpha Team's sector (See Figure 2). You must act now! What do you do?

Requirement. In 5 minutes or less make your decision and issue your FRAGO and any other reports you would submit. Readers who submit their solutions to the scenario should provide the following: fragmentary order to the company team, the rationale behind your decision, and a sketch of your plan of action. E-mail your solution to: ThompsonM@ftknox-dtdd-emh5.army.mil, or mail your solution to ARMOR, ATTN: ATZK-TDM, Fort Knox, KY 40121-5210.

In the July-August issue of ARMOR, we'll include some of the solutions sent in by readers, along with the author's proposed solution.

On page 45, we recap the November-December issue vignette, "Ambush at Dogwood Crossing," and follow this re-cap with the author's solution.

-Ed.
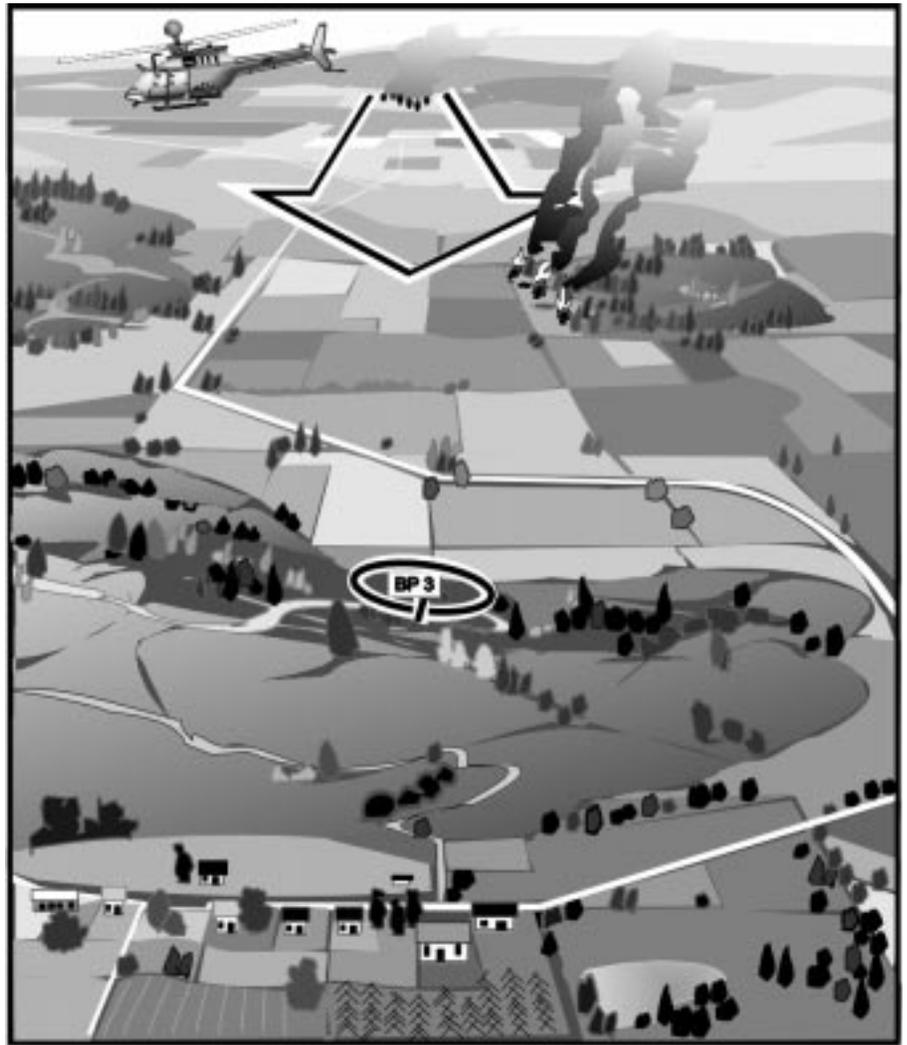
Figure 2. Aerial view from behind Battle Position 3.

CONFIDENCE *from Page 22*

in a foreign war. The armored vehicle is a tool that a professional Army can have and more effectively employ than a rag-tag guerrilla force like Hezbollah can. This advantage must not be squandered due to traditional inflexibility, employing excuses that the tank is not suited for the tasks asked of it whenever it suffers set-backs, and falling back until the tank is only useful for ego-gratifying tank-on-tank duels in the open. Nor should the tank be abandoned by *avant-garde* iconoclasm and nonchalance that we are somehow "above" having to use extreme measures to fight battles today. War is often an all-out, extreme activity — a struggle — not to be taken lightly. This struggle does not just take place during the actual fighting, but before — in the debates over force structure design, training, and equipping our forces. Now

is the time to win on the next battlefield by seeing it as *clearly* as possible and preparing for it, not what we wish it to be, but what it already is and will be.

Sources:

Ed Blanche, "Hezbollah find chink in IDF's Merkava armour," *Jane's Defence Weekly,* 29 Oct 97, p. 17.

Steve Rodan, "Israelis eye more Merkava armour," *Defense News,* 3-9 Nov 97, p. 8.

Mike Sparks is the director of the non-profit military reform think-tank, the 1st Tactical Studies Group (Airborne), which has two web sites at http://www.geoci-ties.com/Pentagon/5265/ and Penta-gon/7963/. Improvements to U.S. Army tactics, techniques, and procedures and equipment are given through official channels at no charge. Suggestions adopted include the wire-cutting feature on the M9 bayonet, all terrain bikes/carts, and the new tripod-carrying modification to the medium machine gun spare barrel bag. A former Marine officer and enlisted man, he is now in a Special Forces U.S. Army National Guard unit. A graduate of MC Basic/AIT, PLC OCS, Officer Basic, Infantry Officer Course, Army Airborne, Combat Life Saver, and IDF parachute school, he holds a Bachelor of Science degree in history/education from Liberty University. His works have been publish-ed in ARMOR, Infantry, Special Warfare, Army Logistician, Aviation Digest, MC Gazette, Naval Institute Proceedings, Be-hind the Lines, and the Fort Bragg Post and Fort Benning Bayonet.

THE PROBLEM:

"Ambush at Dogwood Crossing" from the
November-December 1997 issue of ARMOR

Situation:

Terrain (see Fig. 2, Battalion graphics)

Obstacles - Dogwood Creek is a natural obstacle which will restrict tactical movement because it offers only three fording sites within the area of operation.

Avenues of Approach - Axis California is a high speed avenue of approach that will allow maneuver to be masked by the high ground nearby and the wood line to the east of CP 5. Route Kayla is a dismounted avenue of approach that provides outstanding cover and concealment up to CP 6. Occupation of CP 6 will allow dismounts to engage suspected enemy armored vehicles to their flank, causing disruption to the enemy COA.

Key Terrain - Dogwood Creek is key terrain since the creek can restrict or impede friendly maneuver. The ridge line on PL Yorktown is key terrain because it affords outstanding observation to the north, which will provide an advantage to friendly or enemy forces.

Observation and Fields of Fire - The ridge line along PL Yorktown provides great observation and fields of fire because it is the high ground that dominates the terrain within the area of operation.

Cover and Concealment - The high ground near CP 5 and the wood line to the east of CP 5 provide great cover and concealment as friendly forces maneuver along Axis California.

Enemy. The enemy is conducting a defense out of contact. The 13th MRD has deployed a forward detachment (MRB) ahead of the division to secure a key logistical site five kilometers north of PL Yorktown (airfield). The forward detachment has been establishing hasty fighting positions and protective obstacles for the last 24 hours in preparation for the arrival of the main body within the next 12 hours. Our task force (TF 1) will attack against an MRC (along PL Enterprise) that the forward detachment has deployed forward to provide early warning and to disrupt and attrit enemy forces that enter their engagement area. The MRC is currently at 70% strength. The MRC has been identified by a UAV that flew over their positions two hours ago. The defending MRC deployed a CSOP 2-3 kilometers forward of its main defensive belt (along PL Yorktown) to provide early warning and call for indirect fire to harass enemy maneuver. The CSOP is an MRP which is reinforced with a tank.

Friendly.

Brigade

Mission: 1st Brigade attacks in zone 230630SEP97 to destroy enemy forces vicinity OBJ Amanda in order to allow 2nd Brigade (the division's main effort) to maintain freedom of maneuver as they attack north to seize key logistical site vicinity OBJ Brittany.

Intent: (Purpose) The purpose of this attack is to allow 2nd Brigade to attack north maintaining freedom of maneuver to seize the airport vicinity of OBJ Brittany. The airport allows the division to provide more responsive logistical support within the area of operation. We will accomplish this mission by conducting an attack with three TFs attacking abreast, enveloping enemy forces from the east and west. This will prevent the enemy from massing fires, forcing him to fight in three directions.
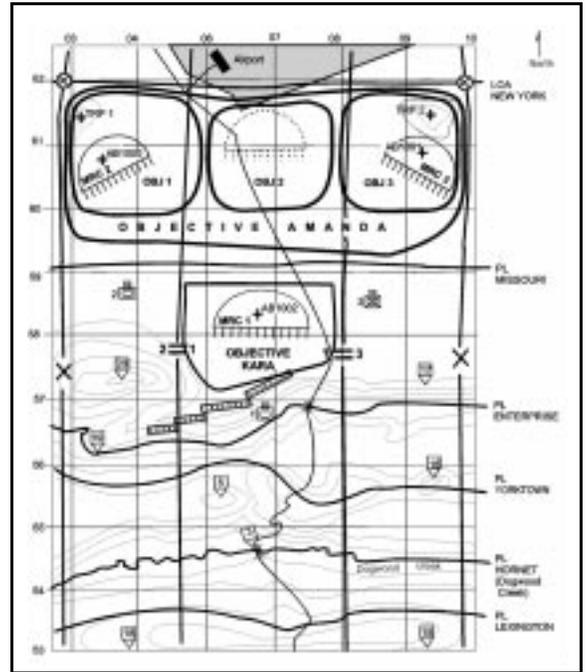
(End state). At end state, enemy destroyed in zone vicinity OBJ Amanda allowing 2nd Brigade to maintain freedom of maneuver as they attack north to seize OBJ Brittany (see Figure 1. Brigade Graphics).

Tasks to Maneuver Units:

TF 1 - Task: Seize OBJ Kara

Purpose: Allow 1st Brigade to maintain freedom of maneuver to destroy enemy forces vicinity OBJ Amanda.

On order, continue the attack north to destroy enemy in zone to LOA New York

Responsible for triggering brigade artillery target AB1002. Priority of artillery up to PL Enterprise

TF 2 - Task: (Brigade main effort) Seize OBJ (Amanda #1)

Purpose: To protect 1st Brigade's western flank

Responsible for triggering brigade artillery target AB1000. Priority of artillery at PL Enterprise

TF3 - Task: (brigade supporting effort) Seize OBJ (Amanda #3)

Purpose: To protect 1st Brigade's eastern flank

Responsible for triggering brigade artillery target AB1001

Task Force 1

Mission: TF 1 attacks in zone along Axis California 230630SEP97 to destroy enemy forces vicinity OBJ Kara in order to allow 1st Brigade to maintain freedom of maneu-

Figure 1. Brigade Graphics
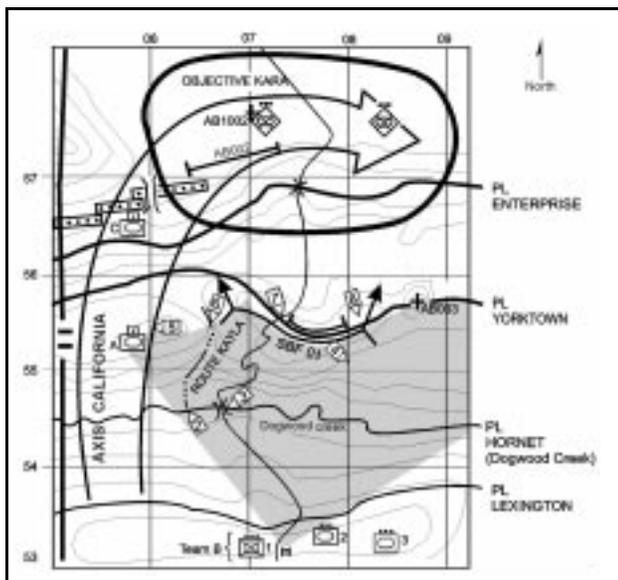
Figure 2. Battalion Graphics

ver and maximize its combat power as it attacks to destroy enemy forces vicinity OBJ Amanda. On order, continue to attack north to LOA New York, destroying enemy forces in zone.

Intent: (Purpose) The purpose of our attack is to destroy enemy forces in zone. This will allow 1st Brigade to maintain freedom of maneuver and maximize its combat power as it attacks to destroy enemy forces vicinity OBJ Amanda. We will accomplish this mission by conducting an attack enveloping enemy MRC 1 from the west. (End state) At end state, OBJ Kara has been seized, and TF conducting consolidation and reorganization operations in preparation to continue the attack north to LOA New York.

Tasks to Maneuver Units:

TM A - Task: (TF main effort) Seize OBJ Kara.

Purpose: Prevent MRC 1 from attacking into the flank of TF 2 or TF 3

Assault force during TF breaching operations

Responsible for firing one green start cluster at PL Enterprise to signal TM B to lift fires

Responsible for triggering artillery targets AB1002 and AB002

Priority of fires at PL Yorktown

Accept one tank platoon from TM C to maximize combat power to seize OBJ Kara, effective immediately

TM B - Task: Support by fire

Purpose: To suppress enemy forces on OBJ Kara in support of TM A's attack

Occupy terrain vicinity SBF 01, which will provide effective suppressive fires on eastern MRP

Lift your fires as TM A fires one green star cluster as they pass PL Enterprise

Support force during TF breaching operations

Responsible for triggering mortar targets AB001 and AB003

Initial priority of fires up to PL Yorktown

TM C - Task: Breach

Purpose: To clear a lane for TM A's attack to seize OBJ Kara

Attached assault and obstacle platoon effective immediately

Responsible for identifying point of breach

Detach one tank platoon to TM A effective immediately

Company Situation

You are the commander of TM B (tank heavy). Your team is attacking in zone as part of a three-team task force attack. TM B is the support force. You are responsible for establishing a support by fire position (SBF 01) to suppress the enemy MRP on the eastern side of OBJ Kara. You have priority of mortar support throughout this operation and are responsible for triggering AB001 and AB003. Your team has just deployed along PL Lexington in anticipation of contact with the enemy CSOP (see Figure 2. Battalion Graphics).

You direct that 2nd platoon (tank) and 3rd platoon (tank) establish an overwatch while 1st platoon (mech) bounds forward towards CP 2. You direct 1st platoon to focus its observation from CP 5 to CP 3, 2nd platoon from CP 6 to CP 7, and 3rd platoon from CP 7 to CP 8. During 1st platoon's bound, they receive fire, and 2nd platoon reports seeing a signature from a firing BMP east of CP 5. As the team continues to develop the situation, it conducts the following actions and gains the following information:

3rd platoon conducts a reconnaissance by fire and reports a vehicle moving vicinity of CP 8.

2nd platoon initially identified a tank turret west of CP 7; the tank has since backed down into a defilade position, leaving only its antennae visible. The platoon additionally identified and destroyed a BMP vicinity NX065550.

THE SOLUTIONS:

Author's Solution

FRAGO:

"GUIDONS, this is BLACK 6, FRAGO follows. **Situation:** The enemy is overwatching the ford site and occupying SBF01. We have a possible BMP at grid 062556, a stationary tank at 074557, and possible BMP moving west near grid 081557. BREAK.

"**Mission:** Team B conducts a hasty attack to destroy enemy forces along PL YORKTOWN to establish SBF 01 in order to support the task force's attack on OBJ KARA. BREAK.

"**Intent:** We will destroy the CSOP in order to establish our support by fire position and suppress enemy forces as the TF attacks to seize OBJ KARA. BREAK.

"**Tasks to subordinate units:**

"**RED (MECH),** Seize the crossing site and establish near side security. On order, establish the left flank of SBF 01 vicinity CP6. Report when set. BREAK.

"**DISMOUNTS,** Clear enemy dismounts along Route Kayla and anchor the left flank at CP6 oriented towards CP5. BREAK.

"**WHITE**, Support by Fire BLUE's assault to seize SBF 01. Orient fires from CP6 to CP8. BREAK.

"**BLUE**, Seize SBF 01. Move through the ford site. Establish the right flank of SBF 01 vicinity CP8. BREAK.

"**FIST,** Suppress the enemy positions at CP5 and CP7 with artillery fires. Trigger AB001 to mask our movement to the ford site. BREAK.

"**BLACK 5**, Move with BLUE. Report movement of enemy or friendly forces maneuvering from the east. You are second in priority of calling fires. BREAK.

"**BLACK 7**, move the trains to a hide position vicinity PL LEXINGTON. BREAK.

"I'm moving with BLUE. Once we're set on SBF 01, RED orients from TRP1 to TRP3, WHITE from TRP2 to TRP3, BLUE from TRP2 to TRP4. ACKNOWLEDGE, OVER."

RATIONALE:

Since the enemy is currently occupying my SBF position, and I am in a time crunch to establish it, I must conduct a hasty attack to destroy him or force him to withdraw in order to establish my SBF position. First, I get the company team to attack known enemy positions with direct fire, while the FIST suppresses them with HE and uses smoke to cover RED's seizing of the crossing site. WHITE supports by fire from his position since he has visual contact with the enemy, and will support BLUE's assault. BLUE then assaults through to destroy or force the withdrawal of any enemy along PL YORKTOWN, and establishes the center of the SBF01.

I'm counting on our firepower and movement to quickly gain a position of advantage over what enemy remains along PL YORKTOWN before we establish SBF 01 and turn our attention on KARA. I make sure we crosstalk with the teams and let the TF know what's going on.

AUTHOR'S NOTE: We purposely reduced unnecessary verbiage staying away from the perfect school house solution that would be unrealistic in the heat of battle. We want to provide to the readers a quick realistic FM fragmentary order from the company commander to his subordinates.

Frago:

Guidons, Black 6, Frago follows:

Situation: Probable enemy CSOP with tanks and BMPs in hasty defense from 060555 to 082557.

Mission: No change

Execution:

Redleg: Call for mortars. Fire for effect, grid 062555, one BMP on a hilltop. Repeat twice.

Red: Move to CP 2 and dismount. Clear Route Kayla up to CP 6 and report whether or not the enemy is in position on the reverse slope of the ridge. Bradleys support dismounted move up Route Kayla and cover company sector from CP 6 to the edge of the battalion sector. Watch ATGM position vic 062555. Use impact of mortar rounds as the trigger to start your move.

White and Blue: Overwatch Red's move and destroy any enemy vehicles spotted. DO NOT fire into Route Kayla once dismounts are on the ground. White, you have from CP 6 to CP 4. Blue, destroy any remaining enemy on the ridge. White moves first, covered by Blue. White occupies CP 7. Blue occupies CP 8. Once White and Blue are set, Red moves to CP 6 and remounts.

Black 5: Move up behind Red to cover their move forward to the dismount point. Stay on the ridge. Battlecarry Heat.

RATIONALE:

Now I am in good shape. I have destroyed one enemy vehicle, and have good ground and have taken no losses. What I do not want to do is charge up to the defile at Dogwood Creek while in direct fire contact. In order for the battalion mission to succeed, my company must reach SBF 1 without taking serious losses. I must first clear the woodline along Kayla to avoid enemy dismounted ATGM fire to my flanks and rear as I advance and set my SBF position. The best way to do this is with my dismounts supported by their Bradleys. The problem is that the infantry platoon must cross over 1000 meters of open ground before they reach the relative safety of the woodline. I will use my tanks and indirect fire support to suppress and destroy the enemy while Red gets into position and dismounts. I know that the enemy is well within range of my tanks, so in many ways I actually hope that they try to shoot Red, so that my tanks can engage and destroy them with superior firepower.

Once Red has cleared up to CP 6 and has eyes on suspected enemy locations, I can bound my platoons forward, execute platoon defile drills, and seize our SBF position. While White moves to seize SBF 1, Blue can destroy any enemy that has remained in position. Once Blue and White are set in the SBF, I can safely bring up Red's Bradleys and remount the infantry.

The XO moves to cover Red in case any enemy tanks are hidden in the woodline or in the vicinity of CP 5. I can trust him to determine when and if it is safe to fire over Red's head and to cross talk with the Red platoon leader and platoon sergeant before he fires. He battle-carries HEAT so that he will not cause fratricide with SABOT petals.

COUNTERRECONNAISSANCE *from Page 11*

predictive and will provide an absolute representation of actual combat. No one will dispute that the CTCs, in general, and the NTC, specifically, have enhanced our training effectiveness and our combat readiness. Yet, we must be cautious in any training assessment conducted at the CTCs that forecast categorical battle facts. Bluntly speaking, the CTCs are little more than a higher magnitude form of "laser tag." Despite the most serious efforts, the CTCs cannot replicate nor adequately simulate the moral domain of conflict. History has shown that battlefield performance may be enhanced by improved physical and C3I systems, but the moral domain of conflict continues to remain predominant. This moral domain embodies the true spiritual and human aspects of combat.[2] Failure at the CTC results in a flashing CVKI (combat vehicle kill indicator) light and a painful exercise in reconstitution. Failure on the battlefield results in dead soldiers and a failed mission. The CTCs cannot replicate the moral impact and paralyzing consequence of effective enemy indirect fire concentrations. Further, it is doubtful that our Army's leadership would allow any combat unit to disintegrate to less than 5 percent combat strength before being pulled or relieved from the battlefield. It is highly questionable that any brigade-size maneuver unit would receive such a large variety of time-sensitive combat missions that we demand at the CTCs. I do not suggest, however, that the CTC training methodology is incorrect. Training efficiency demands that we continue on this course. Yet, we must be cautious in our interpretation of training results. Specifically, when discussing security operations, we may have missed the mark when we conclude that NTC failures reflect deficient doctrine, tactics, and mediocre planning.

Although we must continue to focus on all phases of security operations, particular emphasis on preparation and execution is warranted. Incessant planning is not the answer. Not all answers to battle training failures can be directly linked to faulty planning. Focused and relatively simple security operations SOPs, coupled with disciplined execution throughout the organization, will resolve the mystery of conducting the task of counterreconnaissance. This article has attempted to provide a methodology to do just that. Through the use of simple but flexible SOPs, a shared responsibility for security operations throughout the command, and planning for security as a sequential or concluding phase of any mission may alleviate some of these training challenges.

Notes

[1]*FM 100-5* (Final Draft, 5 Aug 97), p. 5-1.

[2]*FM 100-5,* p. 2-10.

LTC (P) Chris Baggott, currently in the second year of a War College SAMS Fellowship, is the command designee of 3d Armored Cavalry Regiment (June, 98). He has commanded two armored cavalry troops, served as a brigade S4, and as S3 of a tank battalion and three cavalry squadrons. Additionally, he served as aide de camp to the 3rd Armored Division Commander; G3 Plans, III Corps; brigade XO, 3d Bde, 1st Cav; and commander, 1-11 ACR (OPFOR). His military education includes AOAC, Airborne and Ranger Courses, CGSC, SAMS, and Defense Strategy Course.

Armor's Role in the Future Combined Arms Team

by Lieutenant Colonel Kevin C.M. Benson

The question is, "What will maneuver forces bring to the future battlefield?" In numerous journals and on TV talk shows, writers and military pundits say that we are on the verge of a "Revolution in Military Affairs." Whether this is true or not, a reflective professional force must try to look dispassionately upon the current world, imagine the future, and project roles for the profession of arms. Within this reflection and the question posed above are multiple levels of detail, ranging from "What will the combined arms team of the future look like?" to "Do we have to gain and hold ground to "win" the next war or protect a vital national interest?"

The current raging debate within the Armored Force began with a very informative piece on the Division Advanced Warfighter Experiment (DAWE) being held at Fort Hood. Brigades with continuous situational awareness are destroying divisions. Long-range fires are the key to victory. Done completely in simulation, it is "showing" that a new definition of maneuver may be "that which allows the commander to place his artillery in the most advantageous position to destroy enemy forces without resorting to the close fight." The roots of this entire effort — the emergence of separate deep and close battles — can be found in the early writings of the "Boat House Gang," who brought us the 1982 edition of Air-Land Battle, GEN Starry's ruminations on Follow-On Force Attack (FOFA), and the concept of simultaneous deep and close battle. Let us examine this emerging definition of maneuver and what it means to the combined arms team and Armor.

What seems to be developing in DAWE is the ability to defeat opponents outside of direct-fire range. In DAWE, maneuver is translated as the ability to position indirect fires (and attack aviation) relative to the enemy. Is this new and different from conventional wisdom? Yes and no. Those of us who watched the Gulf War from the sidelines should remember Secretary of Defense Cheney speaking in terms of a joint combined arms team when he talked of ground maneuver enhancing the effectiveness of air-delivered fires. In terms of the Army Force XXI fight, indirect fires are supposed to do a great majority of the killing and, from the lens of DAWE, appear to be on the edge of becoming the primary means of defeating/destroying the enemy. Practically, while I will never completely agree that

we can do *all* our killing from long range, there are a number of reasons why we should break up the cohesion of the enemy force prior to us closing and completing the task with tank cannon fire.

From reading some reports on DAWE, it seems that there are two stages within decisive ground operations; shaping operations and initial decisive operations. In these stages, armor and infantry forces are used primarily to secure artillery firing positions and, I infer, attack aviation FARRPS. These heavy forces attack only if necessary to complete the destruction or defeat of the enemy. The armored and mechanized infantry then is not used so much as a decisive maneuver force, but as a maneuver mopping-up force.

I agree that armor and infantry need to look at new ways of integrating decisive maneuver into non-linear operations. I also agree that the advances in indirect fire systems and attack aviation will change how we fight. The central fact remains that simulations are just that, and decisive maneuver of ground forces will, I believe, remain essential to decisive victory. Frankly, I just don't see how we can defeat the enemy without maneuvering ground forces in a combined arms fight, culminating with direct fire engagements. Unless, and until we can completely divorce ourselves from the line of communication required to sustain a modern force, maneuver will be required to both protect our own LOC and turn the enemy off of his. Again, this maneuver enhances the effectiveness of air-delivered fires as well as artillery-delivered fires.

The disadvantages of stand-off and fight are that we can do this until our unmanned sensors are blinded by lasers, our MLRS batteries are caught by tactical ballistic missiles, our attack helicopter battalions run into ADA ambushes, or it rains, snows, or fogs up. Then we must have the capability to roll out a combined arms team and take the battle to the enemy. Close combat is what assures victory.

Since the dawn of man, warriors have sought the means to kill at longer ranges, avoiding the calamity of close combat. Army AirLand battle weaponry and doctrine, Air Force strategic and interdiction bombing campaigns, even some elements of our nuclear arsenals are attempts to kill the enemy deep to take pressure off of, or even obviate the need for, the close combat forces. The concept which is

emerging from simulations, though, is very clear and attractive. Why close with the enemy when you can defeat him from a distance? Close combat, high casualties, the confusion of the melee, the disadvantages of the decisive engagement (ability to disengage, reposition, etc.) should be avoided. Separation of close combat forces is desirable; to close with the enemy is undesirable. In the offense, closing with the enemy in the direct-fire mode is best kept for mopping up the battlefield, a task which must be completed quickly so the armored heavy force can get out front to secure more firing positions.

We must ask ourselves, "Is the general concept of defeating/destroying an enemy from a distance a good idea?" We will have to admit that, from the time of the bow and arrow (Crecy and Agincourt spring to mind), the commander's objective has been to break up enemy formations at a distance, thus making the close fight easier or unnecessary. We must also recognize that the concept has a downside — a heavy reliance on sensors to define a battlefield and indirect fires to dominate the enemy. The inclination to the asymmetrical approach could lead our next opponent to use a low yield airburst tactical nuclear weapon to fry our "off-the-shelf" appliqué computers with EMP. Voilà, loss of advantage. Why, though, is the silver bullet of killing impersonally at long range attractive?

There is an American tendency to look for a fast, cheap — in terms of American lives — way to win, (look at the newest world champions of baseball), like the high-tech air force. The high-tech sensor/shooter fight is sexy, clean, and steeped in the tradition of our firepower-based army. Following the logic of sensor-shooter link and kill at long range, the division deep fight and close fight have melded as simply "the fight." What is now defined as a division deep operation is subsumed within the commander's battlespace due to the technology of existing and developing systems. Since "the fight" generally occurs outside of direct-fire range, but is not a separate deep fight, what appears to be developing is a "middle/long" distance fight. With the advanced fires capabilities being demonstrated in the DAWE, the commander does not have to fight simultaneously in the conventional sense of the term. Long-range artillery fires can continually attrit an attacking or defending enemy until what remains of the enemy force eventu-

ally reaches the close combat area, where he is greeted with a hail of Hellfires and maybe even a sabot or two. Therefore, simultaneous attack becomes continuous attack.

Over-reliance on artillery-delivered fires may sound like WWI all over again. The main killer in our grandfathers' war was artillery-delivered firestorms. Lines of trenches were built, at least partially, to protect both the infantry and the indirect fire assets. The stalemate in the trenches was overcome in 1918, first by the Germans using combined arms assaults of infantry and artillery (Hutier tactics), and then by the Allies using combined arms offensives of infantry, armor, and artillery (Cambrai). Although history shows us that fire alone is not the answer, it seems that the combined arms fight still has a long way to go with coordinated actions of infantry, armor, artillery, and attack helicopters. Having maneuver formations follow closely on the heels of long-range artillery fire will have the greatest effect and is not a new concept.

It is hard to think of a mission, other than full armored combat in the desert, where we will be able to use long-range indirect fires with impunity. The risk of collateral damage and fratricide will prevent the full use of these assets. How would an MLRS battery 30 kms away, directed by an unmanned sensor, help in the following situations:

● Light infantry surrounded in the streets of Mogadishu.

● Preventing a mob of Bosnian Serbs from destroying a Muslim village.

● Ejecting the Panamanian Defense Forces from Panama City.

Our Armored Force and Army will have to test these concepts in many ways, not with a "HU-AH, Can Do!" attitude, but one which will really test the concepts, and perhaps, upset a branch's rice bowl.

Simulated, computer-assisted games and CTC battlefield testing will surely show the limitations of long-range fires. We should not do the testing just at the NTC, a sterile background tailor-made for deep battle, just as were the deserts of Iraq. The testing should also be on terrain much more representative of potential conflict areas — inhabited, partially urbanized, partially forested, with a variety of ongoing human activities other than warfare occurring — places like Vietnam, Panama City, Grenada, Somalia, Haiti, and Bosnia — like the Joint Readiness Training Center. The OPFOR there intermingles with the innocent populace — a low-tech tactic proven to confuse high-tech armies. Of course, anytime our long-range fires kill innocent life by mistake, the CNN player will "broadcast" the pictures to an outraged public, forcing policy and targeting changes on the Blue Force commander.

I predict that "experiments" of this sort will also show that a new form of the combined arms team will emerge. All arms will play to their strengths. For example, the armored force will drive the organized enemy forces away from the population centers and afford the troopers who still have to go into harm's way reasonable levels of protection. The other element of the combined arms team will be the Special Forces and light infantry forces, who engage in civic action and small-unit, high-intensity actions, the night ambush patrols and security mission, all of which allow the populace to enjoy their lives free from the enemy force. A new combined arms team? No, not really, just another form of BG Chaffee's comment of a force of all arms with equal glory for all. Imagine the combined arms team of a Special Forces Group commander with his group, an aviation task force, a light infantry battalion, and an armored battalion task force. A combined arms team, yes indeed!

We are prisoners of our paradigms. For centuries, Western warriors have designed armies to meet on open fields where they are to destroy a target-rich enemy array. This kind of warfare is becoming increasingly rare, for a variety of reasons, and is not likely to make a comeback any time soon. Most of our foes will not conveniently don distinctive uniforms, separate themselves from the populace, and motor around in dense arrays of distinctive vehicles, offering themselves up for the slaughter. Our more likely opponents for the foreseeable future will hide in the towns, among their supporters, wearing us down in a low-tech struggle we'd rather not fight. As we design the future Army, let us not be prisoners of the past.

Dominant maneuver by armored forces may not be the same thing in different areas, but that is what armored forces will bring to the battlefield. We will destroy organized enemy units or drive them away. We will act with relative impunity as we overmatch other potential opponents, while we protect our troopers. Dominance of a battle area will allow other members of the combined arms team to accomplish their missions by enhancing the strengths of the units within the combined arms team, the total being greater than the sum of the parts. Being involved with warfare personally, and on the ground, accomplishes one other extremely important role in the place war occupies within human interaction.

R.E. Lee, on Marye's Heights after the battle of Fredericksburg, said that it was good that war was so terrible lest we grow too fond of it. Distant killing does raise moral issues. The personal nature of combat diminishes, and we must think of that effect. Will it become too easy to conduct operations because we commit machines, as opposed to troopers? The farther away we get from the close fight, the more we forget our machines are killing other people. War becomes clean for us. War must remain a matter of horror, and close combat is necessary to preserve humanity.

I return to the original question, what will maneuver forces bring to the modern future battlefield? The armored force will continue to bring the capability for decisive maneuver, speed, mobility, and shock effect. This is happening now in Bosnia, happened in Haiti, and did not happen soon enough in Somalia. Armored forces operate in all terrain (find a copy of then MG Starry's work on armor in Vietnam) and can dominate that terrain, from rubber plantations, to urban areas, to open plains. The sensor-shooter link can be shortened as we will, but to really dominate ground we have to put troopers on it. Low-tech societies believe what they can see, and the Stealth can't be seen (unless it is raining!). Troopers on the ground, with armored vehicles, lend the unmistakable aspect of power to a situation. In the, thankfully rare, conventional wars of the future, our ability to destroy forces without closing into tank cannon range will save our troopers' lives, and I vote for that. But the wars of the future will not be in the desert and the open sterile terrain, the "tactician's dream, and logistician's nightmare" described by Rommel.

Troopers will still be required to go into harm's way on ground that will be "tank country" because armored forces are there. Armored forces will continue to bring speed, mobility, and shock effect to the battlefield. Our position as armored force officers will remain as advocates of the combined arms team and the advantages of dominant maneuver with forces that seize and hold ground.

LTC Kevin C.M. Benson is the Chief of Plans, Third U.S. Army. He has served in armored and cavalry units in the U.S. and Germany, as the Chief of Plans, XVIII Abn Corps, and as the regimental executive officer of the 2d Cavalry Regiment. He will take command of a battalion in 1998. He is a graduate of Command and Staff College and the School of Advanced Military Studies. He gratefully acknowledges the mother lode of material he read on the SABERNET.

Simulations And Training:

Integrating Constructive, Virtual, And Live Simulations Into Unit Training Programs

by Major Mark Alan Eastman and Mr. George Hel ton

"Therefore it is said that one may know how to win but cannot necessarily do so" ...Sun Tzu.

The old saying is "Live and learn." We must reverse this in war to "Learn and live." We have the technology to train — defined at task level, in constructive, virtual, and live environments — the full capability and synergy of our combat systems, battle-focused for the full continuum of warfighting.

Technology enables the solution — a trained and ready Army with precision in thinking, planning, and execution.

Computer simulations are growing in importance as training devices because they add realism to training and potentially reduce training-related costs. Training devices range from the inexpensive, such as terrain boards, to technical, multimillion-dollar, computer-driven simulators and systems. Simulations are important tools used in training and testing. In the 1970s, war games were converted into two-dimensional computer applications that played in real time, allowing battalion, brigade, and corps staffs to conduct exercises. In the 1980s, technological advances provided the capability to network multiple, similar, weapon system simulators into an interactive, electronic battlefield where military crews conducted realistic, task-based training. The primary example for maneuver units is Simulation Networking (SIMNET). SIMNET initially allowed for force-on-force free play and more recently, structured, task-based training. In the late 1990s, the Close Combat Tactical Trainer (CCTT) will replace SIMNET, and the groundwork for joint exercises and training with allied and coalition forces is under development.

Computer simulations provide important training opportunities and capabilities not always feasible or affordable in field training exercises. Large-scale field exercises that emphasize battle planning and command and control of forces are costly, require a sizable maneuver area, are time-consuming, and cause significant downtime for lower echelon personnel. Training in simulations provide opportunities for individuals and units to practice techniques and procedures, improving proficiency in required skills, both before and after participating in field exercises. The loss of resources or maneuver constraints should not lead one to the conclusion that (virtual/constructive) simulations are a "one-for-one" replacement training tool for those lost resources. Virtual and constructive simulations are not designed for the validation of mission essential task list (METL) tasks. As a result, this powerful capability presents a leadership challenge for leaders and units to determine the proper use of training simulation devices and systems within available resources.

The real art in determining the proper use of available simulations is to understand what tasks can be trained by the different types of simulation. One must also understand how well those tasks can be trained, by whom, and at what level. The purpose of this article is to provide some insight on the capabilities of current simulations and how to optimize a unit's training program using simulations.

The first step in understanding how to incorporate simulations into a unit training program is to understand the definition of each type of simulation: constructive, virtual, and live. Constructive simulations are identified with complex, computer-driven models most often associated with exercises dealing with battalions, brigades, divisions, and corps. The primary training audience of constructive simulations is the commander, subordinate commanders, and battle staffs associated with that echelon of command. Virtual simulations are designed to train individual soldiers and crews in collective training tasks. Virtual simulations are often associated with crew-served weapons systems and focus on training devoted to emphasizing familiarity, skill development, and practice. These simulations contain simulators that closely replicate all or parts of tanks, armored personnel carriers, and other equipment. Virtual simulations normally require the training unit to immerse itself into the simulated battlefield. Live simulations are training events where all the soldiers, leaders, units, and staffs physically deploy (usually against an OPFOR) and use (weapons) simulators to replicate certain parts of combat. Live simulations take place almost anywhere the maneuver space is available (home station, combat training centers).

As resources dwindle, there is increasing recognition that, while traditional field (live) training exercises are the preferred method of training, and essential for validation of critical METL tasks, they can have significant limitations and are often cost-prohibitive. In some cases, these limitations can be overcome or minimized through the use of simulations. For example, gunnery and field maneuver can be limited by the high cost of fuel, training ammunition, and repair parts; lack of space; safety and environmental concerns, as well as a lack of time required to prepare for and undertake such exercises. Simulations are available to assist a unit in refining skills needed to effectively and efficiently conduct those valuable but costly exercises.

Several factors influence the trend toward increased use of constructive and virtual simulations, including safety, reduced costs, environmental protection, land use restrictions, and training scenario flexibility (exercises can be quickly reset, and the factors of METT-T modified as required). Simulations are a tool to maximize training opportunities, especially when resources are limited. Training using simulations can prepare a unit to get the maximum benefits from scheduled field training exercises by providing a flexible training system to the unit before deployment, and as a sustainment and integration training tool. Therefore, simulations should be considered and incorporated into your overall training strategy at all levels, regardless of resource limitations.

The Army, in formal training field manuals, does not currently prescribe

simulations as required training devices because they are not available to all units. Additionally, there are a limited number of tested, standardized training exercises and structured training, or Training Support Packages (TSPs), available for units to prepare training. Therefore, units must develop their own training, sometimes without the benefit of proven methods, to optimize the benefits of the simulation.

Virtual and constructive simulations used in training depict the essence or effect of live exercises (tasks, conditions, and standards) by providing cues/responses that cause the training unit to perform the skills used and those skills that are transferable to a live training environment (live simulation). The training outcomes and behaviors accurately reflect the training outcomes that would have resulted from a similar live simulation exercise. A critical advantage in simulation training is the ability to use prepared exercises that control conditions and cues to ensure that the desired training outcome is achieved, and to provide the ability to record and play back the events exactly as they occurred. There are several ways in which training devices and simulations can support the performance measures of a given training exercise. The range of compatibility goes from those tasks that cannot be supported in simulation, a reminder that validation of METL tasks must be done in a live simulation training environment, to tasks that are highly supported by a simulation (virtual/constructive) environment where the training experience is "*much the same*" as a field environment (live simulation).

The supportability of a task trained in a given simulation depends on whether the cues and responses available result in positive or negative training. A cue in simulation is the stimulus (visual or audio) that causes the unit to make a decision and execute a task. For example, an enemy tank fires on the unit, causing an action on contact or a FRAGO issued by the next higher headquarters. Sufficient cues for the tasks being trained in a structured training environment are provided to allow the participants to practice tactics and techniques and sustain those skills that are transferable to a live training environment. Most simulations focus on C2, maneuver, fire control and distribution, and teamwork. In other cases, sufficient cues or responses are not available, and the execution of certain tasks result in a negative training experience. An example of a negative training experience would be when the simulation causes the user to learn a task

incorrectly. For example, SIMNET could drive the tank at an unrealistic speed without regard to the effects of terrain, causing the driver to employ unsafe driving habits.

The Army has the capability to replicate tactical engagements through constructive, virtual, and live simulations, known together as the Simulation Toolbox. Before employing the proper simulation, the commander and his staff must ask and answer these four questions.

● Who is being trained? Who is the target audience?
● What tasks are being trained? What are the terminal learning objectives (commander's intent)?
● What resources are available? (time, OPTEMPO, ranges, CTCs, simulation devices)
● What is the best environment to use, constructive, virtual, or live?

Answering these four questions assists the trainer in choosing the proper simulation. Several simulation methods can be employed to meet overall training objectives. Each simulation performs specific tasks for the trainer. Selection of the proper simulation, or simulations, ensures that tasks are trained to sustain and training outcomes are present. Figure 1 provides a brief description of several methods and devices. This is not an all-inclusive list but provides some information to help the trainer select the appropriate method of simulation to meet the unit's training objectives.

Training Strategy Development

Several factors influence the development of a unit's training strategy and the simulations used to support that strategy including: current doctrine, the unit's METL/METT-T, and results of training needs assessments.

The Army's primary training publications (*FMs 25-100* and *25-101*, along with *TRADOC REG 350-70*) contain training methods that are relevant to training in virtual, constructive, and live environments. The following list of principles can assist you in developing a training strategy incorporating simulations: (*ST 17-12-7-3-1,* p. 10)

● Make commanders the primary trainer
● Train as you fight
● Train to maintain
● Train as combined arms and services teams
● Use performance-oriented, structured training
● Use appropriate doctrine
● Train to sustain proficiency
● Train using multi-echelon techniques

After the unit has determined its mission from its METL, conducted a training needs assessment, and determined training needs, it must select a simulation to best fit the unit's requirements. The manner in which simulations are incorporated into your training program is a "green tab" issue with staff input. Generally, simulation exercises should be conducted quarterly at the brigade level

Training Device	Training Environment	Target Audience	Purpose
Conduct of Fire Trainer (COFT)	Virtual	Tank Cdr/ Gunner Team	Train/sustain precision/ degraded gunnery skills.
Platoon Gunnery Trainer (PGT) (M1A1) & Advanced Gunnery Training System (AGTS) M1A2	Virtual	Tank Cdr/ Gunner Team/ Plt Leader	Train/sustain platoon of TC/gunner teams on fire coordination, distribution, platoon coordination & precision/degraded gunnery.
Tank Weapons Gunnery Simulation System/Precision Gunnery System (TWGSS/ PGS)	Live	TC/Gunner	Train/sustain precision/degraded gunnery skills.
Tank Driver Trainer (TDT)	Virtual	Driver	Train/sustain M1-series driver
Janus	Constructive	Plt & Co Cdrs/ Bn & Bde Staffs	Trains command and control, synchronization, and decision-making processes.
Brigade/Battalion Simulation (BBS)	Constructive	Bde/Bn Cdrs & Staffs	Trains commanders and staffs in decision-making processes.
Simulation Networking (SIM-NET)/Close Combat Tactical Trainer (CCTT)	Virtual	Platoon thru Battalion	Trains/sustains collective tasks from crew thru battalion level.

Figure 1: Selecting the Appropriate Simulation (Quick Reference)

and below. However, the number, type, and frequency of occurrence depends on the METT-T factors (based on personnel turbulence and skill fade) at each location. Additionally, the commander is responsible for determining the proficiency of the unit in each task on the METL. He has the responsibility of conducting training IAW ARTEP and MTP standards by which performance is uniformly measured. Simulations cannot give you an objective assessment of the unit's proficiency in METL tasks.

When selecting simulations, choose the one that provides the most benefit in achieving and maintaining task performance. Therefore, do not select a simulation if a more appropriate training method is available. The key to choosing the proper simulation is understanding that simulations do not equal live training, nor do they train every task well in every situation. Simulations are training aids that allow the training unit to practice skills and tasks in a scenario specifically designed to present and observe those tasks. Placing the simulation training experience into the overall development of the unit provides invaluable assistance. The Combined Arms Training Strategy (CATS) developed at Ft. Knox is designed to help manage training resources in an integrated manner and to assist units in determining the proper "mix" of simulations in training. CATS establishes a definitive relationship between the mix of field and "simulation tool box training" by showing the training events to be conducted, a more detailed description of the available simulations and training devices, and the resources needed to conduct those training events. The following portion of this article explains in more detail the different aspects of the "simulation tool box" — constructive, virtual and live.

Constructive Simulations

In the majority of cases, these simulations are exercise drivers for CP-type training exercises where the commander and staff are in field CPs. The adjacent, higher, and lower units are "played" in computer workstations transparent to the primary training audience. Communication between the commander and workstation units is with organic communications (some locations have internal TOC facilities where communications are replicated by CB radios).

An example of a constructive simulation where the training audience does not personally or physically interact with the simulation is the BBS (Brigade and Battalion Simulation). BBS is designed as a low-cost training simulation. BBS provides maneuver brigade and battalion commanders and their battle staffs the opportunity to practice decision-making skills. BBS focuses on the execution of Army doctrine in a realistic, multi-threat, time-stressed combat environment. The commanders, with their battle staffs, must be able to develop, correlate, and assess large quantities of tactical and logistical data. They must formulate situational estimates, and make immediate decisions in the C2 and synchronization of combat, CS, CSS, and aviation assets. BBS supports training of combat maneuver commanders and the staffs at brigade and battalion levels (BBS focuses heavily on combat support and combat service support). Company commanders, CS, and CSS units (role players) also receive valuable secondary training as part of any BBS-driven CPX. Normal training time for workstation interactors and warfighters is 6-8 hours. BBS is a personnel-intensive simulation; for example, a battalion-level exercise requires approximately 21 personnel (minus the staff sections that would be located in the TOC and CTCP) to serve as the maneuver elements and role players. A company exercise would take approximately 10 personnel (minus site staff).

Although primary training audiences do not come in direct physical contact with most constructive simulations, some of these simulations require direct interaction with the training unit. This is the case with the Janus simulation. Janus is an interactive, event-driven wargaming simulation used to train platoon leaders through brigade-level commanders and their staffs. Training specifically focuses on the application of tactical doctrine and combat techniques. Janus focuses primarily on ground combat operations and the synchronization of direct and indirect fires. Players must consider all aspects of employing their forces, just as they would in combat. Janus accurately models both friendly and enemy weapons systems with resolution down to the individual platform (e.g., T-80, M2, or individual soldier weapons).

These systems have distinctive properties, such as dimension, weight, carrying capacity, weapons, and weapons capabilities; all of which can be affected by terrain and weather. Recent enhancements include, as one example, the ability to conduct military operations in urban terrain (MOUT) and improved dismounted infantry functionality, as well as multi-sided, coalition-type operations, including non-combatants.

At the battalion and brigade level, Janus serves as an excellent training simulation requiring detailed commander-S2/S3 interaction as they develop and execute the ground tactical plan. Commanders must apply sound warfighting principles and achieve full synchronization of the BOS to fight a successful Janus battle. Normal training time for workstation interactors and warfighters is 8-12 hours. Janus is a less personnel-intensive exercise than BBS. Approximately 12 personnel (minus the staff) are needed to conduct a battalion exercise. A company requires approximately 6 personnel.

Outcomes from constructive simulations are based on models of attrition and algorithms within the simulation. Most constructive simulations require interactive free-play from the workstation role-players in both friendly and opposing forces. Janus is used effectively to train ground combat operations and the synchronization of direct and indirect fires, while BBS is effectively used to train battalion staff and higher level staffs while focusing on combat support and combat service support tasks. Regardless of which specific constructive simulation is used, all are efficient in training leaders and staffs from platoon through brigade.

Virtual Simulations

As previously stated, virtual simulations normally require the trainee(s) to be immersed in the simulated battlefield. The soldier, leader, staff, or unit then inputs the applicable information into the controls of the simulator. Visual, sound, and motion playback cause the trainee to continue interacting with the simulator through a prescribed number of tasks.

Virtual simulations are referred to as simulators because they are either a single part (SIMNET) or complete replicas (CCTT) of individual or crew-served weapon systems and/or vehicles. SIMNET exploits the ability of computer technology to transfer data streams across networks containing large numbers of simulators with real-time update of simulators in the network. SIMNET trains combat units at the crew through battalion echelons. Existing simulators are in the form of M1 tanks and infantry fighting vehicles. Emulations of field and air defense artillery, engineer, dismounted infantry, and combat service support also exist through the use of Automated and Semi Automated Forces (SAF). The planned follow-on system is the CCTT. The CCTT projected fielding date is FY98.

Virtual simulations are designed to provide primary training to individuals and crews in collective training. Major func-

tions of the CCTT include: improved vehicle and graphic fidelity, out-of-the-hatch view capability, and increased weather functions. Scenarios suited for simulation (constructive and virtual) have been developed to provide a "nested" environment that facilitates concurrent, multi-echelon training for units in both the constructive and virtual environment. This program is currently being executed at Ft. Knox, Kentucky, and is referred to as the Virtual Training Program (VTP).

The VTP is a structured training program designed to specifically improve the readiness of mechanized brigades through the use of virtual and constructive simulations. They are used in conjunction with structured training support packages to provide the ability to train specified tasks in a "matrix type" format. These structured training support packages include pre-developed operations orders, graphics, and tables that expose the training unit to a specified set of tasks, conditions, and standards developed from Army mission training plans. This format allows units to progress from simple to complex tasks. The hardware and software used by the VTP, along with a professional observer/controller team (battalion and brigade level) provides a state-of-the-art after-action review during their training rotation. The OCWS (Observer Controller Work Station) used in virtual simulation includes playback of the battle (two-and three-dimensional view), complete with audio cuts of communication, at any speed, any time desired, and from a 360-degree point of view. The constructive simulation center provides a Janus Army Analysis Workstation (JAAWS) playback of the battle exactly as it was executed, complete with charts and graphs with supporting statistical information. In addition, a comprehensive take-home packet is mailed to the training unit to provide assistance in developing home station training programs.

Live Simulations: "The Preferred Method of Training"

As training dollars are reduced and live training opportunities are being limited, the use of simulations as a part of a unit training program is critical to unit readiness. If used properly, simulations can sharpen those "transferable skills" necessary for successful execution and reduce the actual training time needed to conduct a validation of a unit's METL-based Training Plan.

The most notable formal training in the Army utilizing live simulations are the Combat Training Centers — The National Training Center (NTC), the Joint Readiness Training Center (JRTC), and the Combat Maneuver Training Center (CMTC). In each of these CTCs, troops conduct tactical operations as units and utilize various simulations and simulation devices in the course of training.

Some of the simulation devices used are MILES and SAWE-RF, which replicate weapons systems interaction and damage resulting when these simulators are employed. In live simulations at the combat training centers, much of the battlefield is instrumented. The instrumentation devices provide the opportunity for units to train in a force-on-force environment. By using electronic instrumentation devices on tactical vehicles, the training, analysis, and feedback center collects data for the creation, execution, and support of the after-action review process. Since live simulations are associated with force-on-force training exercises, the emphasis on training is on individual and collective training. Residual and secondary learning occurs for the leaders, as well as enhancing the unit's C2 processes, an area that can be trained heavily in all types of virtual and constructive simulations.

Simulations provide a combat rehearsal system for AC/RC units to plan and train for contingency missions using simulations for operations at battalion through echelons above corps, including joint and allies.

Using simulations, we can go from "I hear and I forget, I see and I remember, I do and I learn" (Confucius, 500 B.C) to "I see, I do, and I learn" (Director, NASA Ames Laboratories).

Warfighting today is dynamic, multi-dimensional, multifaceted, and constantly evolving — it's akin to managing chaos. Diplomacy, cultural/ethnic/religious connotations, environmental impacts, just to name a few, preclude treating any contingency as business as usual, or gaining a situation snapshot. Timelines for mission rehearsal have shortened. Shortened timelines make C2 and information systems integration and fusion critical. In current and future training, our goals should be geared toward harnessing and exploiting that information through training with simulations. Future training in simulation will move toward exercises routinely combining virtual, constructive, and live simulations with instrumentation. When these three tools are linked in the same exercise, commanders could train (constructive) with crews (virtual), operating on the "terrain" of the commander's situation map, while individuals and crews (live) actually conduct force-on-force operations on the terrain represented on the commander's map. Combining constructive, virtual, and live simulations could have a number of training advantages as they, in combination, create a synthetic, seamless environment of warfare.

While we are now armed with a better understanding of the powerful possibilities of training with simulations and their capabilities, several questions still remain. How are we going to be able to prepare our soldiers, leaders, staffs, and units for contingencies in areas we have never been before to execute missions across the operational continuum? Given a generic METL and no METT-T until the mission order is issued, how do leaders and staffs select courses of action, validate their operational METL with METT-T defined? Given the ability to rapidly produce digital terrain databases, the answer will certainly include simulation as a way to preview the terrain and infrastructure in developing various courses of action, which can be evaluated, stored, and repeated prior to selection and execution in response to the contingency.

Given the short amount of time available to train, selecting the appropriate course-of-action, force structure, and timeline is critical to battle-focusing the unit's training prior to deployment. Given the appropriate fidelity, a terrain database could provide sufficient rehearsal opportunities for a unit. Therefore, when the unit is deployed, they arrive with the feeling that they have been there before — an excellent morale builder where the commander's intent is understood and the boldness of warfighting can be confidently executed with precision. A deliberate end-state could be defined and visualized from the assembly area to the objective, with a shared view of the end-state desired prior to execution: a way to see the "setting of conditions for battle" and adjusting those conditions to maximize a unit's lethality.

All of these aspects should be considered as we continue to develop training simulations and include those simulations in our training programs. Understanding the capabilities and limitations of the simulations and training resources available will help the unit to choose the correct simulation to maximize training. Simulation training devices are an excellent sustainment and integration tool with enhanced capabilities designed to sharpen unit skills and make the maximum benefit of the unit's live training program. *These are hard times in which a genius would wish to live. Great ne-*

cessities call forth great leadership"...(Leaders)

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ST 17-12-7-3-1, The Battalion Commander's Training Handbook; May 97, (produced by the Training Development Division, Directorate of Training and Doctrine Development, Ft. Knox, Ky.) - call Mr. Mike Kelley @ DSN 464-2505 or commercial at 502-624-2505.

MAJ Mark A. Eastman is currently assigned as the S3, 1st Squadron, 16th Cavalry. He was previously assigned as the Chief of Mounted Warfare simulations (SIMNET/CCTT/JANUS/BBS), Observer/ Controller Team (Warthogs), 16th Cavalry, Ft. Knox, Ky. He is a 1986 Distinguished Military Graduate of the University of Louisville. He received a Master's Degree from Chapman University, Orange, California in 1992 and is a graduate of the Command and General Staff College. He served as a tank platoon leader, executive officer, and scout platoon leader for 2-72 Armor, Camp Casey, Korea; as an observer/controller for the Armor Task Force Training Team (Cobras), Operations Group, National Training Center; and as the Alpha and HHC commander and S3 Air, for the 4th Battalion, 37th Armor, 1st Infantry Division (Mechanized), Ft. Riley, Kansas.

Mr. George A. Helton, Jr. is currently assigned as the assistant Chief of Mounted Warfare simulations (SIMNET/CCTT/ JANUS/BBS), Observer/Controller Team (Warthogs), 16th Cavalry, Ft. Knox, Ky. He is a 1979 graduate of the University of Kentucky and received a Master's Degree from Western Kentucky University in 1985 and is a 1993 graduate of the United States Army Management and Staff College. He served as an education specialist in the analysis division in the Directorate of Training and Doctrine from 1985-1991, Chief of the Analysis Division from 1991-1992, and as the senior training developer for 5-16th Cavalry and Project Sword from 1992-1993.

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amphibious, so the need for bridging is greatly reduced for the squadron. I'd use turreted, breech-loaded 120mm mortars for all squadron indirect fire support, an LAV variant with the 75mm ARES dual-feed automatic cannon in the cavalry platoons, and the Piranha variant with the 105mm cannon for armor platoons. The LAV-AD provides mobile air defense cover for the airborne force.

The squadron could be structured like a standard armored cavalry squadron or based on a concept of individual platoons under a single headquarters being parceled out as needed, with the mortar, engineer, ADA, and various support platoons remaining under the single headquarters. The cost of the wheeled vehicles is far less than tracked vehicles in both initial and life cycle, and the weight factor makes it very attractive for airborne operations. Appliqué armor can be added if needed, either before the operation or once on the ground.

I have long advocated the use of wheeled vehicles for light armor, and have long been worried about the lack of amphibious capability at most levels of the Army. Adopting this concept might solve two problems that the 82d faces, and give the Army some food for thought at the same time.

LARRY A. ALTERSITZ
LTC, FA, USAR
Westville, N.J.

(For a similar view, see "Global Cavalry," in this issue. - Ed.)

**Using What We Have
Until New Developments Mature**

Dear Sir:

LTG D.S. Pihl's comments in the Nov-Dec '97 issue about my article, "The M1A2 Abrams: The Last Main Battle Tank?" (Jul-Aug '97), are puzzling, to say the least.

He says, "...the analogy is not there, i.e., ships to tanks." This is an amazing statement, considering the facts. Both the battleship and the main battle tank are heavily-armored, gun-armed, combat vehicles designed primarily to do battle with others of their own kind.

Spanish Armor *from Page 42*

Program Coraza - 2000 has just started its life, but a full potential for development lies ahead. The commitment is there, and the challenge, too, which is nothing less and nothing more than the full modernization of Spanish Armor up to the same levels as other Allied partners in the task of collective defense and security. *Program Coraza - 2000* is full of possibilities with a big potential for development, and most likely will remain in operation to deal with whatever new armor projects the Spanish Army undertakes.

The terminology is the same, i.e., both ships and tanks have hulls, decks, turrets, sponsons, etc. Even our basic tank formations were copied directly from naval warfare.

Second, General Pihl points out that "...you need a mix of both chemical energy and kinetic energy warheads..." Although it is far from certain that this present truism will still be valid in 2020, at no point in my article did I advocate one type of warhead over the other. While current self-guided missiles, e.g., Javelin, Longbow Hellfire) do have CE warheads, LOSAT shows that KE missiles are well within the realm of possibility.

Third, although the XM291 would indeed deliver performance superior to the current main gun, it is another example of squandering precious resources on incremental, evolutionary development, when we should be working on leap-ahead, **revolutionary** concepts. However good it might be, the XM291 cannot overcome the limitations that are inherent to gun armament.

EM or ET guns — provided they ever make the transition from the laboratory to the field — will certainly be worthy candidates for FCS armament, but note that even the Western Design FCS concept in the Jul-Aug '97 issue incorporated self-guided missiles along with the EM cannon!

Also in the Nov-Dec '97 issue was a letter from James Agenbroad, pointing out that the recoilless rifle gunner on an M113 (see "Too Late the XM8," *ARMOR,* Jan-Feb '97) would be exposed to enemy small arms fire. This is true of the Australian APC shown in my article, but it would be an easy matter to install an ACAV-type armor shield to give the gunner some protection (see p. 7 of the Jan-Feb '95 *ARMOR* for a photo of an M113 with a recoilless rifle/gun shield installation as used in combat in Vietnam). It's admittedly far from a perfect solution to the problem, but it is the best of what can be had from hardware that's already owned by the Army.

As for the M901 ITV, it is not capable of airdrop. However...the ITV **does** have very interesting **potential** to be an airborne combat vehicle. Remove the awkward and ungainly "hammerhead" launcher, and attach a low-profile, four-tube launch assembly to the M27 cupola in the manner of the French AMX-10P HOT antitank vehicle. Armed with a mission-

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Lieutenant Colonel Antonio J. Candil graduated from the Spanish Military Academy in 1972 and was commissioned in Armor. He has served as a tank platoon commander in the Spanish Western Sahara in 1973-76, and is experienced as an XO and company commander. A graduate of the Armor Officer Advanced Course at Fort Knox, he is also a graduate of the Spanish Army Command and Staff School, and the Italian Army's War College. He has been assigned to several posts abroad, in Belgium, Italy, the UK, and Germany, and is now director of Program Leopard within the Spanish Army Logistics Command.

specific mix of Javelin, FOTT, and MPIM/SRAW missiles, such a modified ITV could give parachute-deliverable fire support in a wide range of scenarios, without resorting to "obsolete" weapon systems like the 106mm recoilless rifle. As an added benefit, the gunner would have complete armor protection.

There have been numerous suggestions in these pages for XM8 alternatives, such as the LAV-105, and various light tanks. Unfortunately, all of these proposals would:

- Cost almost as much as the defunct XM8, and
- Require many years of test and evaluation before they would be acquired.

If there is enough money to buy LAV-105, Stingray, or other such vehicles, **buy the XM8!**

Despite its shortcomings, the M113/106mm is still the only option for a tracked, armored, air-droppable, fire support vehicle that costs almost nothing to implement — a fact that no one has yet been able to refute — so why not implement it?!

STANLEY C. CRIST
San Diego, Calif.

The Armor Branch Identity Crisis: Let's Focus on What We Do Well

Dear Sir:

There has been much discussion recently over Armor's relevance to the future of combined/joint warfare. Our branch is under attack, say some. We aren't forward-thinking enough. We aren't capturing critical technologies. The joint community and the American public no longer think that mechanized forces are applicable to the challenges of the next century. Even our own beloved Department of the Army has become more entranced with stand-off capability than funding a quality light/medium scout vehicle with adequate protection.

Many believe that the solution to our branch identity crisis is to convince the DOD hierarchy that we can adapt to the changing situation. Armor units are envisioned that are rapidly deployable and can go anywhere. They will be extremely lethal, but selective in targeting to avoid collateral damage. We will wrap our arms around future technologies and leverage them to our advantage, etc., etc.

This is wishful thinking. We can't be all things to all people. Why are we trying to camouflage what we are?

We, as a branch, encompass the heavy side of warfare. Mechanized units are not rapidly deployable. Armored warfare is a messy business with lots of collateral damage. We exist as a branch to close with and destroy the enemy, seize key terrain, and eliminate the enemy's will to continue resistance. We are about shock, rapid movement, firepower, and decisive action. We pride ourselves on our mental agility, detailed planning,

and violent execution. No one understands the combined arms team like we do. We are in the business of gaining intelligence through reconnaissance, and most importantly, doing something with that intelligence. Let's focus on the fundamentals.

Perhaps I'm a bit cynical, but I don't think Armor's relevance to the broad spectrum of conflict is the issue here. Are we in revolutionary, vice evolutionary, times? Probably. Are roles and missions on the table? Of course. Witness the continuing Air Force/Navy debates on air superiority programs. Each service wants a piece of the sexiest new technologies and will take no prisoners in attempting to leverage more budget clout with the Congress. Should the Armor community be intimately involved in future combat technology? We are the combat arm of decision and desperately need to be at the forefront.

Unfortunately, the only way I can see Armor's relevance being fully demonstrated is through a conflict in which high-tech weaponry (standoff, stealth, etc.) fails to achieve the purpose. We are a technological society that prides itself on our gadgets. The American public has been sold a bill of goods that we (the military) can achieve any ends via non-risk (to us) weaponry. We all know that a determined foe is ultimately persuaded by M1A1s and Bradleys parading through his capital. Potential adversaries receive one message when the 82nd Airborne alerts; they receive a more pointed one when M1A1s roll onto ships.

Let's recognize our limits. Other services are successful on the PR front because they're in bed with large defense contractors who are located in certain states. One Seawolf submarine makes more waves (literally) than a whole fleet of FMTVs. As long as our large end-items don't register in the DOD top-ten of defense contracts, we'll lack budgetary pull.

We need to capture the intermediate objectives first. If we need to establish Armor's relevance to the Army or DOD, let's focus on consolidating mech, armor, and cav missions under the aegis of Armor Branch. Why should the USMC even exist anymore? Particularly their tank battalions? Should Infantry give up the mech mission to Armor and focus on LIC/SF/Ranger-type operations? My argument is that all mounted warfare direct fire should belong to the Armor community.

At the same time that we go after high-tech weapon systems of the future, let's focus on the present. Let's man our units at 90%+, even in the low-density MOSs. Let's swallow some appetite suppressants and reduce taskings, even cut programs to reduce the borrowed military manpower drain. Let's give money to training and insist that it occur. I've seen more discussion on CFC campaigns than troop-level training on some installations. We are mortgaging our present capability because we're chasing after the future.

We need to focus our efforts on getting land, bullets, time, and people down to the tank company/cav troop level. No commander I know currently commanding thinks he gets enough of any of these things. We have

made MTOE units the billpayer for other programs we can no longer afford.

Our leadership at the JCS and Army Staff levels are well aware of the usefulness of the main battle tank. I don't think heavy warfare is dead, and I don't believe most critical thinkers believe it, either. Fundamentally, I have to trust the senior leaders to make the correct strategic decisions. We in the "field" are called to focus on our METL missions. We ensure that when they call for the main battle tank, we're ready to put depleted uranium rounds into targets.

Until we can wrap our hands around the need for a new generation of main battle tank to combat a real, vice imagined, threat, we should focus on maintaining and training what we have. We can continue to fine-tune doctrine; integrate more fully into "joint-ness"; put money into R&D so we don't lose touch with technology; but we're called upon to be ready. Let's scale back our appetite and regain our focus.

MAJ MARK G. EDGREN
SXO, 1/2 ACR

Some Rules to Live By

Dear Sir:

While I read with great interest COL (Ret.) Paul Baerman's "Three Things I Learned in the Army," I wanted to share my guiding 20 principles that served me well during almost 30 years of service, much of it in Armor.

- Take care of soldiers and they will take care of you.
- Never stop learning.
- Let sergeants do sergeant's business.
- When in charge, take charge.
- If in doubt, don't.
- Bad news doesn't improve with age.
- Don't ask others to do what you won't do.
- Don't stifle initiative, reward it.
- It is more important to listen than to speak.
- Think execution, not results.
- Army is for 30, family is forever.
- Never sacrifice your integrity.
- Lead from the front.
- Be accessible.
- Maintain to train.
- Share your good ideas, accept those of others.
- Everyone can make a mistake, but not the same mistake twice.
- Manage your own time; if not, someone else will manage it for you.
- It is sometimes easier to apologize after the fact, than to ask for permission first.
- When it stops being fun, it is time to do something else.

ULRICH H. KELLER
COL, Armor (USA, Ret.)

An Azimuth Indicator for Tank Gunners?

by First Lieutenant Curtis Taylor

Red 1, Red 3, I've got two stationary tanks left of TRP 2, over.

Roger 3, I can't identify them, can you send me a grid?

This is 3, working on it — I'm taking near misses! — How 'bout a little help?

*3, I can't help you if I can't find the targets — send me a grid!*

Red 1, this is Red 4 — 3 is down — did anyone see who shot him?

Negative, we lost 'em.

Anyone who has commanded a tank or Bradley has undoubtedly encountered a situation similar to the one described above. It is an unfortunate reality of combat that the element with the most critical information is often too focused on his own individual crisis to relay information to the rest of his element. During those critical seconds, the tank commander is trying to maneuver his tank, issue a fire command, and fumble with his map to send an accurate spot report. Naturally, his tendency toward self-preservation will take priority. For this reason, the tank or section in contact will fight for its life while the remainder of the element waits helplessly for information.

The problem is often more frustrating for the gunner — who is, in most cases, the first to identify a target. He can see the enemy clearly, but he has no idea where his tank is located or in what cardinal direction his gun tube is pointing. In the past, the tank commander would drop down to the gunner's primary sight extension (GPSE), identify the target, and try to estimate its location. However, with the new CITV, the TC's role has expanded from merely confirming targets to seeking out new ones. If, instead, the gunner had an accurate means to communicate in which direction he was looking, he or his TC could send that information over the platoon net and quickly bring the firepower of his whole platoon to bear.

History has shown, over and over again, that the success of an entire mission is often decided in these first few minutes after the initial contact. This success is contingent upon how quickly the unit as a whole can react and deploy against the threat. The key is information flow, as General S. L. A. Marshall knew when he wrote in *Men Against Fire,* "strength will multiply and decisive action will become possible at the rate at which information flows to all concerned." (p. 128)
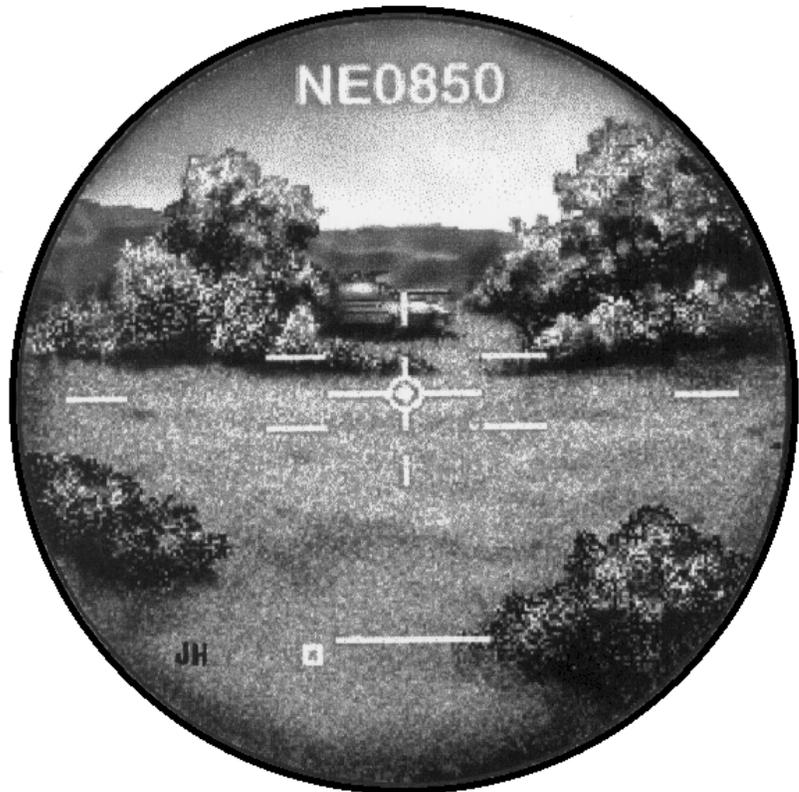
The designers of the new IVIS system have appropriately identified this and made dramatic improvements in the situational awareness of all elements on the battlefield. As one tank identifies a target, an electronic spot report immediately flows to all others on the network and an enemy icon appears on the map display. This system will revolutionize our ability to react to contact.

However, it does not go far enough. In order to bring effective fire upon that icon on his screen, the tank commander still needs to translate what he sees into information his gunner can use. He does this in the same way TC's have since World War II — by yelling "traverse left" or "traverse right" until the gunner identifies the target — a very imprecise method, especially when dealing with long range targets that easily blend with their background.

In the fight, a tanker — and particularly a gunner — thinks in terms of polar coordinates (direction and distance) rather than Cartesian coordinates of latitude and longitude. Communication between a gunner and tank commander will always be in relation to direction and distance. For this reason, both gunner and tank commander should have the target information available to them in this format. Specifically, both gunner and TC should have a readout of the grid azimuth of the gun tube in their respective reticles. This is the information most useful to them, and the technology they operate should support that need.

The far-target designate system on the M1A2 uses a north-seeking gyroscope to compute the direction to enemy targets as it determines their location. The technology, therefore, is already on the tank — all that is needed is a simple modification to provide that information to the TC and gunner.

Instead of slowly talking the gunner onto the target while constantly referring back to his IVIS terminal, the tank com-

mander could immediately relay the direction to the gunner with great precision. He can then return to scanning the terrain from the hatch, or from his CITV, without concern that the gunner is looking in the wrong direction. Future gunnery training could incorporate this practice into the standard fire command for IVIS-initiated engagements. *"Gunner sabot tank 2100 mils."* This will, obviously, not replace the need for constant scanning of the terrain or good target acquisition training. However, the emergence of sophisticated surveillance equipment, from satellites to UAVs, has increased the likelihood that an approaching enemy will appear on a tank commander's computer terminal long before it comes within visual range. A gunner could then point his reticle in the direction of his designated target and wait for the target to appear.

Not only would the azimuth display greatly enhance the precision of spot reports, but it would also create an entirely new method for a platoon leader to control and distribute the fires of his platoon. The platoon leader could quickly divide approaching IVIS targets by issuing approximate mil directions for each of his tanks (provided to him by his terminal). Each gunner then reports when he can identify his target and the precise mil direction. At the appropriate time, the platoon leader issues a fire command destroying four distinct targets. Immediately after the engagement, each tank returns to its designated sector of fire (marked by two mil directions). There is only minimal risk of "double-pumping" a single target because the platoon leader should be able to identify when two tanks are aiming at the same target.

Observer controllers at the NTC frequently criticize tank platoons for failing to establish and adhere to individual sectors of fire — particularly in the offense. Furthermore, these sectors are rarely properly adjusted as the tactical situation develops. The result is wide gaps in observation and an immediate focus on the first target that presents itself.

With an azimuth display, a platoon leader can establish sectors of fire based on azimuths rather than terrain features, which are often difficult to describe over the radio and tough to identify at night. If a gunner knows his sector is from 2400 to 3000 and he hears a report of tanks at 2150, he knows to remain in his sector unless given instructions otherwise.

In the defense, a tank platoon leader with a map and a protractor can also plot his platoon sector sketch with unprece-

dented accuracy to ensure he has no gaps in his security plan. He can identify likely avenues of approach by their numeric azimuth, making them much easier for gunners to identify at night. He can also identify areas where friendly forces are operating and require confirmation to fire into these areas. For example, *"Second Platoon is on our right flank — all fires to the right of 50 mils must be confirmed by Black 6."*

This system will also affect the communication between tanks in a platoon. A gunner could instantly react to a report on the platoon net of enemy tanks at 1400 mils without the need for translation from his TC. The same scenario described earlier might sound something like this:

Red 1, Red 3, I've got two stationary tanks at 850, over.

Roger 3 — I've got 'em. Red 4, you monitor?

This is 4 — Roger — I'm on 'em.

Okay, Bravo section, 2 rounds sabot, at my command, stand-by.

Alpha section continue to scan 1200 to 1800.

An azimuth indicator will also have a tremendous impact on the M1A2's effectiveness against aircraft. The new rapid pulse range finder on the M1A2 has, for the first time in history, made the main gun of a tank a legitimate threat to low flying aircraft. The sophisticated fire control system, however, does not eliminate the human aspect of the problem. The gunner, with an extremely limited field of view, has only a split second to acquire his target before it has passed him by. Anyone who has tried to acquire low flying OPFOR A-10s at the NTC can relate to this problem. A spot report of *"Incoming Bandits, East"* still doesn't provide the precision the gunner needs to ensure he is pointed in the right direction when an aircraft emerges over the horizon. Imagine if a tank commander, viewing his IVIS display, receives a report of an incoming aircraft at 1500 mils and 5 kilometers. He immediately passes the azimuth to his gunner who focuses on the horizon in that direction. Once the aircraft comes into visual range, the gunner can immediately begin tracking him, and, once within range, open fire. If this scenario were repeated in every tank in a platoon, an enemy aircraft would encounter a deadly and somewhat accurate hail of main gun rounds before he had the chance to make even a single pass.

In May of 1940, the German Army effectively annihilated the most powerful

armored force the world had ever known in the span of four weeks. Although numerous causes are attributed to this success, one of the most significant was the presence of a radio in every tank. Few anticipated the incredible synergistic effects that were realized when a armored force could communicate effectively and quickly relay critical information to every combat element. As a result, the Germans, despite their inferior fire-

> *"Both gunner and TC should have a readout of the grid azimuth of the gun tube in their respective reticles. This is the information most useful to them, and the technology they operate should support that need."*

power, could develop the battle quicker and retain the initiative.

Half a century later, that principle holds true. Battles are ultimately won or lost at the point of initial contact. An army that can react faster at that moment and deploy its forces will gain the initiative despite inferior numbers or equipment. The timely flow of information is fundamental to this process. But that information is only valuable if it has meaning to the actual combatant — the man who pulls the trigger. In armored warfare, that man is the gunner. The battle then hinges on passing information to this one man that he can readily translate into steel on target. Since gunners see the world in terms of direction and distance, information flowing to them should be in this format. Therefore, we need a simple way for the gunner to receive and send information about what is in his reticle. An azimuth indicator in the gunner's sight picture will accomplish this feat. It is a fairly simple mechanism, utilizing existing technology on the M1A2, that will revolutionize the way tankers communicate within a crew and within a platoon. Most importantly, it will allow a tank platoon to apply its full firepower instantly and accurately upon an enemy threat.

1LT Curtis Taylor is a graduate of USMA and the Armored Officer Basic Course. He has served as a tank platoon leader and support platoon leader and is currently the battalion maintenance officer of 1-12 Cavalry at Fort Hood, Texas.

REVIEWS

SIMNET on a Budget?

iM1A2 Abrams by Interactive Magic, $49.95. Requires Pentium PC with Windows 95, 2X CD-ROM, SVGA video card and 16MB RAM.

iM1A2 Abrams is currently the only realistic first-person tank simulation on the market. The heir to Microprose's 1990 hit, *M1 Tank Platoon*, *iM1A2* builds on its predecessor's addictive game play and adequate realism. Playing as either a platoon leader or company commander, you must battle your forces through three modern day campaigns in Bosnia, Ukraine, and the Middle East.

Game play is the strongest point of *iM1A2*. You are able to play from any position in your platoon. As the TC, button up and use the IVIS to control your platoon and maintain situational awareness. Unbutton and destroy light vehicles with your .50 caliber. Drop down to the gunner's chair, select your ammo, and engage targets with Sabot, HEAT, MPAT, and STAFF. Or move up to the appliqué computer map and command the battle from a higher tactical level.

Movements to contact, retrograde actions, and hasty attacks are but a few of the mission types available. Playing as a task force commander, you control other combat assets, such as M2 and M3 Bradleys, Apache and Kiowa helicopters, and scout/TOW HMMWVs to complete your mission. Using each unit's strengths results in a successful battle; misusing assets results in quick defeat.

Fire support is one of the most enjoyable aspects of *iM1A2*. The commander has 105mm, 155mm, and MLRS support available during the game, depending on priority of fire and the mission. Watching MLRS land on a threat formation is an experience that has to be seen. A-10 strikes can devastate enemy formations; just make sure you destroy any SAM assets before you call them in!

The sounds and explosions are well done, from the "ON THE WAAAY!" of the gunner to the recoil sound of the main gun. Destruction of enemy tanks and vehicles is fun to watch. Destroyed targets burn long after destruction, cluttering the search for new targets in your thermals. When a sabot hits a tank, the turret is apt to spin and fly into the air. Secondary explosions occur throughout the game as ammunition cooks off.

The artificial intelligence handles the threat well. Once I was engaged in a deliberate defense and had a large enemy formation in my engagement area, so I jumped down to the gunner's chair for some COFT-like fun. As I played gunner and focused on the EA, a threat platoon managed to flank my defense and rout my BP. I learned a valuable lesson about tunnel vision in battle, and kept a watchful eye on the AI from then on to do the unexpected.

All major former Soviet Union equipment is available as threats, even including some that are just appearing now. The T-94 with its 140mm gun is quite a surprise, and will penetrate the frontal armor of your M1 under 1500m. However, you mostly will face T-72s and T-80s, along with BMP-1 and 2s, along with the occasional BMP-3, which is a foe to be reckoned with. The Hind and Havoc helicopters are potentially the most dangerous threat asset; a wise commander saves his MPATs to deal with them.

The modeling accuracy of *iM1A2* is surprising. Tanks respond to damage realistically, with mobility kills and systems breaking. Rounds damage realistically; long range frontal hits bounce off M1s; BMPs can be killed by .50 cal. at close range. Your HEAT and SABOT rounds may hit the enemy without causing any damage. The T-80 and T-90 tanks with reactive armor prove difficult to kill at long ranges. The M1A2 also is vulnerable from the sides and rear. The "invulnerable" myth is put to rest in this game.

iM1A2 has its drawbacks. The terrain is bland and featureless, without any trees and only the occasional house dotting the landscape. It is very difficult to assume a proper platoon BP without maneuvering each vehicle individually into hull and turret down positions. Even SIMNET type trees would enhance the game tremendously.

The game also does not permit you to modify the initial setup of your forces, forcing you to hastily redirect units at the beginning of each battle. Platoon-level formations are accurate, but assuming a company or task force wedge/column is nearly impossible. The ability to create custom scenarios would also be nice.

iM1A2 Abrams also gives the player an appreciation of the advantages the M1A2 offers over the M1A1. The CITV and IVIS allow the TC to have a much better situational picture than was previously possible. The STAFF and MPAT rounds prove to be very effective. The STAFF is particularly effective at obtaining kills on T-80s at over 2000m due to its top attack ability.

The learning curve of *iM1A2* is steep, but tankers will quickly identify familiar equipment and understand its use better than civilians who would buy this game. Once mastered, the game becomes much more enjoyable to play, and demonstrates the true power of combined arms on the battlefield.

The game also includes a multi-player capability that allows players to play head-to-head, or cooperatively over a network or the Internet. The training potential of this game for TCs cannot be ignored, as it provides a reasonably realistic M1A2 model and accurate gunnery. *iM1A2* is almost as realistic as SIMNET and COFT, and more realistic in some ways. At a price of less than $50 a copy, it is also a cheaper alternative, requiring only Multimedia Pentium computers to play.

Two more tank simulations are due later this year, one reportedly with assistance from the designers of SIMNET. For those looking for some realistic tank combat, *iM1A2* is the game for you.

2LT Niel Smith was commissioned through ROTC at James Madison University in 1997. He is currently assigned as a scout platoon leader in Alpha Troop, 3-4 Cavalry, Schofield Barracks, Hawaii. He welcomes all comments at cavlt@armornet.com.

East Front by Talonsoft, A WWII Strategy Game. $54.95.

June 23, 1941- *The Fuhrer's glorious plan is working perfectly. We have surprised the Russians by crossing the river near Hisakliv before they could respond in force. Now you must continue our success by taking your battalion and breaking out of the bridgehead.*

This is just a sample of one of the many scenarios you may face as a participant in Operation Barbarossa. You assume the identity of either a German invader or a Russian defender trying desperately to protect the Motherland. Thanks to Talonsoft, you can now relive history. Take part in one of the greatest campaigns of WWII in their newest strategy game, *East Front*.

Yes, another strategy game has hit the market. Another game to make your eyes glaze over has been added to the multitude of strategy games already on the shelf. Let this review help you decide as you move up and down the aisle looking for something new and challenging.

It does not take long to figure out the mechanics of this game. The player's guide states, "*East Front* is easy to learn but a difficult one to master." The guide is very helpful and within a short period of time you will be able to move units, shoot artillery, and call in air strikes. If you have not played a strategy game before, this is a good one to start with.

As in real battle, the ability to see the battlefield in a strategy game is vital. *East Front* offers six different views to help you see the entire field of battle. Use the *Jump Map* to get a feel for the overall battlefield. Switch to *2D Normal View* to see the terrain in better detail and the units as either graphical icons or military symbols. For even more resolution, use one of the *3D views* that allows you to see the units as miniatures with individual fighting positions. You will also see the bullets fly and impact their targets in this view.

The best feature that this game has is that it remains challenging. You do not become bored quickly. You won't want to file this game away with the other computer games that you quickly mastered and set aside. You must decide what level of command you are going to play. The game allows you to maneuver and position platoons, but you can command from battalion to corps level as either a German or a Russian. You decide whether you want to play a Campaign, a Scenario, or generate a Battle.

East Front is designed for play in the campaign format. Playing in this mode enables you to choose a commander and fight a series of different battles as you progress through the campaign. Your commander earns decorations and promotions based on his tactical savvy and success in battle.

Playing a scenario enables you to fight a pre-designed, historically consistent battle. Here's your chance to make history repeat itself or change the outcome of specific battles along the Eastern Front. The scenarios are numerous and will take even the most avid player quite a long time to complete.

Generating a battle allows you to pick the basic features of some specific scenarios. This is a good place to practice certain missions before you embark into playing a scenario or campaign. Choose the year, month, area, terrain, weather, and the size and type of unit. Fight a meeting engagement in the dead of winter on the open plains or conduct a river crossing in a heavily forested area. The choices are almost unlimited.

The designers also included some game options that enable you to make the game as easy or as challenging as you want. You can fight the computer at levels ranging from easy to impossible. Furthermore, there is the ability to increase the uncertainty of the battlefield by increasing the level of the "Fog of War."

Not challenging enough? Then design your own scenario. You have the ability to design the terrain and map that you want to fight on. Make each hex exactly the way you want it. Then customize your units and organization to your specifications. Sounds difficult, but again, no advanced computer degree is necessary.

After having fought many tenacious and exhausting battles against the computer, you can also match wits against another living and thinking opponent. Use the two-player hot seat mode to play an adversary using only one computer, or play long distance via the Internet or e-mail options.

System Requirements. For those of you who do not have a Pentium-based computer, do not despair; this game worked well on an older 486DX. The game does require Windows 95, a 486DX or Pentium PC (Pentium recommended), a double speed CD-ROM, 8 MB RAM minimum (16 MB recommended).

For those questions that the Player's Guide just cannot answer, Talonsoft's Homepage probably can. This is a great site that you can browse. You'll find the answers to many frequently asked questions as well as discover some good tips, techniques, and tactics. Look for their page at www.talonsoft.com.

Talonsoft's *East Front* is a fun and challenging WWII strategy game that will hook the novice and keep the strategy game enthusiast sufficiently challenged. While playing, do not be surprised if what seems as if only minutes has passed, when in reality it is hours. Just remember, you have PT in the morning. Good Gaming!

CPT BOB HUGHES
Leavenworth, Kan.

Armored Fist 2: M1A2 ABRAMS, developed by NovaLogic. $44.95. For DOS 6.2 & WIN95 computer systems.

Abstract: The program *Armored Fist* is a real-time armor simulation that allows the player to take command of one the United States military's most advanced weapon systems. The simulation is comprised of three levels to accommodate users of various levels of interaction. The simulator allows instant combat for users who want instant action and campaign play for those who want to attempt a role of leadership that many want, but only a select few can have. Includes a multiplier option for campaign warfare.

Minimum Requirements: DX4-100, Soundblaster-compliant sound card, 120MB disk space [for single player], keyboard, 4X CD-ROM, SVGA monitor, 2 MB VESA SVGA card, 16 MB RAM.

NOTE: Although it is possible to play the game with this configuration, I do not recommend it. Attempting to play the game at this level will not give the full effect and graphics that makes this a fully interactive simulation.

Recommended Requirements: P120-P133, SoundBlaster-compliant sound card, joystick, 12X CD-ROM, SVGA monitor, 4MB PCI SVGA card, 32 MB RAM; 33.6-56.6 kbps modem; 300 MB disk space.

Tested On: Dual P120, 64MB RAM, 4MB SVGA PCI card, Windows NT, running WIN95 Boot, Thrustmaster, SoundBlaster 32, 1.6GB drive, Courier I-modem 128 Kbps ISDN.

Setup of the game is extremely easy, with step-by-step instructions, to include the multiplayer setup. The user need only know bare computer basics to install the game.

The game start-up screen gives three play options: *Easy Mode,* which gives the user an easy but unrealistic control of the tank; *Realistic Mode,* which gives an extremely accurate control of an M1A2 tank; and *Realistic Mode w/Auto Lock,* which gives the user the ability to control the tank in a "real-world mode," but the user does not have to concern himself with targeting the main gun or .50 cal. I recommend tankers [E1-E9] play in Realistic Mode and tankers [O-1 to O-10] play in Realistic Mode with Auto Lock. This will allow officers to concentrate more on command and control, rather than gunnery. But try them both.

The next screen is the Choose a Campaign screen, where a user can choose campaign or solo action. The Menu screen will appear after a game selection is made. From there, a player can choose "multi-player" or "stand alone" game play. I do recommend playing in multiplayer mode, especially for those users who want to experience a measure of the complexity of command and control on the battlefield. For tank commanders, platoon leaders, and yes, even Black Six himself, the company commander, it is a must to play *Armored Fist 2* in multiplayer mode. Speaking from personal experience of the confusion that exists in trying to command a group of tanks, I recommend those young officers who will be entering AOBC in the near future play *Armored Fist 2* in multi-player mode to obtain a taste of what will be expected of you when you enter MTT in your 13 weeks of AOBC.

As for the game, Novalogic has outdone themselves. The graphics far surpass *F22* [another game by NovaLogic], *F-16 Fighting Falcon Gold*, and *M1A2.* It can be argued that the graphics even surpass those seen in SIMNET and CCTT, for those who have 4MB graphics cards and Hi-Res monitors. The game gives realistic sounds and views, to include [my personal favorite] that a gunner cannot fire the main gun until a loader gives an "Up." In addition, unlike SIMNET, the damage the tank receives in battle is more realistic compared to the actual tank's capabilities, removing those questionable deaths that SIMNET Warriors often suffer in the SIMNET, although the Warthogs [SIMNET instructors] will argue that the SIMNET is the next best thing to being in a tank [excluding CCTT]. Well, after playing *Armored Fist*, I say throw out the SIMNET software and replace it with *Armored Fist* software.

The game has proven itself so well that, within my own unit, my commander has allowed me to supplement the virtual training program [UCOFT, GUARD FIST] with the usage of *Armored Fist 2* on the company's LAN network, to include networking with other units for force-on-force simulations. However, above all, remember this: *A simulation, no matter how good, or real, will NEVER replace in-the-field training mounted on real tanks. Simulations should only be used as training aids to supplement in-the-field mounted training exercises.*

ALEXANDER R. TAMBASCIA
2LT, Armor
D-Troop, 2-172, 86 Bde

Fighting on the Brink: Defense of the Pusan Perimeter by BG (Ret.) Uzal W. Ent. Turner Publishing Company, Paducah, Ky., 1997. 431 pages, $39.95.

The study of the Korean War has enjoyed a renaissance in the past decade. It began with the publication of Clay Blair's epic, *The Forgotten War,* in 1987, continued with many other impressive accounts of the war and its participants, and continues with Brigadier General (Ret.) Uzal Ent's fine volume. *Fighting on the Brink* is a detailed account of the first four months of the Korean War. The author integrates seamlessly a myriad of secondary sources into the text of the book's 22 chapters, giving the reader a clear picture of the fighting during the savage first four months of the Korean War. By far the greatest strength of *Fighting on the Brink* is how he weaves personal accounts into the narrative, illustrating the hardships and uncommon valor of the ordinary American GI in the fight for the Pusan Perimeter.

There are no new revelations or striking insights in this book. Instead, the author has crafted a work that serves to remind us of the folly and capriciousness of bad foreign policy, coupled with the cyclical attempts by politicians to reduce the Army to irrelevance. The "New World Order" of the post-World War II era lasted long enough to see the Army emasculated in men, equipment, and training, only to be committed in the hills and rice paddies of Korea less than five years after the surrender of Japan. The problems facing Captain Bill Terman, commander of B Battery, 31st Field Artillery Battalion, in training his men is typical of the experience of most of the units of Eighth Army just prior to the start of the war:

"We have a very real problem in welding together a good, efficient military team over here; the procuring of supplies and equipment [is] erratic and inadequate, and, perhaps most discouraging, the virus of insidious bureaucracy permeating the voluminous paper administration is time-consuming in the extreme." Captain Terman was killed in action in August 1950, but the insidious bureaucracy that hampered his battery and all peacetime armies, is alive and well today.

General Ent goes to great lengths to detail the fight of Task Force Smith and all of the combat of the first four months of the Korean War. In many cases, the author is uncritical of the poor performance of American units in the opening stages of the war. While no one questions the dedication and patriotism of the individual soldiers, there is little doubt today that many of the regiments committed early to the fighting in Korea fought poorly. It is anguishing to read the account of then 17-year-old Private Earsel Bonds as he flees the Task Force Smith aid station, and is told by a sergeant to throw his weapon away because the enemy would kill anyone captured with a weapon. It is equally heartbreaking to read about the destruction of 3d Battalion, 29th Infantry at Hadong Pass on 27 July 1950. Once again men discarded weapons, equipment, and clothing to escape the North Koreans. I gritted my teeth as I read how dozens of soldiers surrendered to the North Koreans, while others fled the battlefield, and still others fought the North Koreans at every opportunity; a battalion of nearly 900 men reduced to less than 300 in a single day. It was a poorly trained and led battalion that performed in a predictable manner.

While the author does a commendable job of writing, the editing of *Fighting on the Brink* is less than stellar. There are numerous misspellings throughout the text and many of the pictures in the book are of poor quality. Many of the photos are poorly reproduced versions from other works. *Fighting on the Brink* has numerous maps that illuminate the narrative, but they too are of mixed quality. Like the photos, most are reproduced from other works, with some of the copies of poor quality.

Fighting on the Brink is a worthy addition to the history of the Korean War. It is the most detailed account of the first four months of the Korean War available. The author succeeds in making the book "live" by making the recollections and remembrances of hundreds of soldiers the centerpiece of each chapter. The real lessons of the war come from the voices of those soldiers, reminding us not to forget the futility and agony of the first four months of the Korean War. That, of course, is the real value of *Fighting on the Brink*. The experiences of Task Force Smith and the rest of the soldiers and Marines who fought to defend the Pusan Perimeter remind me to never allow myself to succumb to "insidious bureaucracy," but always focus on the training and readiness of my soldiers. The next deployment is only a phone call away.

ARTHUR W. CONNOR, JR.
LTC, Armor
Army Advisory Group
Maxwell AFB, Alabama

The Sleeping Giant; American Armed Forces Between the Wars by J.E. Kaufmann and H.W. Kaufmann, Praeger Publishers, 1996. 216 pages, $55.00.

The Sleeping Giant; American Armed Forces Between the Wars attempts to document the military's fight for survival, preparedness, modernization, and money. The authors, J.E. Kaufmann and H.W. Kaufmann, do a decent job of chronicling the military services' attempts to remain competitive in a dangerous world. In their introduction, the authors state that they wanted a book that "synthesizes the period" without creating a cumbersome text for the average reader. To varying degrees, the authors met the challenge of synthesizing military developments. Unfulfilled was their attempt at making this a readable book.

The available literature on the American military in this era is surprisingly small. While there are many articles and some official histories, there are few books. I began reading this book assuming that this would be a scholarly effort worthy of its steep $55 price tag. I was very disappointed. *The Sleeping Giant* sheds very little new light on American military policy and development. The book draws from many secondary sources, rarely tapping the wealth of information that exists at the National Archives, the Center of Military History, and the Military History Institute.

While chronicling the military's struggles in the inter-war years, the authors' inherent bias against the isolationist government is blatant. They argue that the shortsightedness of the Republicans, who controlled both Congress and the presidency, directly lead to America's weakness both militarily and politically. If it were not for FDR's keen understanding of foreign affairs and his willingness to listen to his military leaders, America would not have been able to continue as quickly to the Allied war effort.

While describing the military's successes and failures to improve their readiness, the book leaves the reader with many unanswered questions. For example, on pages 77-80, the authors bemoan the government's unwillingness to authorize money to improve or create coastal fortifications at Alaska, Puerto Rico, Guantanamo Bay, and various locations on the American mainland. The authors never explain why these locations were vital to the defense of American interests; nor do they mention that coastal defenses were rapidly becoming obsolescent due to improvements in ships and aircraft. The authors also miss an excellent example of how the rapid pace of technology can cause costs to skyrocket. On page 79, they note the installation of new 16 inch guns in a battery of the Panama Canal's Pacific defenses. By the time the guns were installed in 1929, the Coast Artillery Corps decided they needed to be in casements and that anti-aircraft guns were needed to protect the big guns from aircraft. Yet the authors' tone in the rest of the book was that the U.S. needed coastal artillery. They never discuss the tactical and strategic importance of the weapons in defending American interests.

The Sleeping Giant's most significant contribution is that it warns the reader of the dangers in believing that there is a post-Cold War dividend. The politicians accepted the notion of a post-World War I dividend and vastly reduced the armed forces. The quality of life for service members dropped radically. Correspondingly, the quality of recruits also decreased. Many military bases were closed and consolidated to reduce costs. Training funds were also reduced so that by 1933, only recruits got target practice with their rifles. The funding for development of new equipment (what we now call force modernization) basically stopped for almost ten years. When funding did start trickling into the military, it was for high profile, big-ticket items like battleships, cruisers, and aircraft. The Army suffered much longer because it was not glamorous and could not compete with the high profile Navy, Marines, and the Army Air Corps. New logistic equipment was virtually ignored until the mid-1930s. There was even a vigorous debate about the role of the National Guard in military plans. Does any of this sound familiar? While today's military does not face reductions as severe, it plays a much larger role in U.S. policy than the military of 70 years ago.

I have many complaints about this book. First, I found it very hard to follow the authors' arguments because they jump from one subject to another without warning. This poor structuring dilutes the argument and makes for a hard read.

Second, as I perused the book, I stumbled across 20 pages of maps, illustrations, diagrams, and charts located in the center of the book. The reader must derive their meaning; they are never mentioned in the text. While some of the charts appear interesting, their small size and poor definition hinder the reader. I also found a few errors in the charts, most notably in Figure 17 – the vehicle armaments on the top do not match the bottom. Simple errors like these draw into question the reliability of the data presented in the book. Overall, the below-average qualities of these diagrams detract from the reader's understanding of the text.

Finally, the authors list nine pages of sources; some from individual participants and official documents, but most from newspapers from the time period and books published decades after WWII. The lack of primary sources is disturbing for a book purporting to be of great scholarly value. The authors may argue that they are only trying to highlight what the people knew at the time, but the authors do not list even one Gallop poll taken during the inter-war years. This is especially disturbing since FDR often focused on public opinion and commissioned many polls on his behalf. Although these polls played a part in the government's domestic policies in the 1930s, they are not discussed in the book.

The *Sleeping Giant* chronicles the development of the U.S. military between world wars, but does not provide many insights into the thought processes and decisions made by military and civilian leaders. The book presents more questions than answers. More research and definitely more than 216 pages are needed to cover such a broad and complex subject.

C.J. HORN
Captain, Armor
Ohio State University

On the Way... Leadership is the Focus of 1998 Armor Conference

Clear your schedules and mark your calendars! The 1998 Armor Conference is rapidly advancing into our sector, and once again the U.S. Army Armor Center and Fort Knox will host one of the country's largest annual military symposiums. First held in 1949, the Armor Conference has greatly increased in popularity over the years, and it continues to serve as a valuable opportunity for leaders from all branches and components to come together to discuss current and future issues impacting our rapidly changing profession. This year's conference will be held Tuesday, May 19th through Thursday, May 21st and carries the theme, "The Mounted Leader Today and Into Tomorrow."

Leadership is the central tenet of this year's theme, and it marks a dramatic change from other subjects we've chosen in the past. In today's turbulent military environment, this one personal attribute is absolutely critical to the survival of the Armor branch and the Army in general. As stated in his *Commander's Hatch* editorial, Major General George Harmeyer, the Chief of Armor, views the challenge of instilling and fostering a true warrior spirit in our junior leaders as one of our greatest priorities. As a result, he has extended invitations to some of the Army's most noted visionaries, who will share their views on instilling a warrior ethic in our leaders of tomorrow. Conference participants will find the numerous briefings and open discussions extremely rewarding. In a slight change from previous years, MG Harmeyer has added a half day to the conference on Thursday, May 21st. This exciting addition allows the opportunity for special presentations given by members of the combined arms team.

The annual Armor Trainer Update (ATU) will once again precede the conference on May 17th and 18th. This two-day event focuses on the challenges facing our Army Reserve and Army National Guard brothers-in-arms. As the number of military commitments around the world continues to rise, these units face even greater training challenges. The ATU provides a perfect forum to discuss these important issues. Last year, over 300 Army Reserve and National Guard members attended this event, and we estimate an even greater number of attendees this year.

The G3/Directorate of Training, Plans, and Mobilization will hold the 6th annual External Unit Scheduling Conference at the Armor Inn, held in conjunction with the ATU, on May 18th. Units from the Active and Reserve Components, as well as from other branches of service, will vie for the opportunity to schedule Fort Knox's vast simulations facilities and range complexes. As training dollars dwindle, these cost-effective training facilities at Fort Knox become more and more attractive to units who wish to hone their combat skills. Consequently, the number of units taking advantage of this opportunity has greatly increased every year.

One of the most popular aspects of the conference is the numerous contractor exhibits that are set up at Skidgel Hall during the entire week. Last year, over 150 displays demonstrating the latest breakthroughs in the defense industry, equipment prototypes, and state-of-the-art training devices were available for public viewing, and we expect an even greater number this year. For many, this is a once in a lifetime opportunity to see the absolute best our defense industry has to offer in one consolidated setting. Between the ATU and Armor Conference, we've set aside one entire day for conference attendees to walk through the area and observe the latest innovations. There is something in this forum that will interest everyone, and you will find yourself spending hours browsing through the exhibits.

In keeping with the "leadership" focus, the General Frederick M. Franks Award will be presented on the last day of the conference to an individual who has demonstrated a lasting contribution to the ground warfighting capabilities of the U.S. Army. This year will mark the fourth time we've made the presentation of an award originally conceived by former Chief of Armor, then-Major General Larry Jordan. The nominees for this prestigious award must have demonstrated leadership characteristics possessed by the award's namesake, including one or more of the following: offered a vision for the future of the mounted warfighting force that significantly improved combat survivability, lethality, or mobility; developed an innovation in equipment, material, or doctrine that significantly enhanced the effectiveness of combat arms' mounted elements; exemplified professional excellence in demeanor, correspondence, and leadership; and displayed a love of soldiering. Last year's award recipient was COL Thomas F. Metz, then Director of the EXFOR Coordination Cell, who was instrumental in the execution of the Army's Task Force XXI Advanced Warfighting Experiment.

The Armor Conference has attracted a much greater audience than just the armor and cavalry community. This event is an absolute must for everybody who is concerned with the current and future states of our military, or those who are merely interested in enjoying a week of fun, activities, and camaraderie. Despite continuing military cutbacks and decreases in funding, we face increasing mission demands every day. The only way we can survive these constant fluctuations is to demonstrate the resolve and demeanor that can inspire subordinates, peers, and superiors alike. The Armor Force is committed to bringing back the warrior ethos to its ranks. If you have the same resolve and desire as we do, we'll see you at the conference!

Armor Conference Points of Contact

Event	POC	DSN Number	Commercial
Armor Conference	CPT Dave Bowlus	464-4007	(502) 624-4007
Armor Conference	SFC Morris Lockert	464-1065	(502) 624-1065
Armor Trainer Update	MAJ Thil Hall	464-1579	(502) 624-1579
External Scheduling Conference	Jim Hornback	464-3555	(502) 624-3555
Contractor Displays	SFC Kim Thompson	464-1250	(502) 624-1250
USAARMC Protocol	Jack Eubanks	464-6615	(502) 624-6615
USAARMC Protocol	Sherry Cart	464-6103	(502) 624-6103
Armor Association	Connie Bright	464-2610	(502) 942-8624
Armor Magazine	LTC Terry Blakely	464-2249	(502) 624-2249
VIP Billeting/Transportation	Reservations	464-6180	(502) 624-6180
On-post Housing	Carolyn Burton	464-3491	(502) 943-1000
Armor Classic Golf Scramble	Golf Manager	464-4218/1548	(502) 624-4218/1548

1998 Armor Conference and Armor Trainer Update

(Tentative Agenda)
16 May - 21 May 1998

"The Mounted Leader Today and Into Tomorrow"

DATE	TIME	EVENT	HOST/SPEAKER	LOCATION
Saturday, 16 May	1500-1900	Registration for ATU/Armor Conference	Protocol	Gaffey Hall, Bldg 2369
Sunday, 17 May	0730-0930	Registration for ATU/Armor Conference	Protocol	Gaffey Hall, Bldg 2369
	0900-0910	ATU Welcome/Administrative Info	SACG	Haszard Auditorium
	0910-1030	ATU Presentations	TBD	Haszard Auditorium
	1050-1200	ATU Presentations	TBD	Haszard Auditorium
	1200-1330	Lunch		
	1330-1510	ATU Presentations	TBD	Haszard Auditorium
	1530-1630	ATU Presentations	TBD	Haszard Auditorium
	1830-2200	No Host Social for ATU	SACG-RC	Fort Knox Leader's Club
Monday, 18 May	0800-1700	Armor Conference Early Registration	Protocol	Fort Knox Leader's Club
	0800-1700	External Scheduling Conference	G3/DPTM	Armor Inn
	0900-0905	ATU Administrative Info	SACG	Haszard Auditorium
	0905-1000	ATU Presentation	TBD	Haszard Auditorium
	1020-1200	ATU Presentations	TBD	Haszard Auditorium
	1200-1300	Lunch		
	1200-1700	Contractors' Displays	DFD	Skidgel Hall, Bldg 1724
	1200-1700	Battlelab Demo	MMBL	Bldg 2021, MWTB
	1200-1700	Close Combat Tactical Trainer Demo	CCTT PO	Bldg 2020, MWSTC
	1300-1700	Brigade and Regimental Commanders' Meeting	OCOA	Rivers Auditorium
	1300-1700	USAARMC Sergeant Major Armor Update	CSM Lady	Haszard Auditorium
	1300-1800	Subject Matter Expert Briefs	DTDD, DFD	TBD
	1430-1530	Honorary Colonels of the Regiment	OCOA	Gaffey Hall, Rm 219
	1800-UTC	Pre-Golf Classic Social	Business Ops	Gallotta's
Tuesday, 19 May	0700-1600	Registration	Protocol	Fort Knox Leader's Club
	0800-1200	External Scheduling Conference (if required)	G3/DPTM	Armor Inn
	0800-1200	1st ATB Initial Entry Training Workshop	1st ATB	Rivers Auditorium
	0800-1800	Subject Matter Expert Briefs	DFD, FXXI, TSM Abrams	
	0830-1530	3d Annual Armor Golf Classic Scramble	Business Ops	Lindsey/Anderson Golf Courses
	0800-1700	Contractors' Displays	DFD	Skidgel Hall
	0800-1700	Battlelab Demo	MMBL	Bldg 2021, MWTB
	0800-1700	Close Combat Tactical Trainer Demo	CCTT PO	Bldg 2020, MWSTC
	1630-1800	CG's Garden Party	MG Harmeyer	Quarters One
	1830-2130	Regimental Buffet and Assemblies	OCOA	Fort Knox Leader's Club
Wednesday, 20 May	0730-1200	Late Registration	Protocol	Gaffey Hall (Message Center)
	0800-1700	Contractors' Displays	DFD	Skidgel Hall
	0800-1700	Battlelab Demo	MMBL	Bldg 2021, MWTB
	0800-1700	Close Combat Tactical Trainer Demo	CCTT PO	Bldg 2020, MWSTC
	0900-0915	Welcome/Admin Announcements	COL Geier	Haszard Auditorium
	0915-1010	Presentation	MG Harmeyer	Haszard Auditorium
	1030-1120	Presentation	TBD	Haszard Auditorium
	1120-1130	Patton Museum Presentation	MG (Ret.) Sheridan	Haszard Auditorium
	1130-1200	Armor Association Meeting	Armor Association	Haszard Auditorium
	1200-1400	Lunch/Visit Contractors Displays		Skidgel Hall
	1400-1450	Presentation	BG Wilson	Haszard Auditorium
	1450-1540	Presentation	TBD	Haszard Auditorium
	1600-1650	Presentation	TBD	Haszard Auditorium
	1830-UTC	Cocktails/Armor Association Banquet	TBD	Patton Museum/Armor Inn
Thursday, 21 May	0800-1700	Contractors' Displays	DFD	Skidgel Hall
	0800-1700	Battlelab Demo	MMBL	Bldg 2021, MWTB
	0800-1700	Close Combat Tactical Trainer Demo	CCTT PO	Bldg 2020, MWSTC
	0900-0905	Administrative Remarks	COL Geier	Haszard Auditorium
	0905-0950	Presentation	TBD	Haszard Auditorium
	0950-1000	Presentation of the Franks Award	TBD	Haszard Auditorium
	1015-1040	Presentation	Infantry School	Haszard Auditorium
	1040-1105	Presentation	Artillery School	Haszard Auditorium
	1105-1130	Presentation	Aviation School	Haszard Auditorium
	1200-1300	Chief of Armor Luncheon	TBD	Fort Knox Leaders' Club
	1315-1400	Presentation	TBD	Haszard Auditorium
	1400-1445	Presentation	TBD	Haszard Auditorium
	1500-1545	Presentation	COL Kalb	Haszard Auditorium
	1545-1630	Presentation	TBD	Haszard Auditorium
	1630-1700	Closing Remarks	MG Harmeyer	Haszard Auditorium

For up-to-date information, visit the Armor Conference website at:
http://147.238.100.101/arconf/ or http://www.knox.army.mil/arconf/