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CHIEF OF ARMOR'S HATCH

BG Kevin D. Admiral
Chief of Armor/Commandant
U.S. Army Armor School

Developing Leaders

"We are facing increased global disorder, characterized by decline in the long-standing rules-based international order – creating a security environment more complex and volatile than any we have experienced in recent memory. … This increasingly complex security environment is defined by rapid technological change, challenges from adversaries in every operating domain and the impact on current readiness from the longest continuous stretch of armed conflict in our nation's history. In this environment, there can be no complacency – we must make difficult choices and prioritize what is most important to field a lethal, resilient and rapidly adapting Joint force." -2018 National Defense Strategy

People remain the No. 1 priority in the Army, and developing leaders is quintessential to building readiness. To develop leaders to meet the challenges listed in the 2018 National Defense Strategy, we must understand what leader development is and why it is important.

The Army Leader Development Strategy defines leader development as "a continuous, progressive process by which the synthesis of an individual's training, education and experiences contribute to individual growth over the course of a career." Field Manual (FM) 6-22 defines three domains associated with leader development (institutional, operational and self-development).

The *institutional domain* represents career-long learning and development. Leaders matriculate the institutional domain at different points in their careers to receive professional military education.

The *operational domain* is where leaders gain experience. In the operational domain, training events (situational-training exercises, round-table discussions or seminars) provide multiple repetitions and sets to strengthen mental agility while post-training after-action reviews provide feedback for improvement.

Leaders continuously navigate the *self-development domain* as they enter and exit the operational and institutional domains; the self-development domain is where leaders learn from the experiences of others through professional reading and reflect on their own experiences. This domain enables leaders to interpret their mistakes and internalize lessons-learned during training.

Figure 1 depicts the Army's leader-development strategy.

Retired GEN Martin Dempsey said that "our doctrine and our organization and even the guidance we give … is not going to be perfectly suited. And so these young men and women out there on the edge – it'll be their responsibility to take what they are given ... and apply it in a way that will allow us to protect our national interest and promote our values."

Armor leaders must think faster and react with lethal precision; therefore the method we use to develop leaders must be deliberate and planned like an

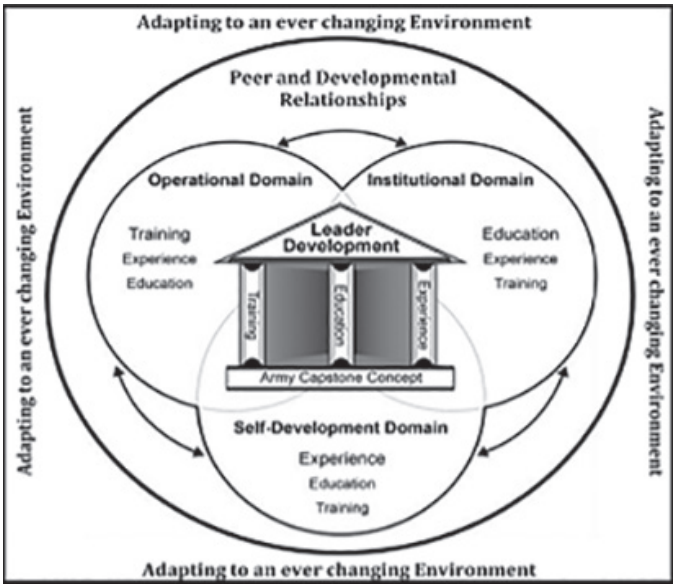

Figure 1. Army leader-development model from 2013's *Army Leader Development Strategy*.

MEMORANDUM FOR All Battalion Platoon Sergeants **SUBJECT: Battalion Platoon Sergeant Development Program**		
1 Purpose: To establish a platoon sergeant professional-development program and provide guidance for its execution.		
2 Intent: Provide opportunities for the battalion command sergeant major to assess the professional strengths and developmental needs of battalion platoon sergeants and develop leaders through one-on-one coaching and mentoring.		
3 Procedures:		
	a. Duration. Each session will be one and one-half (1.5) to two (2) hours long.	
	b. Location. The location will be at the discretion of the platoon sergeant and will be provided when making the calendar appointment.	
	c. Participants. This is one-on-one time for platoon sergeants with the battalion command sergeant major. There will be no other participants.	
	d. Frequency. The first session will occur in the first 30 to 60 days of a new platoon sergeant assuming responsibility. Platoon sergeants will schedule a subsequent session every five to eight months thereafter. Platoon sergeants will conduct a final session in the last month before relinquishing responsibility.	
	e. Session time breakdown (estimate):	
		The first 30 minutes to one hour of the session will be a sit-down discussion by the platoon sergeant with the battalion command sergeant major in an area where they will not be disturbed. Platoon sergeants must come prepared to discuss the topics in detail (outlined later), demonstrating knowledge of their unit and understanding of their mission.
		During the second hour, the platoon sergeant will take the battalion command sergeant major to the selected location. Training should highlight what is unique and interesting to that company's mission. This is the primary focus of the meeting. The platoon sergeant should be showing the battalion command sergeant major how the platoon accomplishes a training event. It is the platoon sergeant's responsibility to know what training is ongoing and where. This is the time for the platoon sergeant to highlight platoon systems, conduct, or techniques and procedures.
	f. Constraints. Platoon sergeants have full latitude to present prepared information to support the topics of discussion. The platoon sergeant will not speak from a prepared script, but should be able to speak specifics about Soldiers in training, sick call, or other appointments.	
4 Topics of discussion. Topics are intended to be ambiguous and prompt open-ended questions for discussion. Platoon sergeants will not receive a briefing shell to fill out. Platoon sergeants must be prepared to discuss these topics in any order or method chosen by the battalion command sergeant major.		
	a. Describe your mission and strategies to improve how your platoon accomplishes its mission. What are your strengths, weaknesses, upcoming opportunities and potential threats as they relate to your unit? Where do you want to take your platoon?	
	b. Discuss your assessment of the training-management processes and training-record management for your platoon. How well does your company use Digital Training Management System (DTMS), and what are your company's challenges with DTMS?	
	c. Describe your platoon's personnel situation, including staffing, certification, physical fitness (with height and weight compliance), medical readiness and profiles.	
	d. What programs do you have in place for professional development? Does your counseling system foster professional development and tailor it for each individual?	
	e. How do you identify, track and care for high-risk personnel in your platoon? Describe your approach to using non-judicial punishment.	
	f. Discuss the external relationships and stakeholders that your platoon has to accomplish its mission. What is your assessment of the strength and benefits of those relationships? What are you doing to maintain or strengthen them?	

Table 1. Example platoon-sergeant development program. *(Adapted from Figure 2-4, FM 6-22)*

operation. The planning process for developing leaders is no different from planning and resourcing an attack, defense or gunnery.

Unit leader-development programs (LDPs) are vital in developing Armor leaders. They must target identified shortfalls and develop critical thinking and decision-making skills. Plan and manage LDPs at the battalion level for platoon leaders/platoon sergeants, and at the brigade level for company commanders, first sergeants and field grades.

Table 1 is an example LDP for platoon sergeants from FM 6-22.

Engaged leadership is the final component in developing leaders. We must create environments that are conducive to learning by accepting prudent risk and not being risk-averse during training – or be attributional when assisting with personal-growth requirements. Subordinate leaders must have the opportunity to gain experience in an environment that accepts failure but provides feedback and time for improvement and growth. The aforementioned fosters mutual trust throughout the formation.

Lastly, superiors must *counsel subordinate leaders*. Counseling enables shared understanding of expectations, strengths and weaknesses, and facilitates individual development plans to achieve growth; counseling is vital to effective reflection. Reflection enables subordinate leaders to understand deficiencies and transcend within the self-development domain. Counseling has a direct correlation with lifelong learning and leader development.

Forge the Thunderbolt!

Acronym Quick-Scan

FM – field manual
LDP – leader-development program

GUNNER'S SEAT

CSM Tony T. Towns
Command Sergeant Major
U.S. Army Armor School

Developing Leaders of Character

Leader development is an ongoing endeavor, delivered in many forms and by different means. From Army attributes and competences across the institutional, operational and self-development domains, to feedback mechanisms such as coaching, counseling and mentorship, leader development is foundational to a disciplined, fit and confident outfit that is "Army Ready" for the crucibles of ground conflict.

While level of competency can be determined through tests, measures of performance and assessments, the quality of one's attributes (character, presence, intellect) are more challenging to ascertain, therefore more difficult to devise a deliberate plan for development. The Army attributes represent the values and identity of the leader, how the leader is perceived by followers and others, and the mental and social faculties the leader applies in the act of leading (Army Doctrine Publication 6-22).

Character is not something that is teachable. Character is often exposed through personal or professional encounters (good and bad), moments of uncertainty or fear, or when facing tough decisions that require moral or ethical decisions. As leaders, are we recognizing these moments when they occur, intently observing behavior to assess the developmental need and, more importantly, devising a plan for improvement?

Intellect is not just about the knowledge possessed. It includes mental agility, sound judgment and interpersonal tact, to name a few. Tough, realistic training opportunities that are both physically and mentally challenging are often engines that showcase mental agility and sound judgment. As leaders, are we recognizing these moments as they occur and devising a plan for improvement?

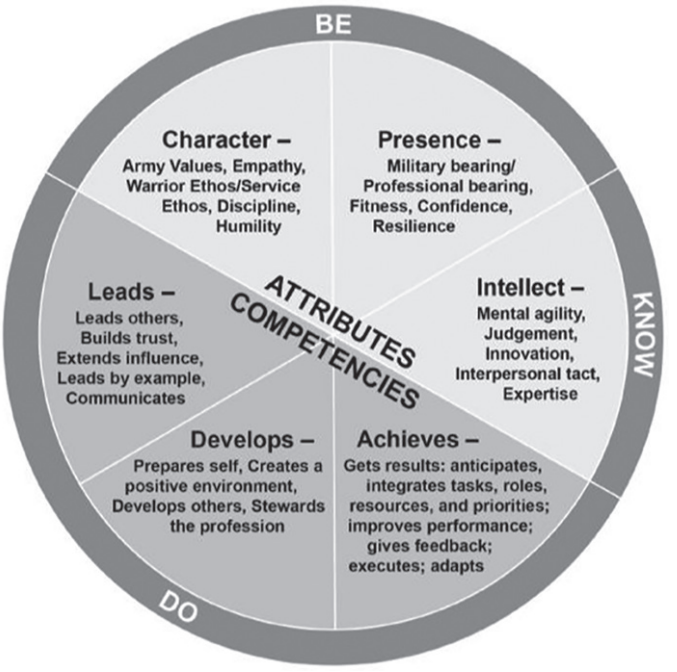

Figure 1. Introductory logic map from Army Doctrine Publication 6-22.

The Army attributes of character and intellect could not be more important in our Army than present-day, yet there are often few formalized plans to develop these essential tenets in our Soldiers and leaders. As daily-life endeavors (personally and professionally) provide the window to assess both character and intellect, we must catalogue and devise a developmental plan that ensure our No. 1 priority – America's sons and daughters are grounded in the disciplines and values of our profession, have a warrior spirit and possess the mental agility / resilience to face and conqueror any obstacles. This focus of leader development is undoubtedly the most challenging, yet I firmly believe it is the most essential!

Armor Ready! Forge the Thunderbolt!

LETTERS

Dear Editor,

In the Summer 2020 issue of ***ARMOR*** magazine, CPT Nicholas M. Charnley wrote an article titled, "Why Cavalry Officers Should Have Their Own Branch." The article articulated many well-researched points and made an argument for the development of an independent Cavalry Branch. However, there are many reasons why Cavalry officers should not have an independent branch.

CPT Charnley highlighted the Army's dependence on non-organic assets at the brigade and division levels. It is true that the conventional Army depended on a great deal of surveillance and observation equipment as well as on Special Operations Forces to collect valuable intelligence during the counterinsurgency-driven global war on terror. However, the Army acknowledged and is adjusting the force structure to address the importance of reconnaissance and security (R&S) at echelon; it knows surveillance alone will not suffice during large-scale combat operations (LSCO).

According to Joint Publication 2-0, reconnaissance is "a mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or adversary, or to secure data concerning the meteorological, hydrographic or geographic characteristics of a particular area." Field Manual (FM) 3-55, ***Information Collection***, distinctly describes the difference between "surveillance" and "reconnaissance." Reconnaissance is active in nature, while surveillance is passive and continuous. Therefore the active nature of reconnaissance usually includes human participation, and it often requires units to maneuver and fight for information. Due to this distinction, it is illogical to divorce cavalry units from maneuver.

Armor captains attend the Maneuver Captain's Career Course (MCCC) because it provides the foundational knowledge required for all maneuver captains before they go to their follow-on assignments. Those assignments could be in infantry, armor or cavalry units, and in any of the three brigade combat team (BCT) structures.

The Maneuver Center of Excellence and the U.S. Army Armor School (USAARMS) have multiple functional courses that are not only available but encouraged and often mandatory for Armor officers to attend after attending MCCC.

CPT Charnley also highlighted the lack of focus in the Infantry Basic Officer Leader's Course (IBOLC) and Armor Basic Officer Leader's Course (ABOLC) on R&S. This is true; however, the intent of those courses was never to build leader proficiency at R&S tasks. Following ABOLC, lieutenants attend the Scout Leader's Course (SLC). Following MCCC, captains attend the Cavalry Leader's Course (CLC). These courses are designed to build proficiency at R&S tasks. The requirements from U.S. Army Forces Command (FORSCOM) and the Armor Branch make it very clear that these courses are not voluntary and nest with existing professional military education (PME). Furthermore, FORSCOM guidance dictates that all lieutenant colonels selected for Cavalry squadron command must attend CLC if they have not in the past.

CPT Charnley implies that there is BCT inequity at CLC; that is an outdated and inaccurate assumption. CPT Sweeney (co-author of this letter) served as a CLC instructor 2018-2019; during that time, he instructed Cavalry leaders in the ranks of staff sergeant to lieutenant colonel. Every small group had an equal mix of Soldiers assigned to armored brigade combat teams (ABCTs), infantry brigade combat teams (IBCTs) and Stryker brigade combat teams (SBCTs), as well as many leaders from security-force assistance brigades. Also, an ABCT requested one of five mobile training teams (MTTs) executed in that timeframe.

CPT Charnley also highlights inconsistencies among the courses. While there may be some differences among Reconnaissance and Surveillance Leader's Course (which falls under the Airborne and Ranger Training Brigade in the Infantry School), CLC and SLC (which fall under the 316th Cavalry Brigade in the Armor School), this is a result of different audiences' requirements for these courses.

The 3rd Squadron, 16th Cavalry Regiment Squadron, of the 316th Cavalry Brigade at Fort Benning, GA, trains and certifies all CLC and SLC instructors. FM 3-98, ***Reconnaissance and Security Operations***, is the foundation for their knowledge and curriculum. Furthermore, instructors from both courses attend all certification teaches for prospective instructors, which are led by the squadron command group. While there is a slight difference in experience between students who are brand-new lieutenants or young staff sergeants (SLC) vs. captains and first sergeants (CLC) as far as level of understanding and detail is concerned, there is no gap in the doctrinal understanding among the instructors of each course. These courses build on the doctrinal knowledge that officers and noncommissioned officers receive during earlier PME. SLC and CLC produce proficient cavalry leaders ready to operate in armor, infantry or Stryker BCTs.

The U.S. Army does not need and should not create a Cavalry Branch. As stated earlier, cavalry units need to understand the tasks, capabilities and limitations of the formations they support to be effective. Their leaders are better suited to execute LSCO after attending broader PME for their respective branch before attending the specialized R&S courses. Instead of seeking to separate Armor officers with their branch, the Armor Branch continues to emphasize the key functional courses for leaders going to cavalry organizations. USAARMS continues to enhance the learning experience for students and uses outreach/MTTs to expand the knowledge of these courses in the operating force.

MAJ DEMARIUS THOMAS
CPT TIMOTHY SWEENEY

Dear Editor,

I have mixed feelings about what has been happening with Armor Branch in the last 10 or more years. I'm amused that my hunch from more than a decade ago that the Army may once again need divisional-cavalry squadrons seems to have turned out to be correct. At the same time, I'm disappointed that so much of the expertise I/we formerly took for granted has been lost.

I'll start off by saying that MAJ Nathan Jennings did Armor and Cavalry a great service in his article, "Reconsidering Division-Cavalry Squadrons, Part IV" (***ARMOR***, Spring-Summer 2019 edition). Since "what's past is prologue," I should say that I came up through a light divisional-cavalry squadron: 1st Squadron, 158th Cavalry Regiment, Maryland Army National Guard. We were the divcav for 29th Infantry Division (Light). By my reckoning, that formation has been extinct in Maryland and all across the Army for 12-plus years. To spare you from having to wipe the dust off an old table of organization and equipment (TO&E), I can tell you that in the beginning, we had two air troops, an aviation-maintenance troop, a ground troop and a headquarters and headquarters troop. Being a glasses-wearer and an Armor officer, naturally I was in the ground troop (A/1-158 Cavalry). Initially we had OH-58Cs and AH-1F Cobras.

Although I was in the unit in the 1990s, this was essentially a Vietnam-era task-organization and would have sounded familiar to anyone who had been in uniform in the 1970s. Even so, when we got the ground troop working with one of the air troops, it was a highly effective task-organization. The aircraft would identify the "big things" (vehicles, large troop movements), and we in the ground troop would identify the "little things" (dismounted infantry or provide detailed reconnaissance). Doctrinally we would screen or provide reconnaissance along the 20- to 25-kilometer front or flank of our light division, and our training and organization enabled us to do that. Being light, we didn't want to engage an enemy directly but preferred to use the General Support 155(T) howitzer battery from the division artillery (for which we would usually have priority of fire) or the Cobras. And it was good.

One of the "lessons learned" from Operation Desert Storm was that the 58s (I'm talking about the "C" model here, without the sophisticated sensors of the later "D" model) were too slow, lacked advanced sensors and couldn't keep up with the Apaches of an attack company. The Army aviation community, in its collective wisdom, decided to pull the 58s and replace them with Cobras. The old aviation warrant officers groused because the TO&E change made their Vietnam-era tactics prohibitively expensive. By that I mean flying an aircraft low and fast above a tree line to draw fire while a gunship flew above to respond was no longer economically viable since no one really wanted to consider losing a Cobra. But I digress.

It was generally recognized by the late 1990s that the Cobra was a legacy airframe and needed to go. Active Army units would receive the light attack helicopter (LHX) while the Guard would get Apaches, with its modern optics and avionics packages. Then two things took place generally in the same timeframe. First, the LHX program was cancelled (largely due to a failure by the Army to manage its requirements and what aviators wanted the aircraft to do, in my opinion). Second, 9-11 happened, and the Apaches (which we had been slated to receive from 101st Airborne) were suddenly no longer available. I was hoping we'd get the OH-58D, but I suppose there weren't enough to go around. Without aircraft to form a ground/air team, the light divcav was no longer viable.

Despite equipment shortages, the death knell of the light divcav squadron was the transformation the Army went through in the 2007/8 timeframe. Two changes came into play that required us to hang up our spurs and Stetsons. The first was the Army's focus on brigades as the primary maneuver echelon (vice the division), which meant that assets formerly associated with divisions (such as intelligence, surveillance and reconnaissance) were now pushed to brigades. (A more thorough explanation of this phenomenon is presented in MAJ Amos Fox's article, "On the Employment of Cavalry," ***ARMOR***, Winter 2020 edition). Second, the nature of the wars in Iraq and Afghanistan didn't require divisions to fight as they had previously envisioned. This set up the "division troops" to be the billpayers for the slots now assigned to brigades, and *voila*, the divisional-cavalry squadron mission was erased.

Although each brigade combat team (BCT) gained its own cavalry squadron as its third maneuver battalion, could that squadron really function as cavalry in a brigade with only two maneuver battalions? If I remember correctly, the Army later went back and added a third maneuver battalion, which would then in theory free up the cavalry squadron to do reconnaissance and security (R&S) tasks for the brigade, but I'll leave it to others to fact-check me on that.

So how's that working out? The elimination of the divcav squadron was probably reasonable based on the situation at the time, but now that the Army's focus has returned to a near-peer conventional fight with divisions maneuvering in the field like in Desert Storm or the invasion of Iraq, it's time to reach for those spurs and Stetsons again. Every time I've done a division-level Warfighter-like exercise, the answer to the question of "Who are we going to use for the division's deep fight?" is to break up a maneuver brigade to use its battalions as substitute divcav squadrons. I seem to recall from reading a manual where it says *ad hoc* teams conducting missions for which they're not well trained are high-risk operations.

While this approach works in a computer simulation, with "tie guys" who can reset the battlefield according to the needs of the training scenario, you can color me skeptical about this working with real people shooting real bullets. A division commander has the authority to use the brigade's cavalry squadron as his own. However, are BCT cavalry squadrons manned, trained and equipped for the job? Do the squadron's doctrine, organization, training, materiel, leadership and education, personnel and facilities align to support the division commander's mission? I think all of us know the an-

swer, and it's not a "roger."

This is where MAJ Jennings' article does us a great service. In revisiting missions and organizations of divcav squadrons gone by, he's reminded me of things I thought I'd forgotten and spurred some more thinking about the problem. In the past I remember being envious of my separate heavy armored-cavalry regiment counterparts and their ability to fight for information, and also their ability to conduct guard-and-cover missions (the latter with augmentation). These are things we couldn't do in the light cavalry without a lot of help.

Looking ahead, what should a divisional-cavalry squadron be able to do? The squadron must be able to conduct R&S missions along the entire division front, flank or rear. On the defense, it must be able to screen. I submit that it should be inherently strong enough to guard without augmentation. On the offense, it must be able to conduct area, route and zone reconnaissance ahead of the division. On a limited basis, it should also be able to destroy high-value targets, seize key terrain and hold it for a short period of time to deny it to an enemy and enable division forward movement.

What might a current-day divisional-cavalry squadron look like?

- It will need to have ground and air components inherent to the task-organization. This might be a combination of wheeled and tracked vehicles on the ground and armed unmanned aerial vehicles or attack helicopters in the air.
- It will need to have adequate dismounted capability for detailed reconnaissance and to maintain a screen over a sustained period of time. It should maximize currently available and future reconnaissance and surveillance technology, including advanced night-vision gear and hand-held drones.
- It must be able to communicate securely across long distances and have command, control and communications tools which enable shared situational awareness and understanding across the squadron and up to division and higher.
- It will need to be able to fuse all-source intelligence, long-range fires, close air support and electronic warfare into a highly aware, lethal and united effort.

Moreover, we must continue to reinforce the lessons we have learned at great expense in places like Afghanistan and Iraq. The cav squadron must also be able to tap into and understand the "human terrain" through culturally aware leaders and 19D10s, or we will once again pay the price. The local people know things about the terrain and the adversary that a map, satellite photo or briefing from the S-2 can't tell you. Based on the situation, we should enhance scouts with tactical human-intelligence teams, psychological operations or even civil-affairs Soldiers. Should that expertise be built in to future cavalry squadrons, or will we be forced into playing a pick-up game again?

If MAJ Jennings or someone else would like to know more about "the way things were," there may still enough of us old guys around to ask.

COL ANDREW D. GOLDIN

Acronym Quick-Scan

ABCT – armored brigade combat team
ABOLC – Armor Basic Officer Leader's Course
BCT – brigade combat team
CLC – Cavalry Leader's Course
FM – field manual
FORSCOM – (U.S. Army) Forces Command
IBCT – infantry brigade combat team
IBOLC – Infantry Basic Officer Leader's Course
LHX – light attack helicopter
LSCO – large-scale combat operations
MCCC – Maneuver Captain's Career Course
MTT – mobile training team
PME – professional military education
R&S – reconnaissance and security
SBCT – Stryker brigade combat team
TO&E – table of organization and equipment
USAARMS – U.S. Army Armor School

In Memoriam: MG Robert J. Sunell

MG(R) Robert J. Sunell, the leader who was instrumental in developing and fielding the Abrams tank, died Aug. 8, 2020. He was 91.

He is preceded in death by his wife, Joann, and his son, Robert P. Sunell.

MG Sunell entered military service in 1953 and retired 33 years later in 1987.

Contributions

MG Sunell was an excellent leader, an innovative thinker and a visionary. His peers referred to him as "the father of the modern tank." For example, he was a forward thinker regarding the Army's training needs, and he instituted programs that greatly improved Army capabilities. As deputy program manager for the XM1 Tank Systems in Warren, MI, he conceived and incorporated into the design of the M-1 tank innovative ideas that resulted in the Army's fielding the premier tank in the world.

As a major general and project manager of the M1 Abrams tank, he conceived the idea of a family of armored vehicles to replace the armored force as it became obsolete.

MG Sunell was a leader in the development of conceptual use of artificial intelligence in warfare. He served on the steering committee of the Center for Strategic and International Studies, Washington, DC, for the Defense Industrial Base Study and the future of armor/anti-armor warfare. He was also an adviser to the Army Science Board on "Close Combat (Heavy) Training Strategies for the 1990s."

MG Sunell was also a consultant for armor/anti-armor and virtual simulation programs with the Institute for Defense Analyses, and was appointed as a consultant to the Army Science Board's Tank Modernization Study.

Summation of service

MG Sunell commanded both infantry and armor units in peace and war, and held multiple positions that significantly impacted the development of the current armored force. His assignments included executive officer, 1st Brigade, 4th Infantry Division, Vietnam; commander, 2nd Battalion, 8th Infantry, 4th Infantry Division, Vietnam; chief, Battalion and Brigade Tactical Operations Division, Armor School, Fort Knox, KY; deputy director, Armored Reconnaissance Scout Vehicle Task Force, U.S. Army Training and Doctrine Command, stationed at Fort Knox; deputy project manager, XM1 Tank Systems, Warren, MI; commander, 11th Armored Cavalry Regiment, Germany; commander, Army Training Support Center (during the development of the National Training Center), Fort Eustis, VA; project manager, M1 Tank System, U.S. Army Materiel Command, Warren, MI; and director, Armored Family of Vehicles Task Force, Office of the Deputy Chief for Operations and Plans, Fort Eustis, VA.

Notably, when MG Sunell assumed command of 11th Armored Cavalry Regiment (Blackhorse Regiment), based in Fulda Germany, in 1978, his responsibilities included implementing and testing the new cavalry organization as well as integrating new vehicles into the regiment. He was promoted to brigadier general while in command of the 11th Cavalry, the only general to command the regiment. Colleagues commented that the 11th Cav assignment was the one he was the proudest of and meant the most to him.

Figure 1. M1A1 System Enhancement Program V2 Abrams tank. MG Sunell's work not only influenced the tank the United States fields as its main battle tank, but other countries use variants of the Abrams. *(U.S. Army photo)*

In the international arena, MG Sunell was an exchange officer with the British Army and program-manager adviser for "Tank 88," a Korean indigenous tank. He also chaired the U.S.-German and U.S.-British Tank Standardization and Harmonization Program, and he worked closely with the Israeli and Swedish research and development community.

After retirement, he was a member of the Swedish Science Council. He also founded Suonperra Inc., which worked closely with U.S. and Allied militaries to improve international cooperation through common equipment and methods. MG Sunell was a contract professional for several companies involved in training simulation, robotics, artificial intelligence and armaments for future combat vehicles.

His military schooling included the basic infantry-officer course, the advanced course for Armor officers, U.S. Marine Corps Command and General Staff College and the U.S. Army War College. His civilian education included a bachelor's of degree in education from the University of Nebraska and a master's of science degree in communications from Shippensburg State College.

MG Sunell held a number of awards for valor and service. These awards included the Silver Star, Legion of Merit (two awards), Bronze Star, Air Medal with V device, Meritorious Service Award (two oak-leaf clusters) and Distinguished Service Medal.

MG Sunell will be interred in Arlington National Cemetery.

LEGENDS OF ARMOR

MAJOR GENERAL ADNA R. CHAFFEE JR.

"Father of the Armored Force"

Maintenance = people readiness

by GEN Paul E. Funk II

While growing up in armored-cavalry units, maintenance was always at the forefront of my mind. A good maintenance program generates combat power, gives the commander options and provides units the tools to win. As a young officer, I viewed maintenance as a function of applying people, parts, petroleum, tools and time (also known as P3T2) to bring equipment up to 10/20 standards.

As I matured in the Army, I learned that successful units and maintenance programs depend on a culture of maintenance – a pervasive attitude and focus on building and maintaining readiness by setting priorities, exercising leadership and ruthless execution. It has been a winning formula. It is this culture, or way of doing business, we must now employ to turn on a persistent challenge regarding our No. 1 pacing item – our Soldiers. We need to apply the culture of maintenance to our people to build our overall readiness and the health of the force.

At any given time, 6 percent of our force is non-deployable. Of these, most are unavailable due to medical reasons. This number does not include Soldiers who are also not mission capable (NMC) due to their failing Army Body Composition Program or Army Physical Fitness Test (APFT) standards. This personnel NMC rate also does not include Soldiers unable to perform to their full potential due to temporary injuries and profiles.

While we can accept the bare minimum of 90 percent operational readiness for most of our fleets, this is not something we can tolerate for our people. We cannot accept a loss of combat power of 6 percent or more before we even cross the line of departure. This is leader business. Leaders need to focus on building "people readiness," and it starts by changing the culture of fitness. We must adopt

Why do we need H2F?

- 70 percent of people between the age of 17-24 are unqualified for military service (about 31 percent due to obesity);
- 17 percent of Active Component Soldiers and 25 percent of Reserve / National Guard Soldiers are obese by Body Mass Index; they are statistically more likely to experience injury and be medically non-available;
- Musculoskeletal injuries affect 55 percent of Soldiers annually;
- Equates to 10 million limited duty days
- Some $577 million spent annually on patient care
- 12 percent of Active Component Soldiers (~56,000) are non-deployable, equivalent to loss of 13 brigade combat teams (BCTs); of this number, 66 percent (~37,000 or nine BCTs) are non-deployable for medical reasons;
- A 1 percent reduction of non-available rates will save more than $40 million.

"The capacity and capability of the Soldier on today's battlefield is threatened by poor health and lack of physical readiness." -GEN Mark Milley, 39th Chief of Staff of the Army.

a culture of holistic health and fitness (H2F).

Changing culture is hard but necessary. Many will argue that we have always valued fitness, but our pursuit of physical fitness has been unevenly applied and has not incorporated all components of fitness. In our current and future fights, every part of our force, every occupational specialty and every unit must value and adopt a culture of fitness. We will win on the battlefield by embracing a culture of comprehensive fitness.

We are starting this change by replacing the APFT with the Army Combat Fitness Test (ACFT). For the first time in our history, we have developed a scientifically validated fitness assessment based on the physical demands of combat. Critically, the ACFT also drives balanced and appropriate physical training that will reduce overuse injuries and unplanned attrition and, like combat, the test standards are age and gender neutral. We will measure all Soldiers against common Soldier and military-occupation specialty tasks, using the physical demands we expect Soldiers to face in combat. But physical fitness is just the beginning.

The U.S. Army Training and Doctrine Command (TRADOC), through the Center for Initial Military Training, is leading the effort to implement the H2F System. H2F is the foundation of the entire fitness enterprise. H2F provides the commander all the tools required to maximize the physical and non-physical components of health and fitness. H2F is the Army's primary investment in increased Soldier readiness and lethality, optimized physical and non-physical performance, reduced injury rates, improved rehabilitation after injury and increased overall effectives of the Total Army.

Figure 2. A U.S. Army Soldier receives instruction on proper form for the ACFT during the ACFT Trainer's Course at 7th Army Noncommissioned Officers Academy, Grafenwoehr, Germany, July 14, 2020. The ACFT Trainer's Course is designed to train leaders to be subject-matter experts on the fitness test. The ACFT is scheduled to be implemented in 2022. *(U.S. Army photo by SPC Zachary Stahlberg)*

Figure 1. SSG Sharonica White, assigned to U.S. Army Garrison Japan, completes a deadlift repetition during the U.S. Army Japan 2020 Army Week's ACFT Fitness Warrior Competition at Camp Zama, Japan, June 8. *(U.S. Army photo by Winifred Brown)*

In the H2F system, dietitians, physical therapists, occupational therapists, athletic trainers and strength and conditioning coaches will provide relevant and ready subject-matter expertise. Just as important are resilience, mental readiness and spiritual health to address the interrelationship between physical and mental well-being. Commanders and leaders take heed – H2F is not designed to be the "valet service" option. Do not expect to hand them the keys when they show up to your unit and stand back and watch them do their thing. H2F provides the mechanism, but your engaged leadership will make it happen.

Leaders must do three things:

- Understand the system;
- Trust the system; and
- Dedicate the time to make it work.

Creating a shared understanding is the basis for successful mission command. It starts with my headquarters and team. As we move to broader adoption of the program and resourcing across the force, we will use every available means to expose leaders to the concepts and techniques. While we are pushing, you need to pull; educate and arm yourselves with the knowledge, skills and proven science our teams have used to get us this far. Only you can take us to the next level.

When you see the results with your own eyes, I have no doubt you will trust the system. Results will not come fast or easy. We will see some short-term positive results, but the ultimate prize is increased readiness and reduced musculoskeletal injuries over the long term. True success will only come through a long-term commitment to regularity and progression. You will see results.

Finally, units will embrace what the commander values and resources. The most precious of these resources is time. Make H2F a priority. Nothing demonstrates a commander's priority like dedicated time on the training schedule; to optimize use of the H2F system, you will have to commit training time throughout the day. H2F is an example of the Army's commitment to its people.

Commanders' successful H2F administration makes that commitment real. Our obligation to our Soldiers is to provide them with an immersive, integrative and comprehensive training system to ensure their success on the ACFT, reduce injuries and build individual and unit readiness. Most importantly, Soldiers watch what the commander does and where the commander chooses to spend his or her time, so my advice is to lead by example. We lead the way.

Generating combat power or building readiness does not just "happen." Just like returning a tank to the fight, preserving the health and physical fitness of a Soldier to withstand the rigor of combat is the product of planning, hard work and leadership. We will need generous quantities of all three if we truly want to change the culture of fitness. It all starts with leadership. This is a priority.

Our Army is in the midst of building a multi-domain operations enabled force and modernizing equipment across all warfighting functions to meet the ever present requirement to fight and win in large scale combat. Our efforts to improve the most essential component – the individual Soldier – is not a separate endeavor but the true cornerstone of building a more capable Army. As GEN George Patton observed, "Wars may by fought with weapons, but they are won by men." Today's men and women in our great Army will win our wars of today and tomorrow. It is up to us to prepare them to win.

Victory starts here!

GEN Paul Funk II commands TRADOC, based at Fort Eustis, VA. As TRADOC commander, GEN Funk is responsible for 32 Army schools organized under eight centers of excellence that recruit, train and educate more than 500,000 Soldiers and service members annually. Commissioned as an Armor officer, GEN Funk has commanded at every level, company through corps, including Company A, 2nd Battalion, 32nd Armor Regiment, 1st Brigade, 3rd Armored Division, Kirchgoens, Germany; Headquarters and Headquarters Company, 4th Battalion, 67th Armor Regiment, 3rd Brigade, 3rd Armored Division, Kirchgoens; 1st Squadron, 7th Cavalry Regiment, 4th Brigade, 1st Cavalry Division, Fort Hood, TX; 1st Brigade Combat Team, 1st Cavalry Division, Fort Hood; 1st Infantry Division, Fort Riley, KS; and III Armored Corps, Fort Hood. GEN Funk's combat and operational experience includes six deployments in support of Operations Desert Shield and Desert Storm, Operation Iraqi Freedom, Operation Enduring Freedom and Operation Inherent Resolve. Operational assignments include observer-controller with the Live-Fire Team (Dragons), National Training Center, Fort Irwin, CA; squadron operations officer, 1st Squadron, 3rd Armored-Cavalry Regiment (ACR), Fort Carson, CO; regimental operations officer, 3rd ACR, Fort Carson; division operations officer, 1st Cavalry Division, Fort Hood; chief of staff, III Corps, Fort Hood; deputy commanding general, Combined-Arms Center for Training, Fort Leavenworth, KS; deputy commanding general (maneuver), 1st Infantry Division, Fort Riley; and assistant deputy chief of Staff, G-3/5/7, U.S. Army, Washington, DC. Joint assignments include chief, Joint Exercise Section J-37, North American Aerospace Defense Command, U.S. Space Command, Peterson AFB, CO; deputy commanding general (maneuver), Combined Joint Task Force-1, Afghanistan; commander, Combined Joint Forces Land Component Command-Iraq, Baghdad, Iraq; and commander, Combined Joint Task Force - Operation Inherent Resolve, Baghdad. GEN Funk holds a bachelor's of arts degree in speech communications from Montana State University and a master's of science degree in administration from Central Michigan University. He is a graduate of the Armor Basic Officer Leader's and Advanced Courses, and the Command and General Staff College and he completed his Senior Service College as a fellow at the Institute of Advanced Technology, University of Texas at Austin.

Acronym Quick-Scan

ACFT – Army Combat Fitness Test
ACR – armored-cavalry regiment
APFT – Army Physical Fitness Test
BCT – brigade combat team
H2F – holistic health and fitness
NMC – not mission capable
TRADOC – (U.S. Army) Training and Doctrine Command

Bringing Great-Power Competition to the Tactical Level: European Rotational Deployment Considerations for Company-Grade Armor Leaders

by MAJ Brigid Calhoun and CPT Alexander Boroff

On July 29, 2020, Secretary of Defense Mark Esper unveiled his new plan for European Command's force posture, which will result in the reduction of 11,900 troops currently stationed in Germany.[1] Of those troops, 5,600 will be repositioned across Europe, while 4,600 will redeploy to the continental United States and subsequently conduct rotational deployments to Europe.[2] This decision follows an extensive Defense Department (DoD)-wide review designed to optimize U.S. military force posture within the strategic environment of great-power competition.

Discussion and analysis of great-power competition currently dominate national-security and defense-strategy forums. This article seeks to distill the concept and its implications down to the tactical level of war by explaining great-power competition to company-level leaders; describing the European operational environment where these leaders may rotationally deploy; and providing leadership and planning considerations for their rotations.

Although the Indo-Pacific region remains the focal point of U.S. national security, the European theater and Russian threats demand deterrence from forward-staged Army forces. Company-level Armor leaders will likely spend at least the next decade of their careers preparing to fight and win ground wars in this contested

Figure 1. Soldiers from various NATO countries train together at the Grafenwoehr and Hohenfels training areas in Germany during Exercise Combined Resolve IV in 2016. The 1st Armored Brigade Combat Team, 3rd Infantry Division, Fort Stewart GA, participated in Combined Resolve IV as the primary U.S. Army training unit; the unit is the Army's regionally aligned brigade to Europe. Combined Resolve is a series of bi-annual U.S. Army Europe exercises designed to train participants to function together in a multinational and integrated environment and to train U.S. Army rotational forces in Europe to be more flexible, agile and better able to operate alongside allies and partners in the region. Combined Resolve IV featured more than 4,700 participants from 10 NATO allies, including Albania, Bulgaria, Croatia, the Czech Republic, Denmark, Italy, Latvia, Romania, Slovenia, the United States and three partner nations of Moldova, Montenegro and Serbia. *(U.S. Army photo)*

environment. Studying and understanding the grand strategy of great-power competition will prove instrumental to their success.

What is great-power competition?

In the unclassified 2018 National Defense Strategy (NDS), then-Secretary of Defense James Mattis stated that "inter-state strategic competition, not terrorism, is now the primary concern in U.S. national security."[3] The NDS further explained that "[t]he central challenge to U.S. prosperity and security is the re-emergence of long-term strategic competition by what the National Security Strategy (NSS) classifies as revisionist powers."

It is increasingly clear that China and Russia want to shape a world consistent with their authoritarian model — gaining veto authority over other nations' economic, diplomatic and security decisions."[4] The NDS cites Russia's 2008 invasion of Georgia and 2014 annexation of the Crimean Peninsula as catalyzing events in a new era of strategic competition in Europe.[5] Russia's disregard of the rules-based international order, state sovereignty and territorial integrity threatens the stability of Europe. Instability in turn threatens "unfettered access to the global commons (air, sea, space and cyberspace) for all," a key U.S. national interest.[6] Such actions put the North Atlantic Treaty Organization (NATO) on edge, as our allies, particularly on the eastern flanks of Europe, wonder if they will be the next target of a Russian attack.

Both the NSS and NDS call for whole-of-government solutions to build and assert U.S. competitive advantages across all domains using various instruments of national power. The military's diplomatic, information, military and economic paradigm provides a useful framework to demonstrate how the instruments of national power unite policy alternatives across government departments and agencies. Specifically within Europe, the U.S. military solution to Russian aggression requires forward presence, flexible response options and strengthening NATO by reassuring allies.[7]

Company-level Armor leaders participating in rotational deployments thus operationalize these strategic objectives. The hallmarks of European rotational deployments – including combat-training-center tours, partnered exercises and maintenance of professional relationships with NATO partners – nest neatly within the NDS and NSS.

Impact on U.S. forces in Europe

While much of the national great-power competition dialogue has rightfully focused on China's aggression within the Indo-Pacific, Russia remains, in large part, the Army's most direct competitor. Forward-positioned Army aviation and Armor forces constitute critical capabilities for countering Russian threats to European territorial integrity and U.S. national interests. A brief review of U.S. force posture trends in Europe may help company-level Armor leaders understand why their continued presence on the continent is so important to our nation's ability to maintain competitive advantage over Russia and preserve the rules-based international order.

While the 12th Combat Aviation Brigade (CAB) is permanently assigned to Ansbach, Germany, no permanent armored brigade combat team (ABCT) has existed in Europe since 2014.[8] Russia's invasion of the Crimean Peninsula that same year, however, rapidly reversed America's decision to retrograde its armored forces. In an effort to re-establish deterrence following this invasion, the United States sent small numbers of tanks to Europe for short deployments throughout 2015.[9]

The following year brought significant changes to the U.S. force posture in Europe. A seminal 2016 report by the RAND Corporation wargamed a hypothetical Russian invasion of the Baltic States and alarmingly found that Russian forces would reach the outskirts of the Estonian and/or Latvian capitals within 36-60 hours. The report further assessed that existing NATO defenses would be overwhelmed and that NATO would have to launch a bloody counteroffensive to eject Russian forces from the Baltics. RAND ultimately recommended that NATO position a force of about seven brigades, three of which should be ABCTs, augmented by airpower and fire support, in the Baltics to prevent their rapid overrun by Russia.

NATO had arrived at similar conclusions and solidified the Enhanced Forward Presence (EFP) initiative at the July 2016 Warsaw Summit. The EFP resulted in the assignment of four multinational battalions, separately led by Germany, Great Britain, Canada and the United States, each to Poland, Estonia, Latvia and Lithuania; it was the largest addition to the NATO defense posture in a generation. In 2017, the Army contributed more forces outside of the NATO context by executing its first nine-month heel-to-toe regionally aligned force (RAF) deployments of ABCTs and CABs to Europe.

Despite the push toward a sustained-readiness model, which ideally maintains all units at a high level of readiness, operational and tactical realities intervene and prevent constant readiness, especially with the strain the rotations place on the armored force. The rotations of ABCTs to the European theater will likely continue in the near term, even as discussions among DoD, Congress and NATO allies continue regarding the possible drawdown of U.S. forces in Germany and the potential establishment of a permanent U.S. base in Poland.

Meaning for company-grade leader

Secretary Esper's emphasis on rotational forces is part of the answer to this question, especially if the person posing the question is an Armor officer.[10] Without attempting to analyze the advantages or disadvantages the rotational deployment policy possesses, Europe, South Korea and, in a lesser vein, Kuwait, remain the U.S. Army's anchor points across the globe to both assure allies of the U.S. our commitment to their defense and to dissuade enemies from moving into positions of relative advantage. While the location of these rotational deployments may change, they will likely comprise the bulk of a company-grade leader's direct experience with great-power competition. And although these same officers may have been hailed as "strategic lieutenants" in the past, they

now occupy more traditional roles at the tactical level as part of conventional combined-arms teams.[11] They still must be educated in strategy, history and current affairs to make informed decisions.

Company-level officers or noncommissioned officers (NCOs) may find themselves as the ranking U.S. military representatives at a particular partnered training event or garrison. However, they will generally not occupy positions analogous to the platoon-level combat outposts characteristic of counterinsurgency operations in Iraq and Afghanistan. Certainly, interactions with allies that are frequently a part of rotational deployments play a significant role in diplomatic relations between the militaries of said countries. Rotational deployments to Europe will require company-level armor leaders to build rapport with foreign allies and partners, and may often find that the relationships become increasingly habitual over the course of a nine-month training deployment. Nevertheless, the great-power competitor at the tactical level must be trained and ready to execute a great-power war, hopefully only as a deterrent to the reality of one.

Learning terrain, enemy

Preparation for likely RAF deployments should begin with every Soldier understanding the tactical, operational and strategic environment into which the unit will deploy. Leaders should leverage their unit intelligence section to provide background briefings in addition to the doctrinal intelligence-preparation-of-the-battlefield outputs. The intelligence section's early provision of friendly and enemy equipment recognition guides will assist every Soldier in distinguishing friend from foe. Understanding the capabilities and limitations of friendly force equipment will ease future planning for partnered training events in theater.

Also, leaders and the intelligence section should together analyze the terrain of their future area of operations (AO), and should prepare maps and graphics for anticipated training areas. Germany's Hohenfels training area, Romania's Novo Selo training area and Poland's Drasko Pomorskie, Miroslawiec and Bemowo Piskie training areas are among the most commonly frequented by RAF units. The brigade's geospatial-intelligence cell should distribute tactical maps of central Europe and the Baltics that clearly illustrate avenues of approach suitable for wheeled and tracked vehicles.

Furthermore, units should study battles fought on the same terrain to accumulate historical context and lessons learned. World War II's Eastern Front offensives, coupled with Cold War planning to secure West Germany's Fulda Gap, inform today's strategic environment and concerns with the Baltics' Suwalki Gap.[12] Also, the Soviet Army's Vistula-Oder offensive in January 1945 serves as a particularly useful case study to help Armor leaders visualize a combined-arms attack across Belarus, Poland and Ukraine into Germany. The Army University Press even offers free virtual staff rides of the Battles of the Marne (1914) and Stalingrad (1942-1943) to facilitate historical analysis of European warfare.[13]

Tabletop exercises to study these battles can be incorporated into existing company and battalion leadership professional development (LPD) programs to build readiness. Because terrain does not change much over time, junior leaders' investment in terrain analysis is almost guaranteed to yield future dividends.

However, future Russian military operations in Europe will likely look much different than those executed in the past. Therefore historical study must be accompanied by thorough examination of emerging Russian military technology, hybrid warfare and multi-domain operations. Russia's campaigns in Syria,[14] Libya[15] and Ukraine's Donbas[16] region provide insight into how the Russian military fights[17] in the modern age, task-organizing electronic warfare at the lowest echelons and incorporating private-military security companies as force multipliers.

Within Europe, the Russian military has also leveraged well-coordinated information and intelligence collection operations against U.S. and NATO forces to discredit them. As such, even company-level training can yield strategic consequences if thoroughly exploited by the Russians. The battalion staff and company leadership should therefore explore how to best allocate the unit's intelligence collection[18] and analysis capabilities across the formation and manage the unit's digital footprint.[19] Rotational units may conduct exercises on NATO's eastern flanks not far from Russian training sites;[20] such proximity inherently puts friendly units at risk of Russian intelligence collection and information operations.

The unit intelligence section owns the lion's share of creating shared understanding of Russian military capabilities and vulnerabilities, but the unit should also liaise with the broader national intelligence community (IC), particularly the Defense Intelligence Agency and National Ground Intelligence Center, to obtain classified intelligence reports and briefings on the current enemy situation, Russian order of battle, hybrid warfare and multi-domain operations. These agencies may even be willing to host site visits for unit leaders or, at a minimum, participate in classified video-teleconferences to brief unit leaders on their future AO. Unit leaders could then maintain relationships with the agencies' European threat analysts throughout the RAF deployment and provide bottom-up refinement of their intelligence assessments. Such collaboration will only benefit the Army and IC over time.

The unit's field-grade leadership should also contact Army foreign-area officers (FAOs) at the European embassies in countries where the unit will deploy. FAOs can bridge military and political considerations, providing strategic insight beyond the usual purview of an ABCT. FAOs can coordinate briefings with the embassies' Offices of Defense Cooperation (ODCs) and defense attaché offices (DAOs) to complement those received from the IC. FAOs may also provide recommended readings that unit leaders can incorporate into LPD programs.

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Figure 2. Map of NATO member Poland and the Baltic States, Suwalki Gap marked in red. Poland is bordered by the Baltic Sea, NATO member Lithuania and Russia's Kaliningrad Oblast to the north; Belarus and Ukraine to the east; Slovakia and NATO member the Czech Republic to the south; and NATO member Germany to the west. Latvia, not shown on this map, borders Lithuania to the north, and Estonia lies north of Latvia. The Suwalki Gap is an area of strategic concern. *(Based on map from CIA World Factbook) (NATO membership list at https://en.wikipedia.org/wiki/Member_states_of_NATO)*

Basic deployment readiness for European mission

Although "readiness" has been the Army's watchword nearly a decade, it includes theater-specific considerations for rotational deployments to Europe. Company leaders in Europe-aligned units, therefore, can begin pursuing the qualifications and licensing necessary to mobilize for deployment. The standard qualifications for unit mobility officer, hazardous materiel, vehicle drivers' licenses and government purchase/travel cards should be supplemented by international drivers' licenses, training for contracting officers and disbursement of funds, and arranging for diplomatic clearances. Also, identifying Soldiers in the unit who speak European languages can inform manning for liaison-officer positions and build the capability to read local open-source material in the unit's future AO.

Lastly, studying successful previous RAF rotations[21] and partnered training events[22] can ease the workload of training management during the deployment. As institutional knowledge of these rotational deployments is still somewhat limited, leaders within ABCTs should look to previous units' experiences to inform the preparation for their own.

Leadership calculus

This great-power competition environment, with its reduction of traditional "combat deployments," places rotational training events in higher regard. Tactical leaders face an incredible leadership challenge when determining how to prepare and deploy Soldiers to these events. As defense budgets continue to contract, the Army must retain strategic and operational flexibility to provide its stabilizing influence on global affairs.

Readiness to deploy comprises a large portion of this flexibility. While it is nearly impossible to be 100 percent ready at all times, tactical leaders must understand that while they are not actively deployed, they will likely be training or assisting their higher headquarters to train. They must understand further that while officers and senior NCOs rotate through units frequently, their lower-ranking NCOs and lower-enlisted Soldiers do not. It is the tactical leaders' burden to shoulder this understanding and steward these Soldiers' time in the garrison environment as able, with the knowledge that near-constant rotational deployments and training cycles likely lay ahead. Communication of the long-range training calendar to Soldiers and their families can help manage expectations and prepare the force for increased operations tempo. Any type of predictability that unit leaders can provide is critical.

Given the constraints that an ABCT training cycle levies upon its members with respect to field time and time away from family, considerations must be made to fully understand the impacts of training decisions made. An unfortunate truth of being assigned to an ABCT is the necessity of longer-duration training events given their cost. Thus, company-grade leaders should maintain a pulse on their formation in multiple ways. Command climate surveys, family days and activities, and simple off-duty interactions among members of the unit can enable leaders to understand these impacts. Successful management of time at the small-unit level leads to more productive Soldiers.

Conclusion

Examining the position of junior leaders within armored formations today leaves little of which to be envious. They face a complex and uncertain operational environment, and a high-demand operations tempo through rotational deployments, and they are often left with fewer and fewer resources to successfully complete their mission sets. Yet despite these challenges, it is important to realize that they are surmountable, especially with good leadership at the tactical level.

Any preparation a unit conducts ahead of its deployment to standardize knowledge of terrain and enemy threats will only optimize available planning time during the rotation. A host of theater- and national-level experts, from intelligence professionals to FAOs, ODCs and DAOs, stand ready to assist ABCTs in preparing for upcoming deployments. Reviewing after-action reports from previous rotations can also shorten the learning curve and prevent mistakes that otherwise would be repeated.

The context and considerations outlined in this article are the first step in understanding why junior leaders find themselves in the situation they do. An introductory understanding of how junior leaders' missions nest within America's national defense and security strategies empowers them to better adapt to and succeed in today's competitive and dynamic global environment.

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commander, Troop C, 3rd Squadron, 61st Cavalry Regiment, 2nd IBCT, 4th Infantry Division, Fort Campbell, KY; brigade planner, 2nd IBCT, 4th Infantry Division, Fort Campbell; commander, Troop C, 3rd Squadron, 16th Cavalry, 316th Cavalry Brigade, Maneuver Center of Excellence, Fort Benning, GA; battalion assistant S-4, 3-69 Armor Regiment, 1st ABCT, 3rd Infantry Division, Fort Stewart, GA; and company executive officer, Company D, 3-69 Armor Regiment, 1st ABCT, 3rd Infantry Division, Fort Stewart. His military schooling includes Maneuver Captain's Career Course, Armor Basic Officer Leader's Course and Ranger and Pathfinder schools. He holds a bachelor's of science degree in mechanical engineering (honors) from the U.S. Military Academy and a master's of science degree in systems engineering from Johns Hopkins University. His awards and honors include the Bronze Star Medal, Meritorious Service Medal and the Combat Action Badge.

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Acronym Quick-Scan

ABCT – armored brigade combat team
AO – area of operations
CAB – combat aviation brigade
DAO – defense attaché office
DoD – Department of Defense
EFP – Enhanced Forward Presence
FAO – foreign-area officer
FPRI – Foreign Policy Research Institute
IBCT – infantry brigade combat team
IC – intelligence community
LPD – leadership professional development
NATO – North Atlantic Treaty Organization
NCO – noncommissioned officer
NDS – National Defense Strategy
NSS – National Security Strategy
ODC – Offices of Defense Cooperation
RAF – regionally aligned force

A Picture is Worth 1,000 Words (or 3,110 Words)

by LTC James Armstrong

People process pictures holistically and process words sequentially, piecing them together. This is why pictures can express multiple, complex ideas quickly and inspire countless discussions. While the benefit of a written vision and approach to command forces a commander to provide clarity and logically connect ideas, commanders can use a picture of the same vision as a powerful tool to understand, visualize, describe, counsel and assess.

Using an example visual tool, I will demonstrate the rich benefits in how a commander can better create shared understanding for the organization's mission, leader development, risk, resources and assessment methods with a picture rather than relying solely on a statement. Army writings which describe the usefulness of systems thinking and visual modeling as part of design have value as part of a commander's vision for and assessment of their organization, but are not commonly used as part of command preparation.

Why a visual tool?

A visual tool for commanders to understand, visualize and assess/reassess enables them to more clearly describe and direct their organizations. As they develop their operational approach as part of their role in the operations process, their ability to represent their understanding and visualization in a picture allows them to more effectively create and share their vision across the organization, and it enables deeper conversations than relying on a vision statement by itself.[1] This picture gives commanders the ability to, literally, distribute a vision from which the organization can assess if it is on/off glidepath, describe distractors or changes with impacts, and identify where commander and subordinate actions contribute to the organization.

The visual tool example was developed at a battalion level at which Army doctrine emphasizes the importance of requiring leaders to be "… adept at establishing a vision, communicating it and deciding on goals and mission outcomes."[2] The ability for the commander and subordinate to point to this picture and discuss the commander's understanding, visualization, operational approach and how the subordinate, higher headquarters and resources impact the desired end state is extremely influential.[3]

This article uses a visual tool developed during command and recognizes that such tools are unique to each commander or organization. While I created a useful vision statement while at the Pre-Command Course (Figure 1), the visual tool developed while in command captured challenges and the context that led to deeper discussions with all levels of leaders in the unit.

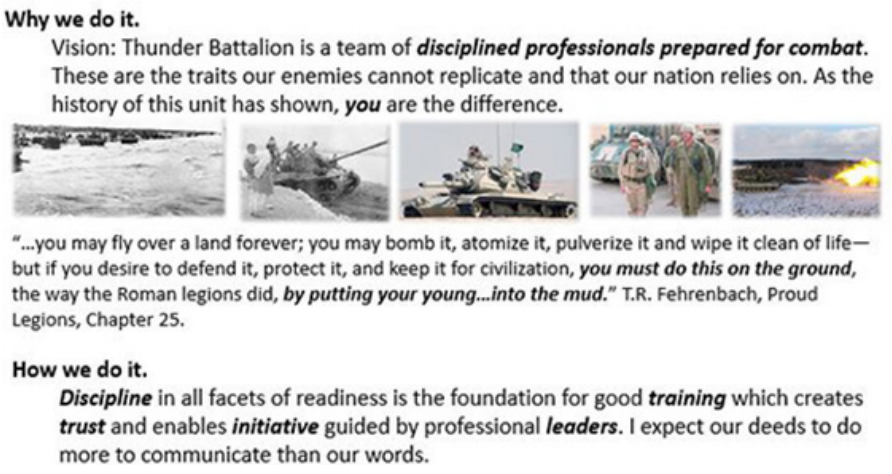

Figure 1. Example of the author's vision statement.

Reality not ideal

All commanders spend time creating their vision, establishing goals for the organization to achieve and thinking about the culture the commander wants to create. A commander's ideal accomplishments and culture never meet reality. Commanders must understand ***why*** the ideal will not meet reality, the impacts of necessary adjustments and what those impacts mean for their organization and its leaders.

Acknowledging that ideal will not match reality is not enough. The commander must have a plan to continually assess and make necessary adjustments. This discrepancy between ideal and reality with required changes leaves commanders with a delicate balance to manage. Too much pressure from top-down may achieve results but breaks people, families and equipment while sacrificing leader development. Too little pressure puts mission accomplishment at risk and creates an organization that does not perform to its potential.

Figure 2 is the author's visual tool used to illustrate these various interactions. Figure 3 is the author's visual tool overlaid on the doctrinal depiction of the commander's visualization.[4]

Subsequent paragraphs will elaborate on the relationship among the ideal, reality and influencing factors as a means for having key discussions regarding: 1) resources; 2) nesting; 3) leader development; 4) multi-echelon

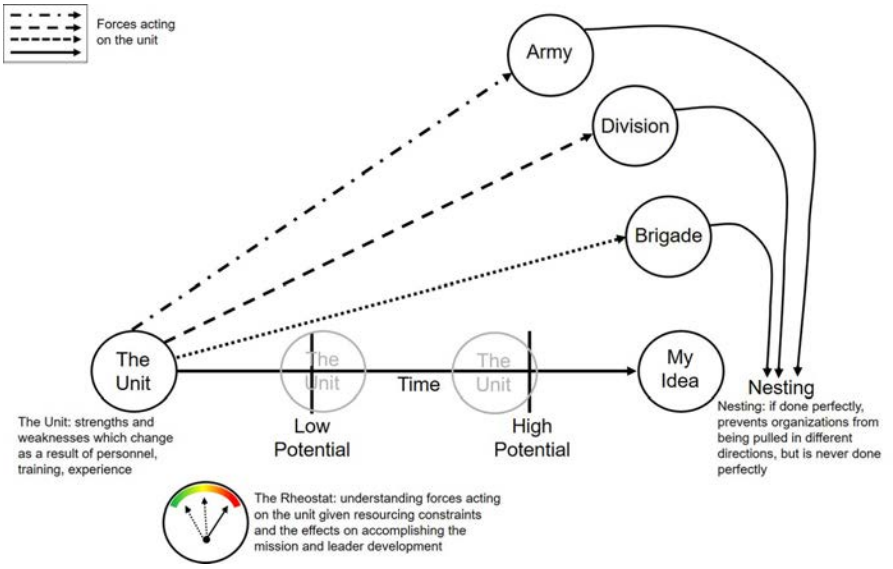

Figure 2. Author's visual tool illustrating interactions among major factors. *(Graphic by the author)*

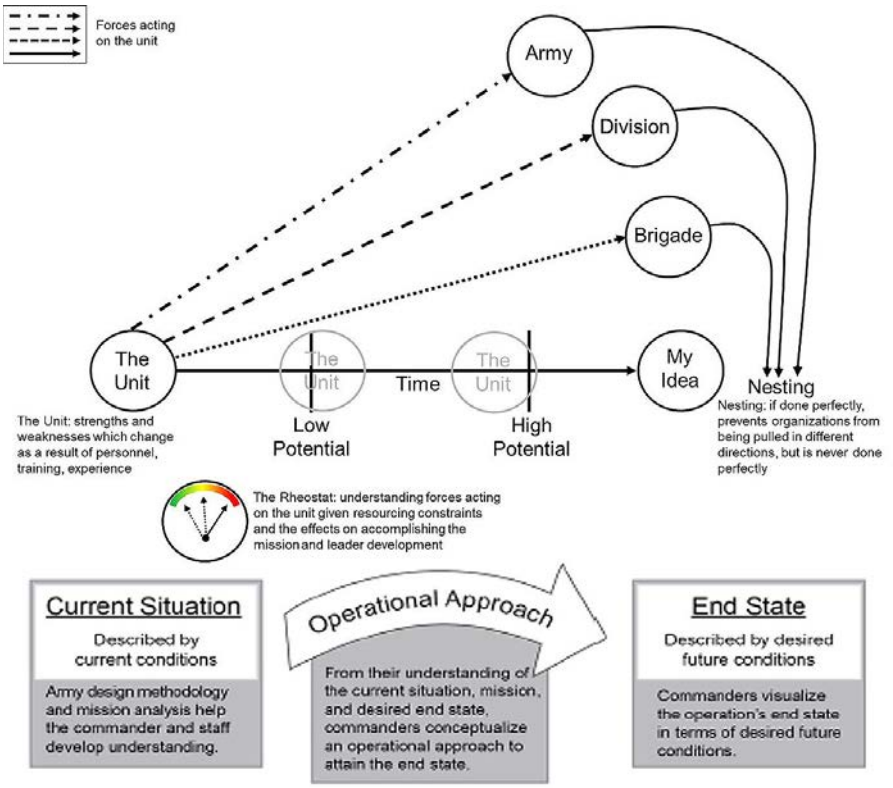

Figure 3. Figure 2 factors overlaid at the bottom with graphic material from Army Doctrinal Publication (ADP) 5-0. *(Graphic by the author)*

training; 5) risk, and 6) assessment. The variety and depth of these key discussions illustrates the richness of using a visual tool.

Resources: people, time, materiel

Each organization comes with its own strengths and weaknesses. Strengths and weaknesses change as often as the people and the training events the organization conducts. This ever-changing organization reinforces the importance of continuing to reassess the organization's talent and location on the glidepath toward achieving goals.

Every commander also has a time horizon in which he/she is attempting to achieve his/her visualization or goals. Time is often understood as the most important resource. Once spent, it cannot be regained. Commanders' decisions about what they do with their time personally and how their organization uses time is critical. Commander-to-commander dialogue needs to focus on candid and specific discussions about items left undone which all represent risk.

As a result of the importance of how time is used and the resulting risk, a commander provides intent, priorities and resources (time, people and materiel). The reality commanders often face is that, depending on echelon, they can provide materiel at varying levels of speed but can rarely provide more people and time. The only sure way of allowing the people and time necessary is to go beyond a list of priorities and create resources internally by removing tasks from subordinate headquarters while accounting for the associated risk.

The friction of limited resources and mounting tasks is often exacerbated by friction of external forces pulling on the organization in various magnitudes and directions other than the commander's ideal. This friction is a result of conflicting direction commanders take action to mitigate risk; in some cases, commanders can simply identify the effects of the friction to ease the organizational frustration.

Nesting

The concept of nesting is widely accepted, which results in each headquarters pulling an organization in the same direction. Each commander who publishes and explains intent and priorities should accomplish nesting.[5] However, in application, higher headquarters often adjusts its focus, causing a change in priorities. This change could be the result of the leader identifying problems from his/her periodic assessments or the rise of completely new problems.

Practical examples of problems and corresponding solutions that may disrupt nested priorities include an increase of discipline incidents with resulting mitigation measures; a substandard maintenance inspection which causes renewed emphasis on

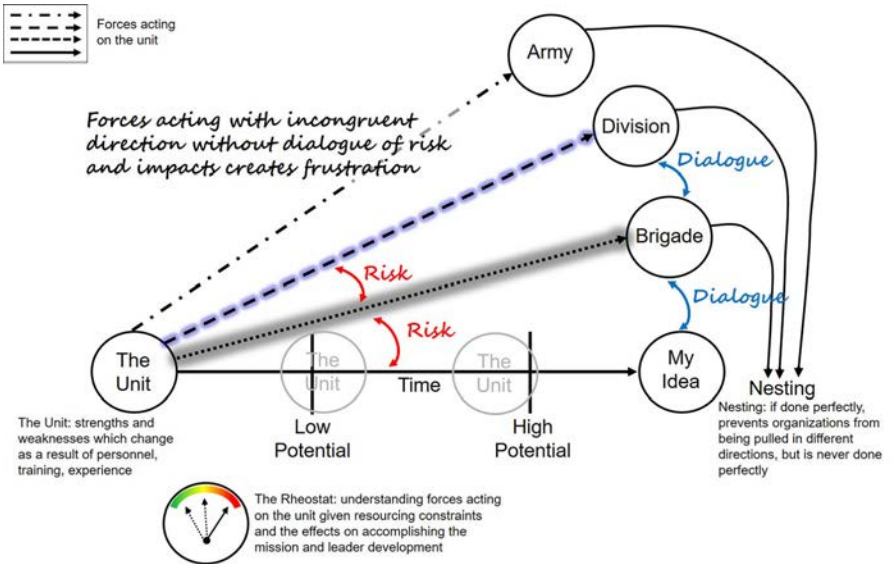

Figure 4. External forces and their impact, necessitating commander's adjustments. *(Graphic by the author)*

maintenance processes and parts inventory; force-protection changes as a result of a change in threats; or a degradation in funding.

While a disruption in nesting among headquarters has its own root causes and solutions, a visual tool can help commanders recognize and address the impacts of the disruption and allows the organization to make necessary adjustments. The visual tool illustrates this nesting mismatch in multiple arrow types to show forces external to the organization pulling in various directions (see Figure 4).

Pulling in various directions frustrates Soldiers and leaders alike. The impacts include task saturation and competition for resources. As a result, commanders must understand these external forces and adjust their own pull on the organization. Failure to adjust creates frustration as Soldiers and leaders feel pulled in different directions. Failure to adjust also dilutes focus and does not recognize the practical delay in reaching previously defined goals.

Adjustments without commander's dialogue about the impacts of adjustments can cause the same frustrations. It is critical for commanders to recognize these external forces, be able to assess their magnitude and direction, and adjust to the associated risks all within a relevant amount of time.

Leader development

Given time as our most important resource, it follows that its impacts on the organization are the most significant and wide-ranging. Commanders must understand the full impact of time constraints. For example, getting the most tasks done in the least amount of time may be the most efficient but not the most effective approach. Therefore commanders should make constant assessments to balance leader-development opportunities, achieving results and the effects of the pace on Soldier health (physical, mental and spiritual).

Too much focus on achieving results in a short amount of time often looks like a commander dragging the organization to his/her ideal and forsaking leader development, job satisfaction and families along the way. Leaders focused on short-term change often start with this approach but fail to adjust to a sustainable strategy.

The other end of the spectrum results in an organization that never reaches its full potential, individually or organizationally, and it jeopardizes mission accomplishment. The ultimate leadership laboratory provides purpose, direction and motivation along the path to achieve nested goals, which enables the organization to progress with appropriate resources with retraining opportunities.[7]

However, resources are always limited. As an organization experiences resource constraints, leaders start to work on gaining efficiencies. A small-arms qualification density is a simple example of a common task where we centralize to gain efficiency. If there is not time or resources (range availability) for each company to conduct its own training event, the unit tasks one company to run the range as others rotate through qualification. As a result of this gain in efficiency, the training, experience and leader-development opportunity for each company to plan and execute a training event is narrowed to one company. Furthermore, if time is severely constrained and the unit has but one opportunity

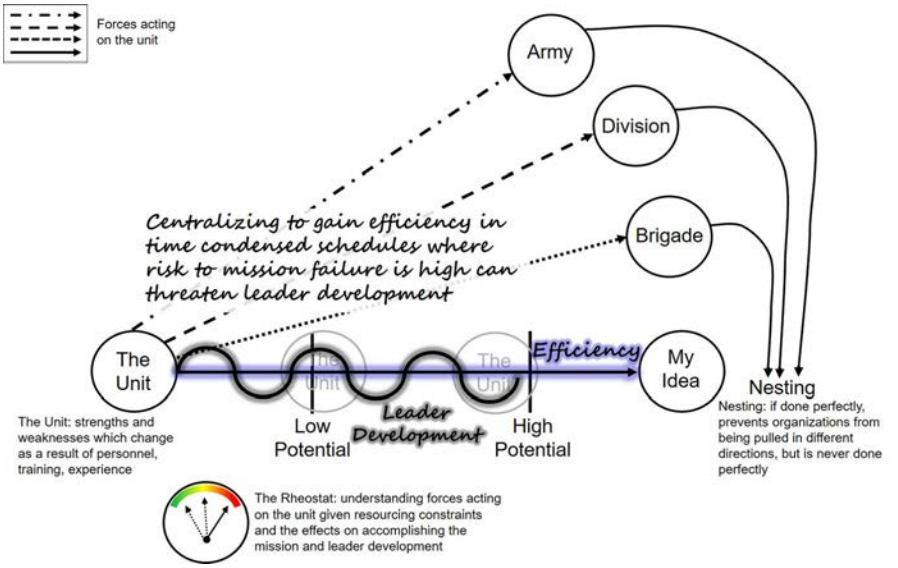

Figure 5. External forces pull in different directions. *(Graphic by the author)*

to get the range done correctly, leaders assess the risk of failure too great to allow and attempt to prevent failure through detailed oversight.

If leaders are not confident in the discipline or training of their subordinates, they quickly lose trust, and detailed oversight becomes micromanagement. This is how leader development becomes the first element to suffer in a condensed schedule. To gain efficiencies, we centralize events. We lose the ability for commanders at each level to develop their own plans on how to prepare their units for their higher-headquarters' collective event using the Eight-Step Training Model. Leaders who understand that leader development was sacrificed as a result of efficiency and who can create repetitions to replace those lost opportunities are more likely to strengthen the foundational discipline and training elements necessary to trust and empower subordinates.

Units can also help themselves by guarding against gaining efficiencies through poorly-thought-out multi-echelon training. Executing multiple events simultaneously is not the same as multi-echelon training.[8] Commanders should be wary of making the training audience at one echelon the trainers and certification authority of simultaneous events.

For example, if a battalion operations center is providing mission command for a platoon live-fire, and the operations officer is required to execute duties as the range officer in charge (think in the tower), the executive officer may be required to help run checkpoints to shut down areas of the training area to support conduct of the range (think admin of training-area support). The battalion commander may be on the lane certifying platoons. Then it is not realistic to expect the primary trainers to give the battalion staff the appropriate level of coaching and training necessary to improve.

If we are to gain efficiencies or seize opportunities to train multiple echelons, we can consider augmentation from outside the training audiences or scale back expectations of training objectives. Leaders should provide a purposeful nesting of training objectives, identify primary training audiences and preserve time for subordinates to train on supporting tasks prior to moving to collective events.[9]

Risk

Each adjustment as a result of changing goals, resource constraints and the simple business of choosing what to execute well all creates risk. Commanders have far too few real risk discussions for three reasons:

- We are not honest with ourselves about who makes risk decisions;
- We too often worry about the risk of taking action instead of inaction; or
- We expect too much from subordinate headquarters to provide feedback on failure.

Who makes risk decisions? Without concerted leader effort and the courage to have dialogue about achievable objectives, the gathering risk as missions get communicated from higher headquarters to subordinate headquarters is assumed by our least equipped personnel to make risk decisions. If brigade tells battalion to do 10 missions with only the resources (time, people, materiel) to conduct five, and battalion turns and gives those same missions and resources to companies – and so on – we eventually end at a young sergeant, specialist or private who now has 10 missions and resources to only do five. Often this young Soldier has the least experience, education and training to make risk decisions. This young Soldier has nowhere to pass the missions, so he or she makes the best decision possible about which five missions are not going to get accomplished.

After leaders discover the failure of half the originally assigned missions, we then start asking each echelon why we chose to execute these five vs. the other five. Commanders and leaders at echelon confront risk decisions where the experience, education and training match the results of the decision, or they accept the default to that young Soldier making the decision which, in some circumstances may be required but should not be left at that Soldier when unnecessary. The difference between accepting prudent risk and accepting risk without reasonable understanding of the possible outcomes is the definition of gambling.[10]

Risk of action and inaction. Army doctrine is sound in balancing the risk of action and inaction. ADP 6-0, ***Mission Command***, begins discussion of disciplined initiative with a quote from Field Services Regulation dated 1941: "Every individual from the highest commander to the lowest private must always remember that inaction and neglect of opportunities will warrant more severe censure than an error of judgment in the action taken."[11]

However, in practice, our view of risk is skewed as a result of codifying the risk of taking action rather than describing the risk of not acting. The conversation is often "If we take X action, then Y risk may result." We too frequently turn the conversation on its head and ask "If we do not take X action, then what Z risk may result." Often, Z risk is greater to the formation than Y risk.

Let us examine two examples where flipping the conversation reveals a greater risk. As a tactical example, if we put the scout platoon on a screen line, they may get decisively engaged and take casualties. Conversely, if we do not put the scout platoon on a screen line, the enemy destroys the main body; scout casualties, while not desired, are less risk than failing the mission as a result of the main body being destroyed.

An operations-security (OPSEC) example would be if we use an unclassified application to communicate information, an adversary could piece together relevant OPSEC details. Conversely, if we do not communicate information in a relevant timeframe, the organization does not move forward and the adversary "steals the march."[12]

Reversing this common trend requires a deliberate effort to have the "converse" discussion and to get back to the intent of our doctrine.

Higher headquarters should set conditions for success, not failure. Headquarters exist to enable success of subordinate units and to combine their efforts in a way that allows the whole to be greater than the sum of

its parts. We have become too reliant on bottom-up feedback and have created intellectual laziness on the part of higher headquarters. Rather than do analysis on troops-to-task, our headquarters are knowingly giving an unfeasible volume of missions to subordinate units and then asking for their feedback on what they cannot accomplish.

While bottom-up refinement is critical, and many commanders would appreciate their higher headquarters giving them a chance to shape mission sets as a result of their feedback, we cannot use this as a crutch for poor work. Especially at battalion- to company-level echelons, where we have the most significant gap in training, experience and education between the echelons. We can do more work to provide feasible mission sets rather than provide a road to failure and expect junior leaders to tell us where they are going to fail.[13]

This idea does not replace the bottom-up assessment we need from our Soldiers who accomplish the mission, but we are out of balance on this equation and scratch our heads wondering why subordinates are hesitant to tell us about failure and the associated risk we knowingly handed them.

Assessment

Not one concept presented in this article is helpful beyond initial counseling or as a start point for leading an organization without the ability to assess and reassess. Leaders use many tools for assessing their organizations, including inspections, battle-rhythm data points, spending time with Soldiers at the point of execution, formal assessments such as command-climate surveys and planned engagements with different cohorts of Soldiers.

The point is that leaders should think critically about their assessment tools and how those tools allow them to see their blind spots. Everyone has blind spots, and the self-awareness to be open to assessments that help illuminate those blind spots is what separates leaders who can make meaningful adjustments from those who are satisfied with receiving reports that all is well. These assessment tools are what allow leaders to truly understand the magnitude and direction of forces acting on the unit.

The leader can then adjust his/her "rheostat" on expectations, engage in real risk discussions, create resources or adjust priorities and intent. The two most likely points of failure in assessment occur because leaders do not create a broad enough tool set for assessment and are too willing to accept good news.[14] As Colin Powell wrote in ***My American Journey***, "The day Soldiers stop bringing you their problems is the day you have stopped leading them."[15]

Leaders naturally want their organizations to perform to their highest potential but should account for (identify and adjust to) the external forces while mitigating the resulting risk. This leaves the leader with a likely problem statement: The leader must accomplish the mission given resource constraints, while leaving room for leader development and without breaking families or the Soldier's desire to serve along the way.[16]

Showing this problem in a picture to share the commander's visualization is extremely valuable and allows the commander to have discussions with peers and subordinates about how they impact the organization, what changes have occurred and make accurate assessments. Whatever picture the commander deems most helpful allows leaders to share in the understanding and visualization; informs how subordinates and other organizations fit into assessment loops; and provides a start point for discussion about where along the path the organization lies.

While the picture does not replace the clarity and logical trail of the written word, it supports quickly communicating a shared understanding across all ranks. If this visual tool and its discussion points created dialogue between the reader and a fellow professional, whether that dialogue was in agreement or in disagreement with the usefulness or accuracy of the tool, then the reader has experienced the benefit a visual tool provides for a commander and the organization.

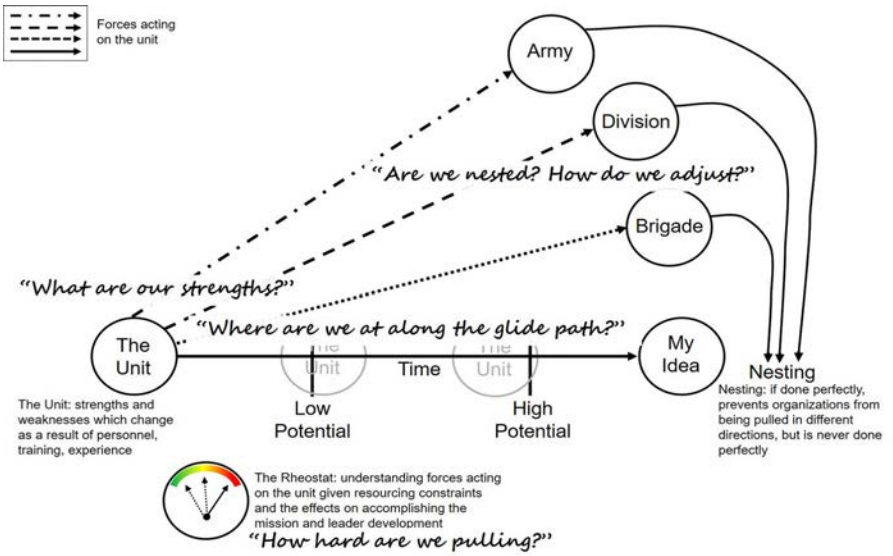

Figure 6. A visual tool for a unit's self-assessment. *(Graphic by the author)*

LTC Jim Armstrong commands 2nd Battalion, 70th Armor Regiment, 2nd Armored Brigade Combat Team (ABCT), 1st Infantry Division, Fort Riley, KS. His previous assignments include concept lead for the Joint Staff Innovation Group, Washington, DC; squadron operations observer/coach/trainer for Grizzly Team, Joint Multinational Readiness Center, Hohenfels, Germany; brigade operations officer (S-3), 3rd ABCT, 1st Cavalry Division, Fort Hood, TX; battalion operations officer (S-3), 1st Battalion, 12th Cavalry, 1st Cavalry Division, Fort Hood; brigade plans officer, 3rd ABCT, 1st Cavalry Division, Fort Hood; and Joint Operations Center battle major, Regional Command-East, Bagram, Afghanistan. During his career, LTC Armstrong has also served as

platoon leader, executive officer and company commander. His military schools include Air-Assault Course, Master Fitness Trainer Course, Armor Basic Officer Leader Course, Armor Captain's Career Course; intermediate-level education, common-core and qualification courses, Command and General Staff College (CGSC); and Joint Firepower Control Course. LTC Armstrong holds a bachelor's of arts degree in systems engineering from the U.S. Military Academy, West Point, NY, and a master's of military arts and science degree in military history from CGSC.

Notes

[1] ADP 6-0, ***Mission Command***, July 2018.

[2] Field Manual (FM) 6-22, ***Leader Development***, June 2015.

[3] Army Technical Publication (ATP) 5-01, ***Army Design Methodology***.

[4] ADP 5-0, ***The Operations Process***, July 2019.

[5] A "nested" concept illustrates how the actions of subordinate units fit together to support a mission of the higher headquarters.

[7] While the author understands the military's penchant to allow subordinates to learn from failure much like industry's "fail, fast, forward," we must maintain that our profession requires winning. We should be careful about learning and retraining vice propagating the idea of accepting failure.

[8] FM 7-0, ***Train to Win in a Complex World***, Oct. 5, 2016.

[9] Ibid.

[10] ADP 6-0.

[11] Ibid.

[12] ATP 5-19, ***Risk Management***, April 14, 2014.

[13] Battalion commanders with 17-20 years of experience, in comparison to company commanders, most likely at five to eight years of experience.

[14] Jim Mattis and Bing West, ***Call Sign Chaos***, Penguin Random House, Sept. 3, 2019.

[16] Colin Powell and Joseph Persico, ***My American Journey***, New York: The Random House Ballatine Publishing Group, 1995.

[16] A problem statement should not start out with "how," which is the beginning of a question. The statement is declarative and describes the dilemma and tradeoffs as a result of the problem.

Acronym Quick-Scan

ABCT – armored brigade combat team
ADP – Army doctrinal publication
ATP – Army technical publication
CGSC – Command and General Staff College
FM – field manual
OPSEC – operations security

The ETHICAL Warrior

by Chaplain (MAJ) Jared L. Vineyard

Is one immoral act or one immoral Soldier able to change the perception of an entire unit or organization? The seemingly obvious answer is yes.

Ethics is a hot topic these days – when to use force, how to use force, whom to use force on and systematic fairness are all a part of the national discussion. These are not only valid topics of discussion but are topics that a functional society needs to be able to answer.

And while these and related discussions continue nationally, they are not new concepts to the military professional. Ethics are embedded in the foundation of the Army profession. When one looks at the definition of the Army profession, it is immediately clear that ethicality is essential.

While not necessarily intuitive to an outside observer, part of being an Army professional by definition is an expertise focused on "the ethical design, generation, support and application of landpower."[2] What this means is that to be a part of the Army profession, one must not simply be technically and tactically proficient – that is, solely able to design, generate, support and apply landpower. One must also be able to do it ethically.

Army leaders have long agreed with this. A more recent example came from GEN Stanley McChrystal, who wrote that "maintaining our force's moral compass was not a difficult concept to understand. Armies without discipline are mobs; killing without legal and moral grounds is murder."[3]

Based on our own definition, if one is not ethical, one cannot be a professional. This is an idea that all Army leaders need to think long and hard about. Just like the idea of being an Army professional is 24 hours a day, seven days a week, the idea of being ethical is the same. Ethics are not just for downtown Kabul but are also for downtown Columbus, GA, or wherever a Soldier finds himself or herself.

What does it mean?

What does it mean to be ethical? The Army is in the business of training Soldiers, which implies that there is a standard to be trained to. Thus, when discussing ethicality, what is the standard for Army professionals? While a perusal through doctrine will show the need to be ethical, a challenge comes when one actually tries to define what that means. In Army Doctrinal Publication (ADP) 6-22, ***Army Leadership and the Profession***, ethics (or a variant of it) is discussed 94 times in its 132 pages. In almost every case, no explanation or definition is given. And if a leader is challenged to define a concept personally, that leader will be challenged to teach or train it to Soldiers generally.

Therefore a standard is needed. The Army has such a standard, known as the Army ethic: "The Army ethic is the set of enduring moral principles, values, beliefs and laws that guide the Army profession and create the culture of trust essential to Army professionals in the conduct of missions, performance of duty and all aspects of life."[4]

While this is the standard for all Army professionals to know and follow, this ethic is a bit vague. It might be hard to teach and train in practical situations. So how does an Army leader do the right thing based on doctrine, both personally and professionally? How is this leader to train his or her formation in what is right?

To answer this question practically, ADP 6-22 contains two specific sections that assist leaders and Soldiers in living the Army ethic while teaching explicit principles for doctrinally based ethical living. The first help is a matrix that provides the moral and legal foundations for the Army ethic.

This matrix provides 19 legal and moral documents or concepts the Army looks at to make decisions. These specific ideals allow an Army leader to make the right and therefore ethical decision in any situation.

For instance, if a Soldier is unsure how to act toward another Soldier in a tense moment, the concept of the Golden Rule or "treating someone like you would want to be treated," in conjunction with the Army Value of respect, would both apply. These two ideals, the Golden Rule and Army Values, are both specific and specified moral principles that Soldiers should aspire to follow.

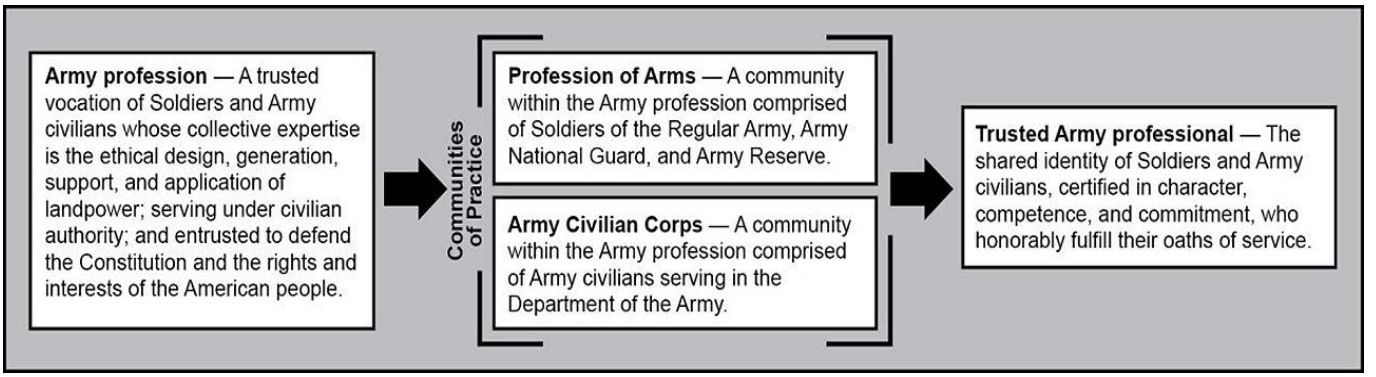

Figure 1. The Army profession of arms.[1]

Applicable to	Legal motivation of compliance	Moral motivation of aspiration
Army profession Trust Honorable service Military expertise Stewardship Esprit de corps	U.S. Constitution U.S. Code Uniform Code of Military Justice Executive orders Treaties, Law of Land Warfare	Declaration of Independence Universal Declaration of Human Rights Just-war tradition (*jus ad bellum*) Army culture of trust Professional organizational climate
Trusted Army professionals Honorable servants Army experts Stewards	Oaths of service Standards of conduct Directives and policies Soldier's rules Rules of engagement	Natural moral reason: Golden Rule Army Values Soldier's and Army Civilian Corps creeds Justice in war (*jus in bello*)

Table 1. Foundations of the Army ethic. *(From Table 1-1, ADP 6-22)*

When it comes to this matrix, the implied task is that all Army leaders have a working understanding and knowledge of each document or concept to live them out. This idea is reinforced in ADP 6-22, which says that Army "professionals perform their duty every day in a manner that the American people judge to be ethical according to the beliefs and values enshrined in the nation's founding documents." These pertinent documents, as well as others, are found in this matrix.

But this is not the only place in doctrine that helps an Army leader to practically answer how to live out what is ethical. The other piece of practical help comes from a section entitled "Ethical reasoning." This paragraph states: "Ethical choices may not always be obvious decisions between right and wrong. Leaders use multiple perspectives to think about ethical concerns, applying them to determine the most ethical choice.

"One perspective comes from a view that desirable virtues such as courage, justice and benevolence define ethical outcomes. A second perspective comes from a set of agreed-upon values or rules, such as the Army Values or constitutional rights. A third perspective bases the consequences of the decision on whatever produces the greatest good for the greatest number [of people] as most favorable.

"Leaders able to consider all perspectives applicable to a particular situation are more likely to be ethically astute. When time is available, consulting peers and seniors is often helpful. Chaplains can provide confidential advice to leaders about difficult personal and professional ethical issues to encourage moral decisions in accord with personal conscience and the Army Values."[5]

After reading through that material, one might ask where did this come from and how does this practically apply? To answer the first question about where these three perspectives come from, one has to look toward the Western philosophy of Aristotle for virtues, to Immanuel Kant for rules and to John Stuart Mill for consequences. The Army is open about the sources of its values when it says that "the Army ethic has its origins in the philosophical heritage, theological and cultural traditions, and the historical legacy that frame our nation."[6] While these three philosophers clearly view the world from differing perspectives, Soldiers could ask themselves a basic question from each.

The question based on virtues that a Soldier might ask is "Would a virtuous person do it?" Aristotle taught: "There are three kinds of disposition, then two of them vices, involving excess and deficiency respectively, and one a virtue, namely the mean, and all are in a sense opposed to all. … That moral virtue is a mean, then, and in what sense it is so, and that it is a mean between two vices, the one involving excess, the other deficiency."[7]

Without getting too in-depth in his philosophy, it is enough to understand that Aristotle believed that virtue resides within the mean of a person's character, not within his or her extremes. An example can be seen in how someone deals with dangerous situations. A person on one extreme – one who doesn't have any fear – might be considered reckless or rash, while on the other end of the spectrum, a person who never wants to deal with danger might be considered a coward, according to Aristotle.

For an Army leader, neither position is particularly suited or desired. Thus, a virtuous person, or a person of the mean, would be a person of courage. Courage is a specific example given by the Army in the paragraph on ethical decision-making. Thus, asking the question, "would a virtuous person do it?" Thinking through a response based on the mean helps a Soldier know what to do in certain situations.

This is not the only question the Army suggests asking. The next might be "Would I want all military professionals to do it?" This is based on rules by Immanuel Kant. Kant taught that "there is only one categorical imperative and it is this: Act only on that maxim by which you can at the same time will that it should become a universal law."[8] It is enough to generalize that Kant believed that if a maxim, or rule, could be universalized, then it might be ethical for all. Therefore, a Soldier might ask would he or she want all Soldiers, noncommissioned officers or officers to do what they were about to do? Or could they make a universal law for everyone in the same position or situation to follow?

The third and final question that the Army suggests a Soldier ask might be "What are the consequences of this decision?" The consequences focus on the unit, the mission or the Soldier's surroundings. This idea comes from the philosophy of utilitarianism by John Stuart Mill. Mill wrote that "actions are right in proportion as they tend to promote happiness, wrong as they tend to produce the reverse of happiness. By happiness is intended pleasure and the absence of pain."[9]

Once again, not diving into Mill's philosophy too deeply, this happiness is a not about a person's individual happiness but about aggregate or collective happiness. Thus for an Army leader, it would be appropriate to think about the unit, the mission and the surrounding area of operations when thinking through consequences. If the consequences of a decision are positive, it may be a right decision. It is important to note that all three of the questions need to be asked for each decision a Soldier makes.

At this point, defining what is ethical according to Army doctrine is basically complete. The Army has an ethical

standard: the Army ethic. It is rooted in the philosophical, theological, cultural and historical legacy and tradition of our nation, which has legal and moral implications today.

The problem is that these principles from the previously discussed matrix, as well as the three perspectives, can be difficult to remember, let alone train the force on. Therefore, one of my tasks when taking a year to study ethics in preparation for my current teaching assignment was to create something easier to remember but rooted in the preceding doctrine. It was to design an ethical decision-making framework that could act as a standard for both Soldiers and leaders to know and implement. From my own experience, it is always easier to remember a concept that can be made into an acronym. So the goal was to take all the principles found in the two previously discussed sources of information and place them in an easily remembered format.

The acronym that eventually came out of this experiment was the exact word I wanted Soldiers to remember: ETHICAL. Each letter of the word stands for a doctrinal concept. Each concept in turn is asked as a question in deciding whether a decision or action might be ethical. This acronym thereby becomes an "ethical checklist" for a Soldier.

The acronym is (with the doctrinal principles in parentheses):

- **E** – Is this decision *equitable*? (Emphasis on the Golden Rule, Army Value of Respect and the virtue of justice.)
- **T** – Is this decision *true*? (Emphasis on facts and the Soldier's moral compass/virtues.)
- **H** – Is this decision *helpful*? (Emphasis on basic human rights, consequences and rules.)
- **I** – Is this decision ***institutionally*** appropriate? (Emphasis on Army Values, Soldier's Creed/Warrior Ethos and Soldier's oath.)
- **C** – Is this decision *culturally* appropriate? (Emphasis on treaties, standards of conduct, policies and directives.)
- **A** – Is this decision *application* just? (Emphasis on Just-War Theory and the Law of Land Warfare.)
- **L** – Is this decision *legal*? (Emphasis on U.S. and military law, including specific rules of engagement.)[10]

Let's look at each letter briefly to ensure that there is a proper understanding of each concept.

The first category is "equitable." To be ethical, all military personnel should ask themselves the question, "Is this decision equitable?" *Equitable* means "having or exhibiting equity; dealing fairly and equally with all concerned."[11] It has fairness at its essence. Standards in the Army should be tough; the bar for leaders should be high, but standards must also be fair. This gets at the principle discussed earlier, the Golden Rule. This is codified very clearly in the Army Value of Respect, which says that Army professionals "treat people as they should be treated."[12]

Aristotle's virtue or justice might also fall under this category. Justice deals ultimately with the issue of fairness. Thus, if a Soldier is going to be ethical, he or she should ask, "Is this decision equitable or fair?"

The next category is "true." To be ethical, all military personnel should ask themselves the question, "Is this decision true?" This question needs to answered in two senses based on doctrine. The first sense is objective truth or facts. Mission command states that "ideally, true understanding should be the basis for decisions."[13] Samuel Huntington in ***The Soldier and the State*** writes that "the 'military opinion' must never be colored by wishful thinking. … The military man will be dealing with military fact, hard figures and grim realities of time, space and resources."[14] While Army professionals understand that complete understanding in every situation is never possible, ethical decisions must be rooted in reality.

But it is not only facts the Army leader needs to consider when thinking through decisions; it is moral truth that needs to be consulted a well. This truth is guided by each leader's conscience. Doctrine tells us that "a leader's character consists of their true nature guided by their conscience."[15] Many may call this the moral compass of a leader. This compass informs a leader's conscience, which is formed and developed over time by a number of sources. For instance, "influences such as background, beliefs, education and experiences affect all Soldiers and [Department of the Army] civilians."[16] How does a leader know if something is immoral? A decision or act might be judged immoral if it goes against the dictates of their conscience.

Doctrine also tells leaders what to do when given an order that is immoral. "Army forces reject and report illegal, unethical or immoral orders or actions. … Soldiers are bound to obey the legal and moral orders of their superiors, but they must disobey an unlawful or immoral order."[17] Therefore a Soldier must ask himself or herself, "Is what I'm about to do morally true according to the dictates of my conscience?" If this is disregarded, moral injury is likely to occur.

The next category is "helpful." To be ethical, all military personnel should ask themselves the question, "Is this decision helpful?" This is meant in two senses, both previously discussed in rules and consequences. One way this question could be asked is, "Is this helpful to my profession?" Or, worded differently, "Would I want all military professionals to make this decision?" Next, based on consequences, "Is this decision helpful to my unit, to the mission or my surroundings?"

It is interesting to note that doctrine states that part of our moral motivation for service are basic rights. These can be found both in the Declaration of Independence as well as in the Universal Declaration of Human Rights. An example of asking the "helpful" question using these documents might be, "Is this decision helpful to those around me?" According to our Declaration of Independence, some truths are "self-evident" such as "all men are created equal" and have "certain unalienable rights – among which are life, liberty and the pursuit of happiness."[18] Therefore a Soldier on patrol cannot simply impede someone's basic rights just because he or she feels like it; that would be unethical.

The next category is "institutionally

Army Values

The Army Values are:

- **Loyalty** – Bear true faith and allegiance to the Constitution of the United States, the Army, your unit and other Soldiers.
- **Duty** – Fulfill your obligations.
- **Respect** – Treat people as they should be treated.
- **Selfless service** – Put the welfare of the nation, the Army and your subordinates before your own.
- **Honor** – Live up to the Army Values.
- **Integrity** – Do what is right, legally and morally.
- **Personal courage** – Face fear, danger or adversity.

Figure 2. Army Values.[19]

appropriate." To be ethical, all military personnel should ask themselves the question, "Is this decision institutionally appropriate?" What this question is pointing to is that there are many Army-specific institutional norms and values that should be followed. The classic example of this is Army Values.

These values are what we as the Army have said are important to us as an institution. In fact, the Army has gone so far to say that "the Army Values embody the practical application of the Army Ethic."[20] What this means in a sense is that if one wants to see the Army ethic is practice, one only needs to look as far as the Army Values.

Another institutionally appropriate concept is the Soldier's Creed, with its associated Warrior Ethos, and Army Civilian Corps Creed.

These creeds personify what it is to be an Army professional. And while these institutionally appropriate values might be good for all people to know and live out, they are at the same time very institutional. This means that they are institutionally-agreed-upon values and norms that guide the conduct of all personnel within the Army institution. Other institutions such as the Navy or Air Force have different, although similar, values. Army personnel must live these agreed-upon values and principles if they are going to be ethical.

Soldier's Creed

I am an American Soldier.

I am a warrior and a member of a team.

I serve the people of the United States and live the Army Values.

I will always place the mission first.

I will never accept defeat.

I will never quit.

I will never leave a fallen comrade.

I am disciplined, physically and mentally tough, trained and proficient in my warrior tasks and drills.

I always maintain my arms, my equipment and myself.

I am an expert and a professional. I stand ready to deploy, engage and destroy the enemies of the United States of America in close combat.

I am a guardian of freedom and the American way of life.

I am an American Soldier.

Figure 3. Soldier's Creed.

The next category is "culturally appropriate." To be ethical, all military personnel should ask themselves the question, "Is this decision culturally appropriate?" As everyone familiar with the U.S. Army knows, "the sun never sets on the U.S. Army." Therefore Army leaders understand: "Army organizations operate around the world in a wide variety of environments with different unified-action partners representing many different cultures. Leaders should acquire cultural and geopolitical knowledge about the areas in which they expect to accomplish the mission. … Leaders require cultural and geopolitical awareness to properly prepare subordinates for the places they will work, the people with whom they will operate, and the adversaries or enemies they will face. The Army requires leaders who are geopolitically aware and can explain how their unit mission fits into the broader scheme of operations. These are important factors when Army leaders attempt to extend influence beyond the chain of command."[22]

Army Civilian Corps Creed

I am an Army civilian, a member of the Army team.

I am dedicated to our Army, Soldiers and civilians.

I will always support the mission.

I provide leadership, stability and continuity during war and peace.

I support and defend the Constitution of the United States and consider it an honor to serve our nation and our Army.

I live the Army values of loyalty, duty, respect, selfless service, honor, integrity and personal courage.

I am an Army civilian.

Figure 4. Army Civilian Corps Creed.[21]

When it comes to understanding different cultures, leaders need to have an understanding of treaties and standards of conduct, as well as different policies and directives such as status-of-forces agreements. When Soldiers and leaders understand the context of where they serve, they will be much more likely not to offend our foreign partners and to be able to extend respect with dignity to those with whom we serve. Dignity and respect are most definitely a two-way process and help leaders from different cultures build rapport and trust, which is the bedrock of the Army profession. Being culturally aware and appropriate helps ensure Army leaders make ethical decisions.

Principle	Alternate names	Paragraphs	Summary
Military necessity		1-23 to 1-27	Justifies the use of all measures required to defeat the enemy as quickly and efficiently as possible that are not prohibited by the law of armed conflict.
Humanity	Humanitarian principle; unnecessary suffering; superfluous injury	1-28 to 1-30	Basis of protection for civilians; forbids inflicting suffering, injury, damage or destruction unnecessary to accomplish a legitimate military purpose.
Honor	Chivalry	1-31 to 1-33	Demands of certain amount of fairness and a certain mutual respect between opposing forces.
Distinction	Discrimination	1-34 to 1-43	Distinguishes between combatants and military objectives on the one hand, and civilians and civilian objects on the other in offense and defense.
Proportionality		1-44 to 1-48	Requires commanders to refrain from attacks in which the expected loss or injury to civilians and damage to civilian objects incidental to such attacks would be excessive in relation to the concrete and direct military advantage expected to be gained. It also underlies the requirement to take feasible precautions to reduce the risk of harm to civilians, other protected persons and civilian objects.

Table 2. Application of basic LoAC principles.[23]

The next category is "just application." To be ethical, all military personnel should ask themselves the question, "Is this decision's application just?" The focus of this concept is combat, specifically looking through the lens of the Just-War Theory and its related Law of Land Warfare. All Soldiers and leaders must understand that there is a proper way to apply landpower to fight and win our nation's wars. Discussions on the proper use, allocation and timing of force have been a part of Western armies as long as there have been armies. A brief summary of key principles from the Law of Armed Conflict (LoAC) are in Table 2.

For Soldiers to be ethical, they must honor the Law of Land Warfare and ensure that their application of landpower is just.

The final category is "legal." To be ethical, all military personnel should ask themselves the question, "Is this decision legal?" While this might seem obvious, all Soldiers and leaders need to ensure the legality of the decisions they make. Some might add that this should be the first question leaders ask when making a decision; while that may be true, it is surely not the only question that should be asked. The military works under the legal framework where the U.S. Constitution is the foundation followed by laws, the Uniform Code of Military Justice, executive orders, etc. For a decision to be ethical, it should be legal.

Ethics is an area that every Solder and leader must think through, whether training during peacetime or fighting during war. The Army's job is to win. This can be seen in its mission statement: "The Army mission – ***our purpose*** – remains constant: to deploy, fight and win our nation's wars by providing ready, prompt and sustained land dominance by Army forces across the full spectrum of conflict as part of the joint force."[24]

Victory done right

But in winning, there is a tension. This tension is summed up by Michael Walzer with the dilemma of winning and fighting well.[25] While the Army is tasked to win, we must win the right way, the ethical way. Walzer goes on to say, "War is the hardest place; if comprehensive and consistent moral judgments are possible there, they are possible everywhere."[26] What is he saying? War is hard, and if you can be moral in war, you can be moral anywhere.

But I think all Soldiers and leaders need to be challenged with the other side of that comment: If you can't be moral anywhere when it is "easy," you won't be moral in war. Being moral implies a standard; the acronym ETHICAL is a doctrinally based standard to help leaders and Soldiers make the right decisions – to be ETHICAL warriors. We as an Army must be ethical, not just to be perceived as right but because our profession demands that we are right.

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Acronym Quick-Scan

ADP – Army doctrinal publication
LoAC – Law of Armed Conflict

Reconnaissance and Security Operations Are Essential to Thwarting Russian Interests in Western Hemisphere

by 1LT Anthony M. Analla

Leaders of the Russian Federation maintain a strategic foothold in the Western Hemisphere by preserving the presidency of Nicholas Maduro in Venezuela. Cooperation between Russia and Venezuela offers the Russian government an ability to bolster its intertwined military, economic and political interests. To that end, the Russian military continues a campaign of material support to the Venezuelan military to deter foreign and domestic threats.

The United States recognizes interim President Juan Guaido and considers the Venezuelan National Assembly, which he currently leads, to be the only legitimate federal institution, according to the Venezuelan Constitution. This pits Russian and U.S. interests in Venezuela at odds because Russia supports Nicolás Maduro, president of Venezuela since 2013, with his presidency under dispute since 2019. In this context, it is crucial to effectively train the U.S. Army and our allies in reconnaissance and security tactics that incorporate the lessons of post-Soviet acts of Russian aggression to prepare for potential hostilities in the region.

Maduro and his United Socialist Party of Venezuela (PSUV) present a desperate need for political, economic and military aid that complements the Russian desire for influence in the region. Venezuelan Socialists justifiably fear the threat of a coup because the PSUV temporarily lost power during a coup d'état in 2002.[1] Russia deters threats to the PSUV through arms sales,[2] private military contractors,[3] military advisers/trainers[4] and the United States' fear of confronting the Kremlin in open conflict if a move is made against the PSUV. Further, Russian veto power in the United Nations Security Council provides political cover for Maduro. Finally, the Kremlin bolsters Venezuela through direct financial aid and lines of credit.[5] In return, the Russians gain a foundation to build influence and undermine the interests of the United States in the Western Hemisphere.

With bolstering Venezuela the known objective of the Russian government, the U.S. Army must think critically and train effectively to counter Russian support for the Latin American country that could manifest itself into an armed conflict in the Western Hemisphere.

Russian mindset

Since the late 1990s the Russian Federation has executed a series of military actions that reveal the character of the military forces the Kremlin has developed to actualize its political objectives and the mindset of its contemporary leaders. In June 1999, Russian forces successfully gained leverage in negotiations over the disposition of a newly created United Nations peacekeeping force by seizing the airport in Pristina, Kosovo, prior to the arrival of North Atlantic Treaty Organization (NATO) forces.[6] This was the first of many actions that demonstrated rising boldness among Russian leaders and a belief that Western powers will not risk the use of military force against Russians.

Russian actors launched a cyberattack in April 2007 against the government of Estonia in retaliation for the removal of a World War II monument honoring Soviet veterans.[7] False news reports that the Estonian government

planned to destroy rather than just move the statue exacerbated the unrest among ethnically Russian populations in Estonia.[8] This unprecedented wave of cyberattacks led to major disruptions of government services, email, on-line banking, automated-teller-machine access, e-commerce and more. Cumulatively, the cyberattacks and ethnic tensions led to riots and crippled the country for more than two weeks.[9]

Notably, the Russian government never acknowledged its role in the cyberattack and the specific perpetrators remain unknown, though they are almost certainly government-supported, Russia-based actors.[10] Russia and many other nations learned that cyberattacks now present an effective and low-risk means of disrupting an enemy's ability to maintain order, which reduces its capacity for armed conflict.

One year later, Russia intervened in then-Georgian-controlled South Ossetia and Abkhazia in support of ethnically Russian populations.[11] Prior to the Russian occupation, the Russians recruited, organized and equipped separatists to prepare the battlefield.[12] They also conducted large-scale training exercises that served as rehearsals for the occupation and a plausible cover for massing forces near the Russia-Georgia border.[13] In this conflict, the Russians fought in all domains to achieve limited strategic goals that included greater influence over the South Caucus Energy Corridor and discouraging a partnership with NATO.[14] Post-conflict analysis reveals that the Russian military struggled to operate effectively in joint and combined-arms operations.[15] Georgian tactical success sparked a new determination to upgrade Russia's military equipment and move away from Soviet-era tactics.[16]

Russian President Vladimir Putin took his largest and boldest military actions to date by annexing Crimea and launching an offensive in the Donbass region of Ukraine in 2014. Russia has gained an advantage throughout the conflict through the effective use of deception to delay responses by the Ukrainians and the West.[17] Concrete steps taken to conceal Russian involvement include the use of unmarked soldiers,[18] military contractors[19] and the dubious use of humanitarian aid.[20] Despite these efforts to deny the extent of Russian involvement, unsubtle funerals for fallen Russian soldiers confirm the reality of the situation.[21] In conjunction with Russian actions in Georgia, these actions confirm a strong preference in the Kremlin for the use of military and paramilitary forces that afford the Kremlin deniability on the international stage.

Lessons-learned

Members of the U.S. Army's Asymmetric Warfare Group, among others, have published studies based on the ongoing conflict in Ukraine that identified critical lessons for the U.S. military. Their findings indicate that the Russian military favors the use of snipers and boobytraps as a means of fixing larger forces and causing significant psychological strain on their enemies.[22] Russia has integrated unmanned aerial systems (UAS) with electronic-warfare (EW) capabilities to project jamming and spoofing effects on its enemies' locations. These systems also fuel the targeting of indirect weapons, often toward elements with a large electronic signature.[23]

Fire-support elements, as opposed to maneuver elements, take finishing actions in Russian offensive operations; this is a continuation of Soviet-style fighting.[24] Despite many advances since the end of the Cold War, resource constraints cause several vulnerabilities in the Russian fighting force. Specifically, their lack of resources causes a deficit of highly trained professionals, especially in the sustainment occupational specialties.[25] As a result, their force struggles to match top-tier maneuver and fires with top-tier sustainment, reducing the likelihood of success in expeditionary operations.

Syrian President Bashar Al-Assad requested military assistance from the Kremlin in 2015 as he struggled to fight a growing multitude of militant groups.[26] Officially, the Russian Federation Council approved only the use of air assets for combat operations in Syria, though the Russians maintain a ground force in the country.[27] Russia has equipped the Syrian army with main battle tanks and small arms while supporting with its own attack aircraft.[28] Sustaining this effort required the Russians to use reserve units and military contractors, which suggests a weakness in Russian capabilities with respect to personnel.[29]

Russian contractors became the subject of much debate when they attacked a combined U.S.-Kurdish force near Deir Ezzor, Syria, in February 2018. Some suggest leaders in the Kremlin used contractors to prosecute the attack to maintain deniability for the government. Others suggest the contractors acted in a cavalier fashion without explicit consent from the Kremlin.[30] Both of these possibilities require that the United States prepare for such actions by Russian contractors in the future. Through Russian assistance the Assad regime has regained much of its territory, and Russia now has a blueprint for strengthening other regimes in the future.[31]

Russian military forces currently train and equip Venezuelan military forces to inoculate the Maduro regime against internal and external threats. Economic turmoil poses the greatest threat to the Maduro regime, so the Russians have responded with billions in direct aid and credit.[32] Since 2000, Russia has made arms sales of more than $7.5 billion to Venezuela, including fixed-wing and rotary aircraft, armored personnel carriers and small arms.[33] Venezuela also relies on embedded Russian troops to train its force and serve as a deterrent to potential aggressors.[34] Russian strategic bombers have also visited Venezuela, and the two countries have conducted combined military exercises, to the dismay of Western officials.[35] These means and methods of support indicate that any potential conflict in Venezuela will have a similar character to those in Georgia, Ukraine and Syria.

Aggressive intelligence collection

Lessons of Russian intervention in the recent past indicate that reducing the effectiveness of Russian strengths and exploiting Russian weaknesses requires aggressive intelligence collection. Training reconnaissance organizations includes at least three

audiences – the primary collectors (Soldiers and junior noncommissioned officers), platoon and troop-level leadership and the staff. Effective training for all audiences requires the use of technology for specific threats and scenarios that force us to think like our adversaries. Ultimately, developing muscle memory in the tasks that cause the right information to flow quickly to the appropriate decision-makers is the goal. This goal includes two important indicators of success: risk decisions made at the appropriate level and mid-operation changes to the enemy's course of action.

This conceptual framework and our synopsis of selected Russian actions leads to five focus areas for training:

- Improvised explosive devices (IED)/ boobytraps;
- Snipers;
- UAS;
- Sustainment; and
- Information operations.

In Iraq and Afghanistan, the United States invested significant resources to defeat the threat posed by IEDs and snipers, two strengths we expect to find in Russian supported forces. In contrast to Iraq and Afghanistan, Russian supported forces likely use military grade manufactured explosives – boobytraps – rather than IEDs.[36] We must also anticipate that the skill of a Russian trained sniper will surpass the skill of the snipers from Iraq and Afghanistan.[37] Passivity significantly increases the risk to the force in an environment with snipers and IEDs/booby traps, while proactive reconnaissance efforts reduce both the psychological and material impacts of the threats.[38]

Proactive reconnaissance efforts for these threats begin with primary collectors and troop-level leaders learning to think like the enemy while analyzing the terrain. From this analysis, they identify positions of advantage from which to counter the threat and minimize the risk to their force. Currently, our force rarely teaches average scouts to think like a sniper. However, we would be wise to encourage this training. Members of the staff must use the analysis to identify the networks that support the battlefield effects of snipers and boobytraps. Analysis from the staff fuels an ongoing effort to plan future reconnaissance patrols among other operations. Ultimately, the feedback loop significantly increases the difficulty our adversaries have in achieving battlefield effects from either a sniper or a boobytrap.[39]

Leveraging technology

U.S. and allied forces must leverage the latest technology in conjunction with battle drills to reduce and defeat the threat of boobytraps and snipers. Currently, U.S. forces infrequently train with gunshot-detection devices and jammers that increase our survivability. Technology, like the processes of information flow, requires extensive training that leads to muscle memory to yield a material benefit. For example, the placement of gunshot-detection devices within a convoy or on a piece of tactical infrastructure requires critical analysis from leaders at the platoon and troop level. Improper placement may yield no benefit to friendly forces.[40] Technology infrequently defeats threats on its own; rather, it enables maneuver forces to defeat an enemy threat. Therefore, training battle drills such as react-to-contact must accompany training with gunshot detection and jammers.

Unmanned aerial vehicle (UAV) threats contrast threats from snipers and boobytraps in that the means and methods available to counter them lack thorough, real-world testing. Most commonly, UAVs serve as intelligence, surveillance and reconnaissance assets that frequently support the targeting process for indirect-fire assets. As noted, Russia specifically began using drones to project EW impacts to their enemies in Ukraine; however, it is unlikely Russia would support a country like Venezuela with such a scarce resource. This may change as Russia produces and fields more EW-capable drones or if the Syrian civil war stabilizes.

Equipping scouts with counter-UAS devices and weapons enables friendly forces to severely limit a key component of any potential adversary's fighting style. To leverage these resources effectively, the staff must analyze the enemy and predict the task and purpose of their UAVs. As a result, the staff enables commanders to establish engagement criteria. Primary collectors and troop-level leaders must train in identifying UAVs and employing counter-UAS systems. Again, success requires a feedback loop with each component of a reconnaissance organization working effectively.

Effective employment of counter-UAS systems offers an important example of friendly forces exploiting the weaknesses of countries like Russia and Venezuela. If the United States even went to the extreme of using a Stinger missile (about $38,000)[41] to destroy the common Russian Orlan-10 drone (about $87,000),[42] U.S. forces gain a significant advantage. As the Asymmetric Warfare Group stated in its analysis, Russia struggles to compete with the United States in the sustainment warfighting function.[43] This weakness results from the United States maintaining about 30 times Russia's wealth, which translates into greater resources for defense activities.[44] Venezuela depends heavily on Russian support due to its own economic turmoil. It is likely, therefore, that U.S. and allied forces can significantly impact the means and ambition an actor such as Venezuela has to fight by attacking its scarce resources.

In an armed conflict in the Western Hemisphere, the lack of logistical support may constrain adversaries of the United States to the point that it yields a strategic benefit. To exploit weaknesses in sustainment, primary collectors and troop-level leaders must learn to identify the equipment Russia and its allies use for sustainment. Members of the staff must learn to analyze the types of forces that specific equipment sustains and assist the commander in valuating it properly. Ultimately, developing and disseminating engagement criteria that supports U.S. or allied strategic goals becomes paramount in this type of conflict. Reconnaissance organizations as a whole must only introduce a single limiting factor, such as food, water or ammunition, into an adversary's operations to give the following maneuver force a significant advantage.

Greatest risk

Among likely threats from a Russian ally like Venezuela in the Western Hemisphere is the ability of the Russian government to manipulate information. It presents the greatest risk to the mission. Russia claimed that humanitarian needs necessitated their intervention in Georgia[45] and Ukraine,[46] while claims of fighting terrorism drove its intervention in Chechnya[47] and Syria.[48] Russia currently employs hundreds of military contractors in Venezuela, whose activities remain largely unknown.[49] Cuba – another Russian ally – maintains an estimated force of 20,000 personnel in Venezuela.[50] Also, the PSUV has driven Venezuela into a humanitarian crisis.[51] Certainly, Russia could use humanitarian concerns or threats posed by pro-Western, anti-Maduro militias as a justification for more direct military intervention.

Reconnaissance organizations make first contact with both the enemy and the civilian population. Scouts, therefore, must train to identify which Russian-supported actors are on the battlefield and where civilians require humanitarian assistance. In an information campaign, U.S. forces and our allies must consider ourselves guilty until proven innocent. By distinguishing between actors on the battlefield and identifying areas requiring humanitarian assistance, the United States takes important first steps toward denying Russia the ability to use information to its advantage. Distinction between actors on the battlefield in conjunction with thorough training on escalation-of-force procedures and the rules of engagement leads to justifiable actions. Non-lethal capability, means of restraint (e.g. flexcuffs) and other forms of technology increase the options available to commanders to support U.S. goals in an information campaign. When encountering a Russian-backed actor, tactical success becomes meaningless without the ability to control information.

Summary

In summary, Russia has strong incentives to train and equip the Venezuelan military and defend Maduro's regime. Recent history suggests that a Russian-supported Venezuelan force will use IEDs/boobytraps, snipers, UAVs (possibly with EW capabilities) and Russian contractors on the battlefield. Outside of the battlefield, the Russian government will most likely use its political capabilities to create confusion while conducting an information campaign and cyberattacks on behalf of the Venezuelans.

To counter these threats and exploit the weaknesses of a Russian-supported Venezuela, the United States must properly equip reconnaissance forces and train them to aggressively collect information. Scouts, staff and commanders must rehearse specific collection and analysis tasks that enable us to destroy IED/boobytraps and sniper networks. Similarly, we must rehearse collection and analysis to engage enemy UAVs and sustainment assets according to our strategic goals. Finally, we must train with the mindset of proving our innocence to an onlooking world to deny the Russians any advantage in an information campaign.

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Acronym Quick-Scan

EW – electronic warfare
IED – improvised explosive device
NATO – North Atlantic Treaty Organization
PSUV – United Socialist Party of Venezuela
UAS – unmanned aerial system
UAV – unmanned aerial vehicle

At the Forward Edge and Beyond:
Lethality and the Armored Brigade Combat Team

by MAJ(P) James Burnett and MAJ Jeffrey A. Feser

Operational requirements for the past 20 years have degraded the armored brigade combat team's (ABCT) lethality. The state of armored lethality at the small-unit level is serious, and it is continuously decreasing through the loss of institutional knowledge.

Decline of lessons-learned

Before 2001, when the National Training Center (NTC) was the keystone event in every brigade training cycle, battalion and brigade commanders brought with them a sacred institutional knowledge gained through experience. Hard lessons-learned created leaders who bore the knowledge of past battles, engagements and experiences through fighting a lethal and thinking enemy. As the bridge between operational art and tactics, these lessons were the most valuable tool a battalion commander could distribute across the force.

These documented experiences, augmented with decades of experience from senior noncommissioned officers (NCOs), especially master gunners (MGs), enabled our junior leaders to develop the tactics and leaderships skills that made America's armored formations the most formidable and lethal in the world.

However, the shift to the counterinsurgency (COIN) environment rendered these lessons-learned about how to approach decisive-action engagements at NTC obsolete. With the return to great-power competition, today's Armor force faces the loss of institutional knowledge across the force when it comes to decisive-action engagements.

The U.S. Army's armored and mechanized formations are the arm of decision to the most capable land force in the world. However, while the United States focused on COIN-centric operations for the past 20 years, our adversaries have capitalized on our preoccupation. They adapted, modernized and professionalized, testing their weapons, tactics and doctrine in limited conflicts with devastating effects.

Regaining operational knowledge

The return of great-power competition represents a different operational environment than previously faced. The incorporation and integration of enemy elements associated with the rise of Grey Zone operations requires small U.S. military elements to disperse over great distances to rapidly converge, engage and destroy the enemy in combined-arms operations. The U.S.

military must move rapidly from one point of conflict to another, repositioning and attacking the next objective to provide continuous overmatch of violence at decisive points.

Unfortunately, recent reports from the combat-training centers (CTCs) cite a 30-percent decrease in target hits during the past two decades with first-run crew-qualification rates routinely below 60 percent. Discrete adjustments to Army manning, training and structure have resulted in a multitude of unanticipated second-order effects within the armored force. For example, a myriad of global requirements dampened platform lethality despite technological advances throughout the mechanized force.

The question we now need to ask ourselves is how can we regain operational knowledge through institutionalized training, doctrine and manning to increase ABCT lethality and dominate in large-scale combat operations (LSCO).

To address this question and the current state of the armored and mechanized force, III Armored Corps initiated the ***Lethality Report on the State of the Armored Brigade Combat Team (ABCT)***. It collected observations, insights, data and lessons in collaboration with Headquarters Department of the Army (HQDA), Human Resources Command (HRC), U.S. Army Materiel Command, U.S. Army Training and Doctrine Command (TRADOC), First Army and the Maneuver Center of Excellence.

Report authors III Corps deputy commanding general and III Corps command sergeant major presented the findings at the Army Warfighting Conference in September 2019. The report articulated a snapshot of the overall state of III Corps' formations, seeking to address the probability of winning a peer-on-peer LSCO by establishing a baseline for discussions on the requirements of the armored and mechanized community. The report also identified and highlighted the declining lethality in the armored force despite continued weapon-system and fire-control improvements.

In response, III Corps identified three lines of effort (LoEs) encompassing 38 recommendations and operationalized by HQDA, U.S. Army Forces Command (FORSCOM), HRC and TRADOC, to correct systemic issues from the crew through Army-command level. These LoEs center on MG use and proficiency, M2 Bradley Infantry Fighting Vehicle (IFV) leader competency and improved operational training.

Encompassing these LoEs, III Armored Corps recently submitted the ***Commander's Guide to ABCT Gunnery Handbook*** to the Center for Army Lessons Learned for its publication. This publication connects commanders with the knowledge that MGs and senior NCOs have developed during years of executing gunneries. It also provides tips and lessons for how to prepare for successful gunneries as well as enhanced training standards intended to stress crews to their maximize training value. Its focus is how to use gunnery as the means to an end to increase crew lethality in combat.

Increasing lethality

To increase lethality, it is necessary for all units to fill all authorized MG positions to train our mechanized forces. MG use and proficiency addresses the mechanized force's lack of MGs and the correlating general decline in lethality and safety. MGs are the lifeblood to developing unit and crew lethality. They are the subject-matter experts, institutionally trained in direct-fire weapon systems, planning, gunnery, training programs and combat-vehicle weapons maintenance. They enable us to defeat the enemy by optimally employing our most lethal weapon systems and increasing training focus on effective direct fires; they are a force multiplier.

Engaging the enemy effectively at the tactical horizon while dominating the operational foreground takes direct-fire precision that can only be taught by our MGs. However, MGs are manned at below 50 percent across the force, and they often have less live-fire experience than a senior lieutenant of the 1980s. This lack of experience and an inadequate quantity of MGs can be attributed to poor identification, development and performance of the candidate at the MG course. III Corps is actively working to change this trend; it is building, managing and fielding MGs within the force.

To decrease delinquencies and build effective MGs, III Armored Corps is working with Army divisions to create standardized sabot academies; increase access to the Abrams Training Assessment Course and the Bradley Training Assessment Course; and create a Department of the Army selection process to discover potential candidates. III Corps is also working with FORSCOM and HQDA to designate coded MG skill-identifier positions in Armor platoons while adding requirements for Armor, Bradley and Stryker MGs at division and corps headquarters levels.

Upon completion of these initiatives, each tank company will have three more MGs, with an increase of 18 within each ABCT. Upon identification and graduation from the course, commanders are ensuring MG stabilization through proper personnel coding to maintain unit stability following the completion of key development positions – a historical delinquency depriving units of trained personnel.

Units are able to maintain technical and tactically proficient NCOs up to 18 more months to increase institutional knowledge and stability within the force. Therefore active solicitation of MGs, along with committed management and support from HRC for remaining shortages within each branch, is facilitating increased experience and lethality within ABCTs.

Looking at our maneuver brethren in the XVIII Airborne Corps, we can see they have embraced the idea of institutional training as the keystone to realizing operational lethality. Ranger School, Airborne School and Air-Assault School are all key components of their leader development. M2 Bradley IFV leader competency must address the lack of leader proficiency within the M2 Bradley force.

The M2 Bradley is the preeminent fighting platform deliberately developed by the Army to be part of the lethality coefficient and a key component of combined-arms teams on the battlefield. As such, the vehicle commander must be able to both effectively destroy the enemy with direct

fire and transport infantry into close combat. They are responsible to not only "shoot, move, communicate," but also to integrate direct and indirect fires; maneuver infantry while supporting vehicle maneuvers; and communicate a clear and concise view of the engagement area through the incorporation of the Bradley Fighting Vehicle.

A single ABCT holds 233 Bradley crewman positions or about 3,700 infantry-trained M2 crewmen across the Army enterprise. Of the approximately 1,800 officers and NCOs on assignment instructions to mechanized forces in 2020, less than 1,100 have prior ABCT experience. With that in mind, leader competency must be addressed across the force as nearly 700 leaders lack M2 experience upon arriving at an ABCT. Without proficient crews, troop and company commanders, units cannot effectively, nor safely, bring to bear the full lethality of the M2 platform.

In response, III Armored Corps is changing the instructional method for leaders unfamiliar with mechanized platforms. It is supporting re-institutionalization training and an associated B9 additional skill identifier for Infantry Branch M2 trained crewmen. It is also enlarging and re-allocating prioritization of NCOs for the Bradley Leader's Course through the unit modified table of organization and equipment, while requiring attendance of institutional schooling prior to arrival at ABCTs to create the competency and lethality.

Starting in 2021, HRC will annually increase total Bradley Leader's Course slots for NCOs, increasing training opportunities because of operational needs. Mechanized-infantry Soldiers must understand how to maneuver their platform at the tactical level; it is the key to robbing the enemy of the initiative. By combining maneuver and surprise, leaders at the lowest levels create opportunities to deny the enemy the initiative.

Strenuous training needed

Finally, to increase lethality, forces must reintegrate strenuous and comprehensive training scenarios. The lack of sufficient technically competent NCOs who are skilled on the M2 has stagnated current training proficiency within armored and mechanized forces. Correlations stemming from inefficient training and standards are further impacted by current operational tempo, inefficient "Leader's Time Training," lack of Advanced Gunnery Training System (AGTS) / Bradley Advanced Training System (BATS), and/or poor preparatory training prior to certifications. As such, negligence of technical proficiency and the tactical capability among platform commanders remains limited, which prevents the ability to train and develop lethal Soldiers.

These critical issues affect our combat capabilities and Soldier safety. CTC injuries demonstrate that inexperience is the lead contributing factor for injury and loss of life on both the M2 Bradley and the Stryker. A long-term solution for this problem will have to include exponential increases in the Bradley Commander's and Gunner's Course capacity and the creation of a Bradley Crewmen Course to incorporate junior leaders. The investment in institutional introduction and recurring training will reduce injuries, increase proficiency and ensure units are ready and lethal in case of LSCO.

A lack of MGs and their limited experience amplifies poor training. As a result, training and live-fire standards across heavy formations vary significantly from the requirements established in the ***Gunnery Training Circular***. These deviations result in a wide lethality variance across the force as units differed on the types of engagements and distances they chose.

The future battlefield demands a culture where units raise proficiency by achieving the standard against increasingly difficult conditions; however, the ***Lethality Report*** discovered that only one of the four brigade combat teams' (BCT) Abrams gunneries that were analyzed fired 72.7 percent (eight engagements) of their main-gun targetry at a long-range distance. Three other BCTs averaged below 27.3 percent (three engagements). The preponderance of BCTs surveyed failed to challenge the capabilities of the vehicle or the crews; they engaged short- and medium-range targets that do not represent the standard and did not operate under the conditions units expect to operate in during combat.

In response, III Armored Corps is initiating multiple efforts to correct these issues and limit the difference. To improve operational training and maintain proficiency, it published new policies to change the mindset of gunnery from a training event to a means toward lethality. It now requires unit-level training emphasizing gunnery tasks and AGTS/BATS systems leveraging to increase lethality. III Armored Corps also forward-positioned digital training systems to support continuous training during operational deployments.

Recommended changes to Training Circular (TC) 3-20.31, ***Training and Qualification, Crew***, also limits allowed variances within gunnery; these limits restrict deviation approval levels and quantities. All planned deviations from standards prescribed in the TC require approval by the first general officer in the chain of command at the G-60 brief.

Similarly, division G-3s must now approve all primary and alternate gunnery scenarios and shot sheets for crew qualification tables. These actions will change the mindset of gunnery, returning its focus to crew lethality instead of gunnery completion.

Conclusion: increase lethality

The U.S. Army must be able to execute simultaneous offensive, defensive and stability operations to prevail in large-scale ground combat while distributed, but Armor lethality at small-unit level remains in a serious state. The problem is complicated, but the corrections required are feasible when they are recognized as an interconnected system. Returning to a great-power training focus requires ABCT emphasis on MG use and proficiency, M2 leader competency and improved operational training to increase lethality and ensure the mechanized force is prepared to win the next first battle.

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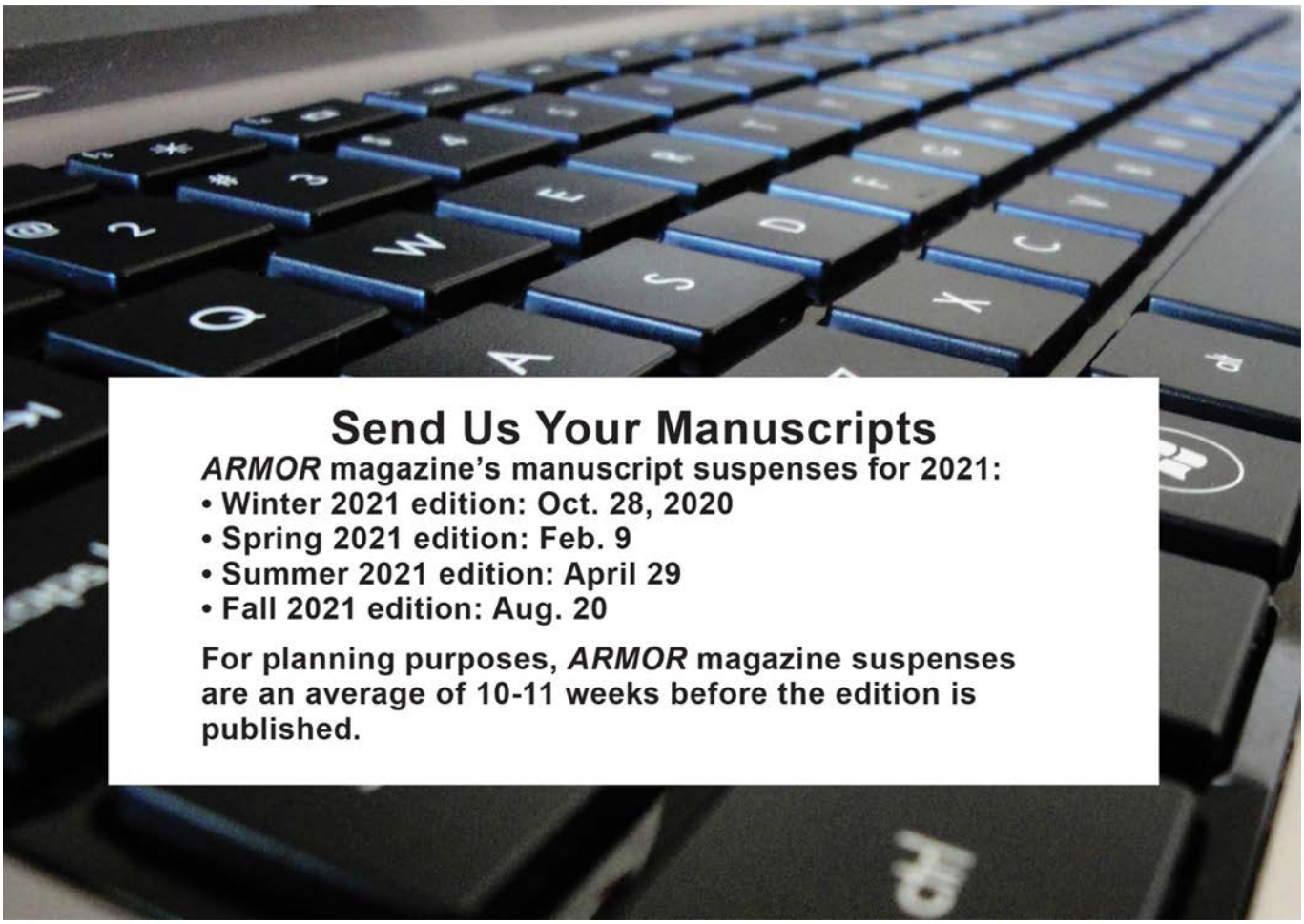
Acronym Quick-Scan

ABCT – armored brigade combat team
AGTS – Advanced Gunnery Training System
BATS – Bradley Advanced Training System
BCT – brigade combat team
COIN – counterinsurgency
CTC – combat-training center
FORSCOM – (U.S. Army) Forces Command
HRC – Human Resources Command
HQDA – Headquarters Department of the Army
IFV – Infantry Fighting Vehicle
LoE – line of effort
LSCO – large-scale combat operations
MG – master gunner
NCO – noncommissioned officer
NTC – National Training Center
TC – training circular
TRADOC – (U.S. Army) Training and Doctrine Command



Armored Brigade Combat Team Cavalry Squadron's Combat Trains during Large-Scale Combat Operations:

Balancing Maintenance, Recovery, Freedom of Maneuver

by MAJ Gary M. Klein and CPT Ragan T. Rutherford

The squadron was planning to continue its reconnaissance east across the Ujen Bowl toward Razish, but its combat trains were about 20 kilometers back from the current forward-line-of-own-troops (FLOT) in the vicinity of Reyalem. The squadron leadership knew this was less than ideal to support even current operations, so the headquarters and headquarters troop (HHT) commander had started to move the combat trains to the western end of the Washboard the day before. Unfortunately the HHT commander did not have enough M88 recovery vehicles in the combat trains to move the squadron's non-mission capable (NMC) M1 Abrams and M2/M3 Bradley Fighting Vehicles (BFVs) in the maintenance collection point (MCP) in one movement.

Compounding this challenge, the squadron's new mission was about to send it another 10 kilometers east. This left the squadron in the precarious position of improving its current position – moving its combat trains from Reyalem (MCP1) to the western end of the Washboard (MCP2) – while simultaneously planning another MCP for the eastern end of the Colorado Wash (MCP3). For at least a brief period of time, the squadron was going to have three MCPs.

How did the squadron end up with so many MCPs? How should the squadron arrange its leaders to lead these additional maintenance and recovery nodes? How can the squadron leadership create a maintenance common operational picture (COP) to enable it to track and regenerate combat power in multiple MCPs?

Cavalry-squadron doctrine provides a template for how to organize and arrange the squadron's sustainment and maintenance systems.[1] Unfortunately battlefield friction makes it challenging for leaders to arrange and operate the combat trains as neatly as doctrine describes it. The three MCPs in the introductory real-world vignette is one example. Squadron leadership must continually reorganize its sustainment and maintenance assets to improve the system, striving to bridge the inevitable gap between doctrine (an ideal solution) and the current battlefield situation.

The authors, both leaders within 1st Squadron, 1st Cavalry Regiment Blackhawks, became keenly aware of the aforementioned gap in their combat trains' disposition during National Training Center (NTC) Rotation 20-01, and they sought to improve their position. Unfortunately the fast tempo of operations prohibited them from closing this gap entirely. However, they learned valuable lessons about their combat trains they share in this article to help leaders navigate the inevitable friction units will encounter while sustaining themselves during large-scale combat operations.

An armored brigade combat team (ABCT) cavalry-squadron's combat trains contain a number of critical resources and capabilities, but this article will focus on three:

- Command and control;
- Recovery; and
- Maintenance.

Ideally, these three activities operate simultaneously without interference, but reality is rarely so clean. Leaders must consider a number of questions related to these three capabilities:

- When should leaders recover NMC equipment to another location, and when should they fix it in place?
- What conditions may cause this

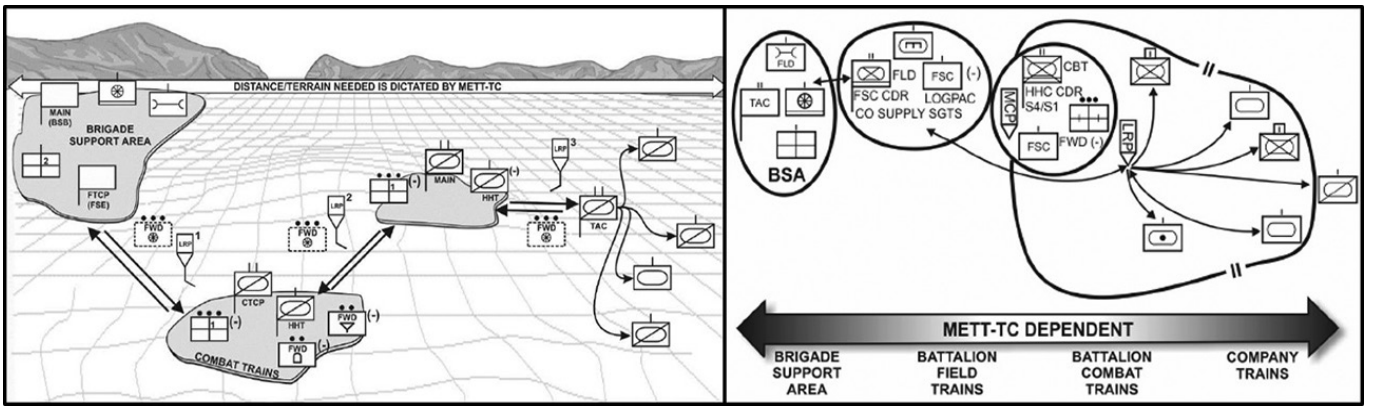


Figure 1. Doctrinal squadron/battalion trains. The left side of the illustration, from Army Technical Publication (ATP) 3-20.96, does not show the MCP in the squadron's combat trains, but it does describe it in its text. *(Left-side illustration adapted from Figure 7-4, ATP 3-20.96,* ***Cavalry Squadron****; right-side illustration is adapted from Figure 7-3a, ATP 3-90.5,* ***Combined-Arms Battalion****)*

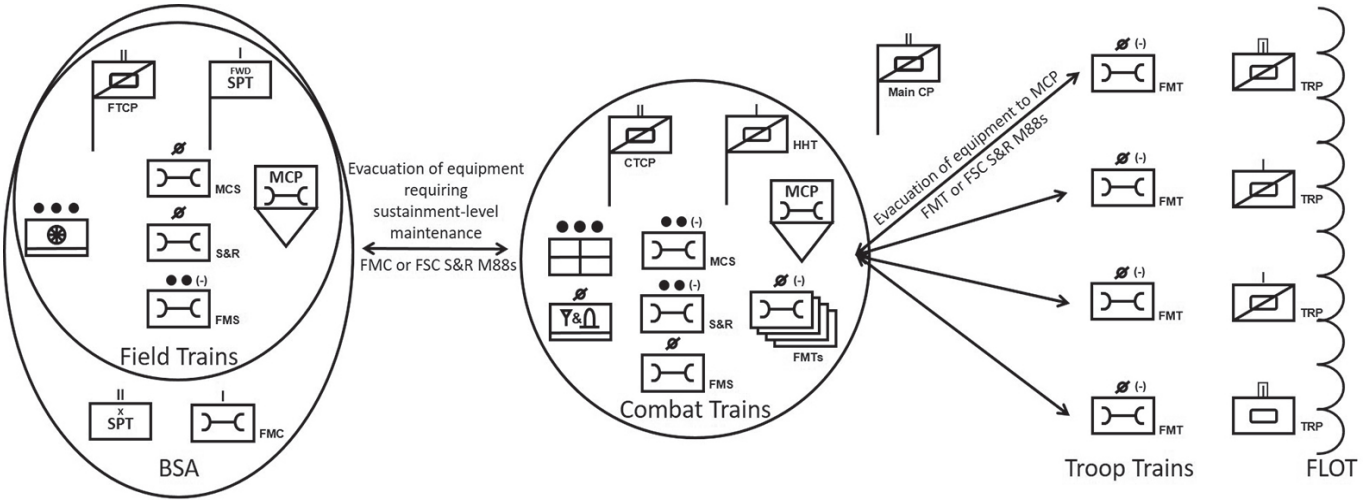


Figure 2. Echeloned squadron trains and maintenance and recovery assets. This figure and Table 1 describe the Blackhawk Squadron's standard distribution of maintenance personnel and recovery vehicles. They also describe what recovery sections or assets are responsible for evacuation among the different maintenance nodes (i.e. troop trains, combat trains, MCP and field trains). *(Graphic by the authors)*

	BSA / FMC	Squadron field trains FSC CP	Squadron combat trains / HHT CP *Very Small Aperture Terminal	Troop trains / FMTs
M88s	4	0	2	4 (1 each)
M984s	3	1	1	0
91As	4x each in FMC's M88s	0	11x 91As from tank-troop FMT split between troop and combat trains	
91Ms		0	9x 91Ms per cavalry-troop FMT split between troop and combat trains	
91Hs			Cavalry-troop FMTs have their 1x 91H in troop or combat trains	
		7x 91Hs from FMS split between field and combat trains		
91Bs		15x 91Bs from FMS split between field and combat trains		0
92As		1	6	0

Table 1.

standard to change?

- How do current and future reconnaissance and security (R&S) operations impact these activities?
- Whose responsibility is it to make these decisions, and who must command-and-control these activities once leaders make a decision?

These are a few of the questions Cavalry leaders must consider to employ their combat trains effectively, enable the squadron's R&S operations and achieve their purpose of answering the commanders' priority intelligence requirements.[2]

The aforementioned questions allude to the fact that leaders must understand the current mission and operational variables to develop and implement successful sustainment concepts of support. Furthermore, units must develop and practice standard operating procedures (SOPs) that enable them to succeed in a range of situations. This article will explain some of the challenges the Blackhawk Squadron faced during NTC Rotation 20-01 and present some options for how units might address these challenges in the future.

Squadron leadership must have a shared understanding of how to lead, organize and arrange the combat trains; how to balance the potentially competing demands of maintenance, recovery and freedom of maneuver; and how to establish a maintenance COP that helps leaders sustain continued R&S operations.

Cavalry-squadron combat trains

The squadron's combat trains traditionally contain the squadron's combat-trains command post (CTCP), the HHT command post (CP), the squadron aid station (SAS), an emergency

resupply of Class III and V, and the MCP (Figure 1, left side).[3] Although it is not specifically referenced in Cavalry doctrine, the combat trains – specifically the MCP – usually contain a portion of the forward-support company (FSC)'s maintenance platoon to return battle-damaged and NMC equipment to the fight as soon as possible.[4] The Blackhawk Squadron's combat trains include most of the FSC's maintenance control section (MCS) and service and recovery (S&R) section, the squadron's shop stock, elements of the cavalry and tank troops' field-maintenance teams (FMTs), and a team from the field-maintenance section (FMS) to support wheeled and light track maintenance (Figure 2 and Table 1).[5]

With this SOP, the Blackhawk Squadron combat trains include four key leaders: the squadron S-4, the HHT commander and platoon-level leadership from the SAS and maintenance platoon.[6] Doctrinally the squadron S-4 controls the squadron's trains, and the HHT commander has supervisory responsibility over the combat trains. However, the Blackhawk Squadron gave the HHT commander operational control over all elements in the combat trains to leverage his leadership experience and authority – a decision that enabled the squadron's sustainment operations at NTC.[7]

In addition to the added weight of a troop commander, Blackhawk's decision to place the HHT commander in command of the combat trains creates redundant leadership there. This enables the S-4, HHT commander or HHT executive officer to leave the CTCP and trains for the squadron main CP or the field trains to conduct planning and support activities.

Finally, if the combat trains have to split – like in the case of creating multiple MCPs, which will be covered in the next section of this article – these leaders can separate to lead the additional node(s).

Another notable aspect of the Blackhawk Squadron's trains is the baseline disposition of the squadron's maintenance and recovery assets (Figure 2). In line with doctrine, the Blackhawk Squadron SOP prioritizes forward maintenance and recovery support by placing the four FMT M88s and contact trucks in the troop trains, along with a portion of each team's tank and BFV mechanics (91A and 91Ms).[8] The rest of each FMT's 91A and 91Ms are located in the combat trains, along with the FMTs' forward repair system (FRS) and bench-stock containers.[9] The FRS and bench-stock containers are located in the combat trains to not hinder the mobility of the troops' trains. This arrangement places all the squadron's 91A and 91Ms in either the troop or combat trains.

Cavalry-squadron doctrine is not unique in organizing its FMTs forward in the troop and combat trains. Combined-arms=battalion doctrine organizes its FMTs into the company and combat trains as well (Figure 1, right side).[10] The forward placement of all

	Option	Assets required	Advantage(s)	Disadvantage(s)
1a	Backup / reinforcing support from troop FMT M88s	M88s from troop FMT(s)	Reinforcing support resourced internally	-Hinders troop recovery -May reduce troop trains' freedom of maneuver
1b	Backup / reinforcing support from BSB's FMT M88s	M88s from BSB's FMC S&R section	Maintenance and recovery assets remain postured to fix forward	-Commits brigade's recovery reserves -May limit BSB's freedom of maneuver
2	Recover NMC vehicles to field trains / BSA for passback maintenance support	M88s from FSC or FMC S&R sections	BSB's or squadron's M88s are able to retain their standard recovery posture	-To fix combat platforms (M1s and M2s) in field trains, commanders must send FMT mechanics there, reducing forward-maintenance capacity
3	Create multiple MCPs	None	Retain freedom of maneuver if reinforcing support or passback maintenance are not feasible options	-Squadron's M88s are decisively engaged with recovery operations -Combat trains cannot displace in one movement -Additional nodes means additional personnel dedicated to security -Must sustain Soldiers and maintain vehicles at multiple MCPs

Table 2. Options for MCPs unable to displace in one movement.

the brigade's 91A and 91Ms means the only tank and BFV mechanics further back than the squadron or battalion combat trains are the M88 recovery-vehicle operators in the brigade-support battalion (BSB) FMC. In effect, the brigade does not have any field-maintenance capability for its combat platforms (M1 Abrams and M2/M3 BFVs) in its field trains or brigade-support area (BSA) unless leaders deliberately adjust their task-organization or placement of 91As and 91Ms.[11]

Balancing maintenance, recovery, freedom of maneuver

Leaders must balance their desire to conduct maintenance forward with the realization that the squadron's combat and troop trains can lose their freedom of maneuver – a fundamental of reconnaissance – if they are overwhelmed with NMC vehicles.[12] At the troop-level, doctrine states that "[i]f the field-maintenance team cannot repair the equipment quickly onsite, evacuate the component to the squadron's [MCP]."[13] Unfortunately the authors learned firsthand that the need to evacuate NMC equipment to the combat trains to retain troop freedom of maneuver can have the second-order effect of limiting the squadron combat trains' freedom of maneuver.

Cavalry troops have little choice but to evacuate NMC vehicles that require lengthy amounts of time to fix, so the squadron must develop options to retain its combat trains' freedom of maneuver. Ideally, the troops' FMTs in the combat trains are able to repair NMC combat platforms recovered there relatively quickly. Alternatively, the combat trains can hold NMC vehicles until additional part(s) arrive from the brigade's supply-support activity, still allowing the FMTs to repair the vehicles in the combat trains.

In either case, the HHT commander must prepare to displace the combat trains, including any NMC vehicles. Given the fact that there are two M88s in the combat trains, this starts to become problematic if there are more than two NMC combat platforms there. Given the combat trains' disposition, two NMC combat platforms is the threshold at which the combat trains can still "displace in one movement."[14] Once the combat trains exceeds two NMC combat platforms, the squadron is forced to look for other options to retain its freedom of maneuver.

Once the combat trains are no longer able to displace in one movement using its organic S&R M88s, the squadron has three options to retain its freedom of maneuver (Table 2). First, leaders can provide reinforcing support by consolidating the troops' FMT M88s in the squadron combat trains or by requesting reinforcing M88s from the BSB's FMC S&R section. Second, the commander can evacuate NMC platforms with its S&R M88s to the squadron field trains, typically located in the BSA, or request assistance from the BSB's FMC S&R section to accomplish the same task.

Finally, the commander can create additional MCPs and bound NMC equipment from one MCP to subsequent MCPs on the battlefield. Each of these courses of action has advantages and disadvantages (Table 2), and some require assets that may or may not be available depending on the current mission variables.

The first option to displace the MCP and combat trains with more than two NMC combat platforms is to gain reinforcing support by consolidating the squadron's M88s or by requesting M88 support from the BSB.[15] If the squadron orders its FMTs to provide reinforcing support to the FSC's S&R section, this solves the immediate problem of the combat trains' mobility, but it hinders the troops' ability to conduct its own recovery operations and may limit the troop trains' of freedom of maneuver.

This may be a good solution if M88 support is only needed for a short period of time or if the troops can go without their M88s for a specified period of time (for example, during more stationary security operations) because the commander can solve the problem without requesting assistance from another headquarters. However, it runs counter to the doctrinal concept of keeping maintenance assets "as far forward as the tactical situation permits to return inoperable and damaged equipment to the battle as quickly as possible."[16]

To retain the squadron's ability to conduct maintenance and recovery operations forward, the squadron can request reinforcing support from the brigade's BSB. Unfortunately, the FMC has limited reinforcing capacity for recovery support, and there may not be enough M88s available in the BSB's FMC – depending on the brigade's operational readiness (OR).[17] Some commanders may commit the FMC's M88s early to reinforce battalions or the squadron if they have one or more NMC M88s.

Also, the BSB may need to retain these M88s to move NMC vehicles in the BSA. Reinforcing recovery support is the preferred option to retain the combat trains' freedom of maneuver in most cases, but this option may become difficult depending on the brigade's OR rate.

Another option is to recover NMC combat platforms back to the squadron's field trains in the BSA. R&S doctrine implores planners to specify when this is necessary – without citing specific examples – but maintenance doctrine reminds us that this option requires moving more maintenance assets and personnel to the field trains to enable maintenance operations there.[18]

According to current modified tables of organization and equipment, the brigade only has four tank and BFV mechanics in the BSA, but these maintainers are dedicated to the FMC's M88s for recovery operations, not maintenance operations. This disposition differs from historical maintenance concepts of support that included maintenance pass-back support.[19] This does not mean that the squadron cannot conduct maintenance activities on its combat platforms in the field trains, but commanders must either send maintainers back to the field trains with their NMC vehicles or task-organize 91A or 91Ms to the FSC's FMS.[20]

In some cases, a combat platform may be damaged to such an extent that it requires evacuation for sustainment maintenance. If this is true, the lack of

tank and BFV mechanics in the BSA is not an issue. Doctrinally, the BSB's FMC "serves as the central entry and exit point for all equipment requiring evacuation for sustainment maintenance."[21]

The decision to evacuate NMC combat platforms back to the squadron field trains retains the troops' and combat trains' freedom of maneuver, and it enables the brigade to maintain its standard recovery stance. However, it may come at the cost of forward-maintenance activities. In the best-case scenario, if commanders can afford to reallocate maintainers to the field trains, this option may slow the return of combat platforms to the troops. In the worst-case scenario, the field trains collect excess NMC vehicles, which jeopardizes the field trains and BSA's freedom of maneuver.

Either way, the decision to recover vehicles back to the squadron's field trains in the BSA must be a deliberate one that includes ensuring M1 Abrams and M2/M3 BFV mechanics and tools are available to fix these platforms.

The third option is for the squadron to temporarily create more than one MCP. As briefly touched upon in the opening vignette, the authors found themselves in this situation during NTC 20-01, and although it was less than ideal, they were able to negotiate the challenges by leveraging the HHT commander's leadership. If the combat trains were unable to move all the NMC vehicles in the MCP, the S-4 could move the CTCP and the bulk of the combat trains, and establish a new MCP closer to the FLOT, while the HHT commander, with recovery support, assumed the task of recovering the NMC vehicles from the existing MCP to the new MCP in multiple movements (Figure 3).

Rather than being constrained by its rear-most, immobile pieces of equipment, multiple MCPs enabled the squadron to continue sustainment operations and maintain its "mobility so that it may support the [R&S] mission at extended ranges" by creating another MCP closer to the FLOT.[22] This places the S-4 and the CTCP closer to the troop trains so that he or she can maintain communication and sustainment reporting with the troops.

Also, this allows the portion of the troops' FMTs in the combat trains and their maintenance capabilities (lift, shop and bench stock, etc.) to remain closer to the troop trains, supporting their maintenance requirements. By creating another MCP, the squadron can continue its logistics planning and position its alternate CP (i.e. the CTCP) closer to the main CP, and enable the squadron's freedom of maneuver through close access to emergency ammunition and fuel while simultaneously recovering vehicles from the previous MCP(s).

Multiple MCPs

Having multiple MCPs has its advantages, but it creates more challenges and support requirements as well. Having multiple MCPs enables the combat trains' freedom of maneuver by restoring its mobility, but it often necessitates more than one movement to displace. If attacked, leaders may have to temporarily abandon some immobile equipment during survivability moves. Also, multiple MCPs will decisively engage the squadron's recovery assets until all NMC vehicles are consolidated in the new MCP. Finally, each additional MCP is another location that must be secured and sustained, requiring additional maintenance personnel to conduct security operation and additional time for logistics-resupply operations.

While more MCPs enable the squadron to continue operations, they hinder the squadron's ability to rapidly displace and regenerate combat power. As the squadron's lines of communication (LoCs) get longer, M88s and like vehicles for recovery move further from the older MCP(s) and make it more difficult to recover vehicles from there.

Also, leaders prioritize recovering vehicles that have parts on hand, leaving those with long-lead-time parts at MCPs further back. At that point, the squadron inherits another logistical problem: resupplying multiple MCP(s). The HHT commander and first sergeant must assume the responsibility for resupplying the MCP(s), and this creates more demands on their already busy timelines. Until the squadron transitions to more stationary operations, regenerating its lost combat power becomes more and more difficult as its LoCs get longer.

Despite these disadvantages, the squadron may be required to create

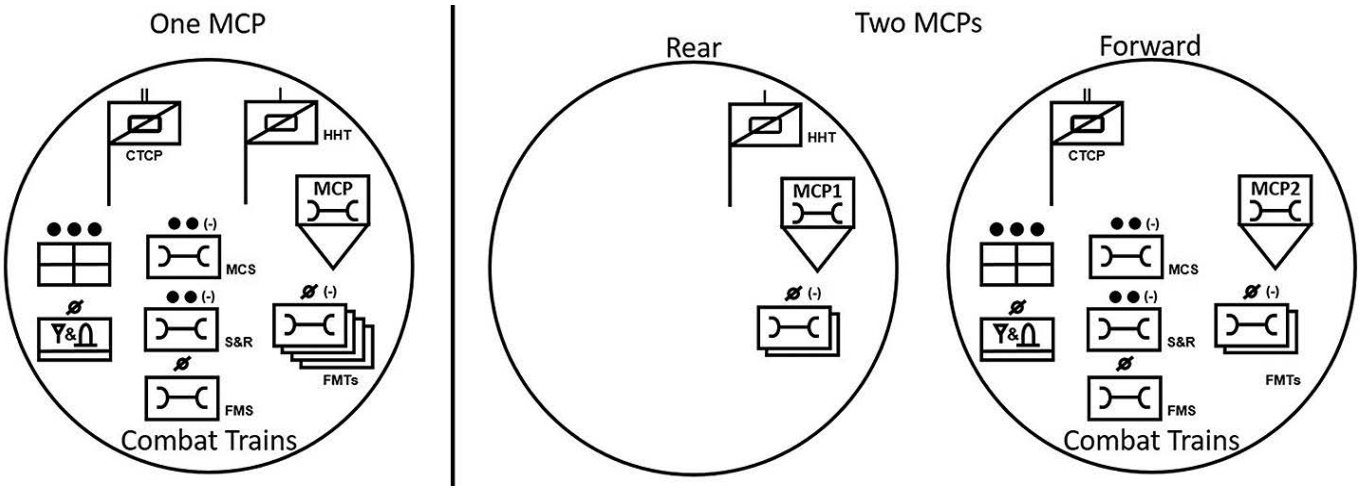


Figure 3. Proposed composition of combat trains with two MCPs.

Maintenance node		Location	Recovery assets	
Troop trains	A Troop	AB 12345678	D831 (M88)	
	B Troop	AB 12545878	D841 (M88)	
	C Troop	AB 12746078		
	D Troop	AB 11045878	D861 (M88)	
Combat trains		AB 10545278	D818, D819, D851 (M88s), D813 (M984)	
Field trains		AB 05046278	D814 (M984)	
NMC vehicle tracker				
Vehicle	Fault	Location	Vehicle	Fault
A12	Prop shaft	Troop trains	HHT96R	Transmission
B21	DVDB	Troop trains	HQ20	Class III leak
C15	Thrown track	AB 12446078		
C26	TDA motor	Combat trains		
D31	Class III leak	AB 11045878		

Table 3. Maintenance running estimates tracker with example data.

multiple MCPs if reinforcing support is not available and the brigade or squadron does not wish to execute pass-back maintenance to the field trains or BSA.

Regardless of the option selected to retain the trains' freedom of maneuver, leaders must establish maintenance time limits and evacuation timelines, and specify conditions for recovery operations to determine when evacuation to the different trains is advantageous.[23] At a minimum, leaders should establish these conditions within their operations orders, but ideally, they establish and train these conditions as part of their tactical SOPs.

Comparing current doctrine, ATP 3-20.97, ***Cavalry Troop***, mentions the idea of time guidelines to enable repair or recovery decisions. ATP 4-33, ***Maintenance Operations***, discusses some of the things that commanders should consider when developing maintenance time limits. ATP 3-20.5, ***Combined-Arms Battalion***, references specific examples of evacuation timelines, and ATP 3-20.96, ***Cavalry Squadron***, mentions that leaders must determine triggers in coordination with supporting elements across the brigade for when evacuating equipment to the trains is advantageous.[24]

ATP 3-20.5 suggests a standard whereby "repairs requiring up to two hours are conducted at company trains; two- to six-hour repairs at the combined-arms battalion MCP; and any repairs requiring greater than six hours go to the field trains."[25] Leaders must remember that the option to recover vehicles to the field trains must consider whether the brigade, BSB and squadron commanders' plans – specifically, the disposition of the brigade's tank and BFV mechanics – support executing maintenance in the field trains and BSA.

Maintenance running estimates

To enable the squadron and troop commanders to make maintenance and recovery decisions, the squadron must include maintenance running estimates as part of its COP. Maintenance running estimates enable commanders to determine where to conduct maintenance, when to recover vehicles to a different maintenance node (i.e. troop trains, combat trains, MCP and field trains), when to adjust the standard maintenance time limits, and how to retain the trains' freedom of maneuver.

To enable these decisions, the staff must develop maintenance-related friendly force information requirements (FFIR) and continuously update the squadron's running estimates using these FFIR, or risk unnecessary maintenance delays or the squandering of future combat power. Three keys to enable the establishment of the squadron's maintenance COP are FFIR and reporting and tracking systems. Leaders across the squadron must report timely and accurate maintenance information to update the squadron's COP.

The first step to establish maintenance running estimates is determining what information must be reported to enable the commander to make maintenance and recovery decisions. The 1-1 Cav's experience during NTC 20-01 highlighted the need-to-know of four critical FFIR:

- Location and fault(s) of all NMC equipment;
- Part availability for NMC equipment;
- The location and capabilities of each maintenance node; and
- Current recovery capabilities at each node.

The list of NMC equipment at the MCP(s) was particularly important for commanders to continue to account for equipment and plan for the

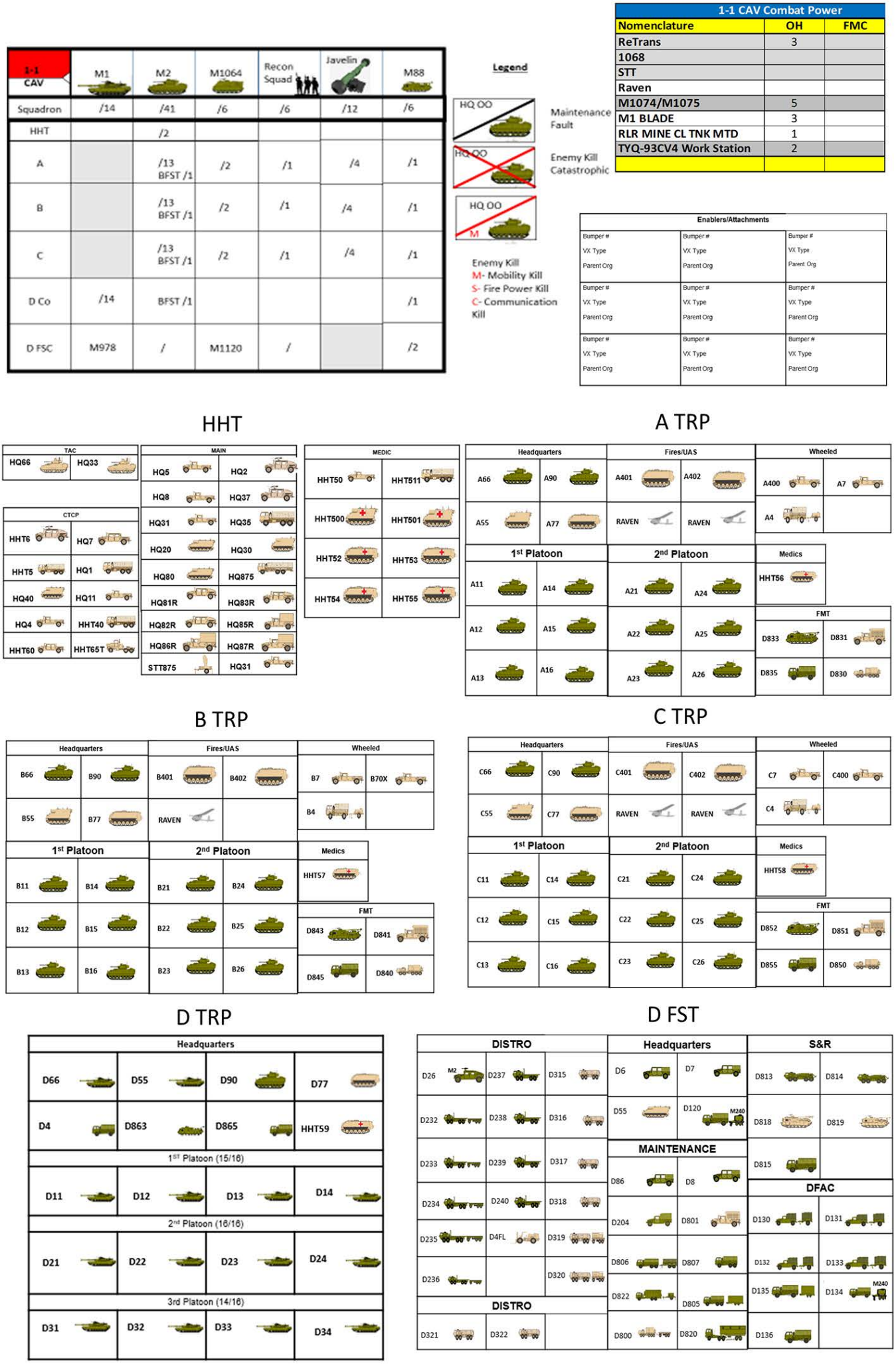


Figure 4. 1st Squadron, 1st Cavalry Regiment, combat-power tracker. *(Graphic by CPT Max Banerjee)*

displacement of the squadron's combat trains. Collectively these maintenance running estimates (Table 3), combined with the squadron combat power tracker (Figure 4), enabled commanders to decide where to conduct maintenance, when to recover NMC vehicles to a different maintenance node and how to prepare for future operations.

Maintenance running estimate trackers must be updated from a combination of routine situation reports, battle-update briefs (BUBs) and periodic maintenance updates from the squadron's trains. Troops' routine situation reports should include information on NMC vehicles – whether they were combat losses or maintenance faults – and the locations of troop and combat trains. BUBs provide another venue for confirming and refining running estimates, including planned movements of the squadron trains during the next 24-48 hours and maintenance updates from the troops.

Finally, periodic maintenance updates from the squadron's combat and field trains provide critical updates on NMC vehicle locations and maintenance status. Updates from the combat trains are especially important, as maintenance activities there are taking place under the supervision of the HHT commander and away from the line-troop commanders. While the squadron executive officer, maintenance officer and field-maintenance technician are responsible for leading the field-maintenance effort itself, the HHT commander must plan, recommend and supervise the combat trains in the context of its sustainment, mobility and tactical emplacement within the squadron's larger operations.

This includes potentially splitting the combat trains if conditions require that. This is a significant increase in the HHT commander's maintenance responsibilities as compared to garrison – where HHT does not even have a field-maintenance team of its own – and the squadron executive officer and HHT commander must synchronize plans and priorities daily to ensure unity of effort.

Conclusion

Maintenance operations are demanding enough in garrison, but they face increased challenges during tactical operations. Inevitable drops in the squadron's OR rate often create competing maintenance and recovery demands that can challenge the MCP(s) and trains' freedom of maneuver. The squadron has three options to overcome these challenges: request reinforcing M88 support; initiate passback maintenance; or create more MCPs. These three options for retaining the combat trains' freedom of maneuver have advantages and disadvantages, and leaders must understand the entire maintenance system from the troop to the brigade level to enable optimal maintenance and recovery decisions.

To sustain continued combat operations, squadron leaders must have a shared understanding of how to balance the potentially competing demands of maintenance and recovery, and the trains' freedom of maneuver. All commanders must contribute to these efforts by reporting accurate FFIR that update maintenance running estimates and establish a COP to enable decision-making.

Finally, the HHT commander must have an intimate knowledge of the brigade's maintenance and recovery system to lead the combat trains and enable combat power regeneration. Regenerating and maintaining combat power are not easy tasks during continuous operations, but leaders must learn and apply lessons like those mentioned here to ensure successful R&S during large-scale combat.

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Notes

[1] ATP 3-20.96, ***Cavalry Squadron***, Washington, DC: Government Printing Office, 2016.

[2] Field Manual (FM) 3-98, ***Reconnaissance and Security Operations***, Washington, DC: Government Printing Office, 2015.

[3] ATP 3-20.96.

[4] ATP 4-33, ***Maintenance Operations***, Washington, DC: Government Printing Office, 2019.

[5] The MCS attaches one 92A to support logistics automations in the field trains. The S&R section attaches one M984 to support recovery operations from the field trains. The FMS is primarily located in the field trains, but it attaches 91Bs and 91Hs to the combat trains to enable wheeled vehicle and light track maintenance there as necessary.

[6] It is advantageous to echelon the squadron's S-1 and S-4 leadership across the battlefield as well. We recommend splitting the S-1 section between the combat and field trains, and the S-4 section between the squadron main CP and the combat trains.

[7] Placing the HHT commander in charge of the combat trains is not unusual. See Paul M. Guzman, Anthony R. Davila and Marc A. DeLuca, "The Combat-Trains Command Post in the Stryker Brigade Combat Team's Cavalry Squadron," ***ARMOR***, January-March 2016; and Kyle S. Marcum and Andrew J. Prunty, "Fighting the Combat-Trains Command Post in a Decisive-Action Training Environment," ***ARMOR***, January-March 2016.

[8] ATP 4-33.

[9] NTC Ops Group, "Combined-Arms Battalion Maintenance," ***The Company Leader***; accessed May 9, 2020, http://companyleader.themilitaryleader.com/2020/05/09/combined-arms-battalion-maintenance/.

[10] ATP 3-90.5, ***Combined Arms Battalion***, Washington, DC: Government Printing Office, 2016.

[11] ATP 4-33.

[12] FM 3-98.

[13] ATP 3-20.97, ***Cavalry Troop***, Washington, DC: Government Printing Office, 2016.

[14] ATP 3-20.96.

[15] Reinforcing support is mentioned in modern maintenance doctrine, and it is specifically referenced in modern support relationship doctrine, but it is no longer deliberately described as a maintenance support method like it was prior to Army modularization. See ATP 4-33 for modern mentions of reinforcing maintenance support; FM 6-0, ***Commander and Staff Organization and Operations***, Washington, DC: Government Printing Office, 2014, for modern support relationships doctrine; and FM 4-30.3, ***Maintenance Operations and Procedures,*** Washington, DC: Government Printing Office, 2004, for a description of the historical "backup / reinforcing support method."

[16] ATP 4-33.

[17] Ibid.

[18] ATP 3-20.96; ATP 4-33.

[19] FM 4-30.3, ***Maintenance Operations and Procedures***.

[20] Garrick L. Cramer and Jeffrey P. Kelley, "Passback Maintenance in a Decisive-Action Operation," www.army.mil, May 29, 2018, https://www.army.mil/article/204474/pass_back_maintenance_in_a_decisive_action_operation; accessed May 3, 2020.

[21] ATP 4-33.

[22] FM 3-98.

[23] ATP 3-20.96.

[24] ATP 3-20.97 and ATP 4-33.

[25] ATP 3-90.5.

Acronym Quick-Scan

ABCT – armored brigade combat team
ATP – Army technical publication
BFV – Bradley Fighting Vehicle
BSA – brigade-support area
BSB – brigade-support battalion
BUB – battle-update brief
COP – common operational picture
CP – command post
CTCP – combat-trains command post
FFIR – friendly force information requirements
FLOT – forward-line-of-own-troops
FM – field manual
FMC – forward-maintenance company
FMS – field-maintenance section
FMT – field-maintenance team
FRS – forward repair system
FMS – field maintenance section
FSC – forward-support company
HHT – headquarters and headquarters troop
LoC – lines of communication
MCCC – Maneuver Captain's Career Course
MCP – maintenance collection point
MCS – maintenance-control section
NMC – non-mission capable
NTC – National Training Center
OR – operational readiness
R&S – reconnaissance and security
SAS – squadron aid station
SOP – standard operating procedure
S&R – service and recovery

Zone Reconnaissance – Why Don't We Do It?

by MAJ Jeffrey W. Jennings

April 1, 2020: *You're a cavalry-troop commander deployed to the National Training Center (NTC), Fort Irwin, CA. Two enemy boyevaya razvedyvatelnaya dozornaya mashina (BRDMs), or Russian-made scout vehicles, have just destroyed your entire troop.*

You received a fragmentary order (FRAGO) at 10 a.m. to execute zone reconnaissance west to provide freedom of maneuver for the brigade, expand the security area and establish a screen in the vicinity of Brown Pass (Phase Line (PL) Panther). At noon, you issued your own FRAGO to your platoon leaders, walked through a quick map rehearsal, and then you closed your eyes to sleep for the first time in two days.

You woke from your nap at 4 p.m. to participate in a commander's update brief, in which squadron ordered you to your line of departure (LD) at 6 p.m. and to make your reconnaissance pace rapid: "You need to move fast and establish your screen at PL Panther no later than 10 p.m. to avoid desynchronizing the brigade."

At 6 p.m., your troop executed LD and began its zone-reconnaissance mission, departing Columbia Wash and moving (in column) generally northwest toward Main Supply Route (MSR) Ia Drang. A little while later, as the sun set behind the Sawtooth, your night-vision goggles washed out, and you ducked down in your hatch to check your Joint Capabilities Release (JCR). You saw your troop's icons traveling west in close-column on MSR Ia Drang. You thought you should deploy – after all, the terrain to your south looked trafficable for your troop's vehicle platform.

W*here exactly was your troop boundary to the south, again?*

On your JCR, you could see there was not much dispersion between 1st and 2nd platoons. The phrase *"ducks in a row"* flashed across your mind.

Where exactly was your probable line of contact, again?

Figure 1. A "Donovian BRDM" engages friendly-force vehicles with its Hot-3 anti-tank guided-missile weapon system at NTC. *(U.S. Army photo by PVT Austin Anyzeski)*

Just as you finished that thought, your gunner began to read to you a *flash, immediate, priority, routine* message from squadron that ordered you to increase your rate of march. The combined-arms battalion you were supporting needed you to hurry up so they could LD on time. You radioed 1st Platoon and told them to pick up the pace.

Then, as your vehicle (tucked safely between your 1st and 2nd platoons, still traveling in column) passed the Pizza Hut on MSR Ia Drang, Red One burst onto the troop net.

"*Contact! Tanks!* (but they weren't tanks …) *North! 1,000 meters! Out!"*

Five minutes ago, your troop's last surviving vehicle was destroyed. You reported with your dying breath to squadron, and you now sit in your vehicle staring at your map – studying a place called The Race Track. You scratch your head. What just happened?

Common scenario

Scenarios like this are commonplace among cavalry troops at NTC. All too often, the enemy engages and destroys the cavalry troop as it travels down an MSR in a convoy or, slightly better, traveling while "deployed" in a very tight wedge or line with very little dispersion between vehicles. However, this painful learning experience can be avoided before your unit departs home station. This is a fight you can win before LD. Here's how.

Understand the scout mission profile and the missions you will execute. Was the unit described in the opening narrative really executing zone reconnaissance?

Zone reconnaissance is the most common mission assigned to cavalry troops at NTC, yet it is almost never executed to standard. The troop commander, in conjunction with the

squadron commander, determines the priority of tasks that best answer priority information requirements (PIRs) and then focuses the troop's collection efforts against these requirements. In other words, they establish ***reconnaissance objectives***. According to Army Techniques Publication (ATP) 3-20.97, tasks associated with zone reconnaissance include:

- Find and report all enemy forces within the zone;
- Determine the trafficability of all terrain in the zone;
- Inspect and classify all bridges in the zone;
- Locate and report all mines, obstacles and barriers in the zone; and
- Locate bypasses around built-up areas, obstacles, etc.

These tasks are completed to answer PIR in named areas of interest (NAIs) and target areas of interest, or to identify and mitigate an enemy system on your high-payoff target list.

Did the unit described earlier accomplish any of those things? Did they even attempt to? Perhaps the unit in the opening narrative was unintentionally executing something more akin to a movement-to-contact. A movement-to-contact is a mission executed by armor and infantry formations to develop the situation and to establish or regain enemy contact when the tactical situation is not clear. It's also used when the enemy has broken contact. A movement-to-contact, by design, may result in a meeting engagement or a transition into a deliberate attack. It usually does not adhere to the principle of making contact with the smallest element. The goal, once in contact, is to maneuver quickly to overcome enemy forces before they can react.

A movement-to-contact is ***not*** a doctrinal reconnaissance task; it does not adhere to the fundamentals of reconnaissance.

Often cavalry troops at NTC simply maneuver in a specific direction (toward a limit of advance) focused almost entirely on making enemy contact. Once contact is made, cavalry troops usually attempt to maneuver against the threat (becoming decisively engaged) and are often destroyed in the process. This occurrence constitutes zone-reconnaissance failure, is more similar to a movement-to-contact and does not achieve the squadron's requirement to collect and provide information to the customer unit.

To successfully conduct zone reconnaissance, troop commanders must develop a concept of operation (and a detailed scheme of maneuver) that clearly incorporates and delineates reconnaissance and security (R&S) guidance (focus, tempo, engagement criteria, disengagement criteria and displacement criteria) as described in Field Manual 3-98, ***Reconnaissance and Security Operations***, Page 4-8, Paragraph 4-38. Commanders must consider the supported commander's PIR and the last time information is of value, and then shape maneuver accordingly. Commanders must integrate reconnaissance methods such as dismounted, mounted, aerial and reconnaissance by fire in conjunction with deployment methods and movement techniques that support the desired tempo of operations.

Commanders must clearly understand (and coordinate with adjacent units) boundaries identifying the troop's and platoon's area of operations to ensure effective reconnaissance. Commanders must also ensure that subordinate leaders (at the team, section and platoon level) understand the indicators that will allow them to answer PIRs in a timely fashion. Commanders must fully understand and incorporate higher headquarters' reconnaissance objectives and R&S guidance, and must engage in commander-to-commander dialogue to confirm that understanding. Commanders must leverage the squadron S-2's intelligence preparation of the battlefield (IPB) to assist with mission analysis. ***These*** are the elements that constitute effective zone reconnaissance (ATP 3-20.97).

Leaders must understand their formation's doctrinal missions. Build checklists into your standing operating procedure (SOP) to ensure you accomplish the tasks necessary for each mission. Plan your scheme of maneuver accordingly.

To execute effective zone

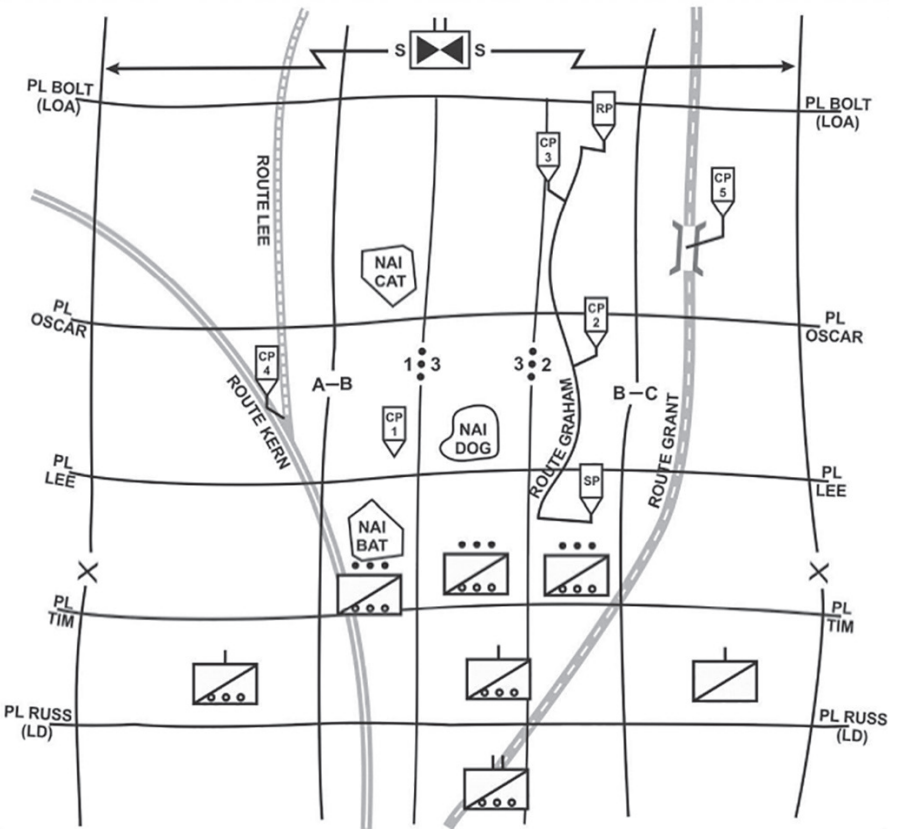

Figure 2. Cavalry-troop zone reconnaissance. *(From Figure 3-1, ATP 3-20.97)*

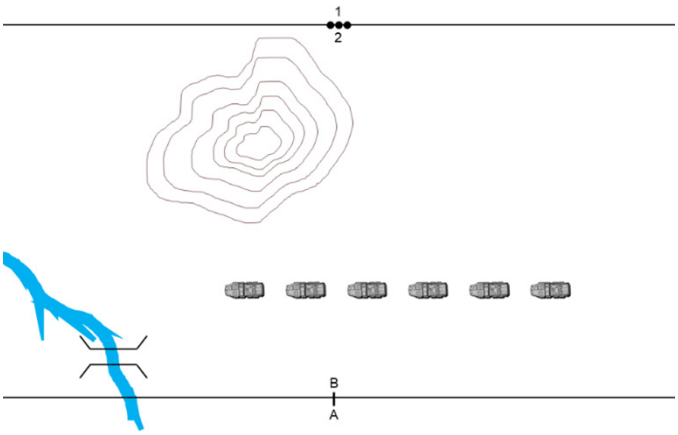

Figure 3. A scout platoon traveling in column with 20 meters of dispersion between vehicles cannot effectively execute zone reconnaissance and is vulnerable to enemy direct- or indirect-fire engagement.

reconnaissance, you must first understand what it requires.

Execute proper maneuver, dispersion

Was the unit in the opening narrative using the correct formations, movement techniques and operating distances (dispersion) for effective zone reconnaissance?

No. The troop in the opening narrative was traveling in close columns while tasked to execute zone reconnaissance (a common occurrence at NTC). In doing so, the troop simultaneously failed to operate at proper dispersion distances, to use the appropriate formation(s) and to employ the correct movement technique(s). These failures not only reduce the troop's ability to execute its zone-reconnaissance mission but also provide the enemy with easy direct-fire engagement opportunities.

To effectively perform zone reconnaissance, cavalry troops must operate at their maximum achievable dispersement. They must also transition between movement techniques and formations as appropriate, based on probable lines of enemy contact (by weapon system / capability) and the commander's reconnaissance guidance (tempo and focus).

Properly dispersed, a Stryker brigade combat team's scout platoon, for example, can achieve a "frontage" of up to four kilometers. This is calculated (and adjusted) based on enemy-fires capability, friendly-fires coverage, mutual direct-fire support between vehicles, unit boundaries, terrain and other mission considerations. References for developing operating distances specific to particular missions is at Appendix B of ATP 3-20.97, ***Cavalry Troop***.

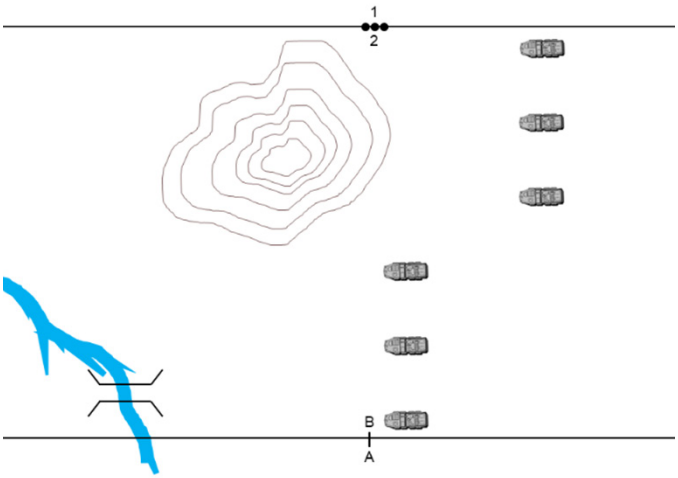

Figure 4. A scout platoon bounding by section with 1,000 feet between vehicles can effectively reconnoiter a zone and is less vulnerable to enemy direct- or indirect-fire engagement.

In the opening narrative, the troop commander wondered "where is my probable line of contact?" Knowing where the enemy will likely begin to engage you, and with what weapon system, is essential to transitioning between movement techniques. Therefore, commanders must conduct IPB (and leverage the squadron S-2 to assist) to determine the probable line of contact to determine the probable line of deployment.

If enemy contact is unlikely, traveling may be appropriate. When enemy contact becomes likely, scout troops/platoons must transition to bounding overwatch. When squadron wants a quicker pace/speed, the cavalry troop must adjust its movement technique rather than its formation. In any case, one truth remains constant: regardless of the likelihood of enemy contact, a scout formation traveling in a column cannot properly execute zone reconnaissance.

Tactics, techniques and procedures (TTP): At NTC during reception, staging, onward-movement and integration week, platoons and troops can execute drivers' training/terrain familiarization, incorporating movement techniques and formations. This sort of training should also be executed as a part of all training at home station.

Prepare, rehearse, build playbook now

It's Training Day 5 in your NTC rotation; you've been awake for close to 40 hours. You've just received a FRAGO to execute a zone reconnaissance. Would you rather …

- *Put on your thinking cap, pull out a sketchpad and develop your plan from scratch; or*
- *Refer to the "playbook" (SOP) your team developed together, discussed, implemented and trained at home station?*

Have you ever watched a National Football League game in which the coach and quarterback huddled on the sideline to design every play from scratch immediately before they executed it? Unlikely. Develop your "playbook" ***now*** when you are rested, have time, can plan collaboratively and can practice (rehearse) your plays (SOPs). Figuratively, know that in a given situation you are going to execute "56 Trap Right" or "88 Y-Option Wheel."

TTP: Using maps and micromachines on a conference room table, your team can collaboratively design what zone reconnaissance (and other

missions) looks like in garrison. You can establish which platoon/section is responsible for which tasks, and you can make those enduring assignments. You can rehearse (have the executive officer play the enemy) those "plays" to work out points of friction early. Then, once you're executing in the field, you simply adjust your "play" (SOP) for terrain and enemy, adapt and execute. It is much quicker than designing your play on the spot when time counts and you're in contact.

Endeavor to reach a point of shared competency so well developed that when you tell your team, "We're executing zone reconnaissance to establish a screen at PL Panther" at NTC, everyone knows exactly what that means and the part he/she will play in it. Battle drills are only well rehearsed and effective once the whole team understands and incorporates the associated pre-combat checks and pre-combat inspections associated with each R&S mission in your unit's profile. That's why these items must be codified into SOP checklists. Well-rehearsed and fluidly executed battle drills enable your unit to achieve the quick pace and effectiveness higher headquarters demands.

Before departing home station, strive to achieve a level of core mission-essential task-list proficiency so high that everyone in your formation could do zone reconnaissance in his/her sleep. This will require you to be creative with your training opportunities – you don't need to be in the field to practice zone reconnaissance. You can do it on a map (of NTC, preferably) with miniature vehicles. You can do it during physical training. You can do it during brownbag lunches with your team. Wargame and rehearse now.

Refer to Chapter 5 (specifically Page 5-22) of ATP 3-20.97 for a zone-reconnaissance vignette (which includes a full operations order and graphics) that you can use for planning and rehearsing. If you prepare now, you'll simply be executing well-rehearsed battle drills at NTC. Simply put, if you wait until Training Day 4 to sketch what you think your (insert mission here) will look like, you may find yourself in the same position as the troop commander in our introductory narrative.

Conclusion

If you are a cavalry-troop commander or platoon leader, you can rest assured that most of your missions at NTC will brief a lot like this: "Comanche Troop executes zone reconnaissance of Area of Operations Carolina, clears Objective Falcon and establishes a screen at PL Panther no later than [time/date group] to provide freedom of maneuver and early warning to the brigade. …" Units (leaders) that execute zone reconnaissance (and other missions) to standard come prepared.

- They develop, rehearse and execute SOPs at home station (they come with a playbook).
- They know, understand and use proper dispersion, movement techniques and formations.
- They know, understand and abide by their commander's reconnaissance guidance.
- They follow the zone-reconnaissance task list and understand the priority of tasks.
- They reconnoiter.
- They develop and refine NAIs to answer PIRs.
- They use smoke and suppressive fires to facilitate maneuver (both mortars and field artillery).
- They fly their Raven.
- They use their enablers and attachments.
- They report accurately and with timeliness, based on observation of NAIs to answer brigade PIRs.
- They expand the general themes of this article beyond zone reconnaissance and practice the same TTPs when executing security missions as well.

In short, units that are successful at NTC do all these things routinely. They adhere to R&S fundamentals. Units that do none of these things simply learn the hard way. Start now. Come prepared. The BRDMs in the vicinity of The Race Track are waiting for you.

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Acronym Quick-Scan

ATP – Army techniques publication
BRDM – *boyevaya razvedyvatelnaya dozornaya mashina* (Russian scout vehicle)
CP – checkpoint (Figure 2)
FRAGO – fragmentary order
IPB – intelligence preparation of the battlefield
JBLM – Joint Base Lewis-McChord
JCR – Joint Capabilities Release
LD – line of departure
LoA – limit of advance (Figure 2)
MSR – main supply route
NAI – named area of interest
NTC – National Training Center
PIR – priority information requirement
PL – phase line
R&S – reconnaissance and security
RP – release point (Figure 2)
S – screen (Figure 2)
SOP – standard operating procedures
SP – start point (Figure 2)
TTP – tactics, techniques and procedures

Reforge the Broken Saber:

Evolving the Infantry Brigade Combat Team's Cavalry Squadron to Win the Recon Fight

by SGT Christopher Broman

Part 2 of 2

In Part I we discussed squadron and troop organizational solutions. In this part we'll look at suggested technology, as well as more Soldier and vehicle solutions that support the organizational solutions proposed in Part I.

Squadron, platoon and squad UAS

"Aerial reconnaissance conducted by [unmanned aerial systems (UAS)] ... provides a flexible, low-risk means for gaining basic information in the least amount of time," according to Army Technical Publication (ATP) 3-20.98, ***Reconnaissance Platoon***.[1] The rise of UAS in both military and civilian applications has effectively demonstrated the accuracy of this.

Currently the only organic UAS available to the squadron are the Raven systems at troop level. For aerial information collection (IC), a UAS needs to be at every level from squad to squadron. These systems should be man-portable at the lowest level, scale up in size and capabilities at the next higher element, and have vertical take-off and landing (VTOL) capabilities.[2]

At squadron level, a RQ-7B Shadow should be the assigned UAS asset. With its nine hours' endurance from take-off to landing and a variety of intelligence, surveillance and reconnaissance (ISR) capabilities, it is the ideal system to help support the squadron.[3] In the infantry brigade combat team (IBCT) and armored BCT, the one Tactical Unmanned Air Vehicle (TUAV) platoon is at the brigade level, but the Stryker BCT squadron has one organically in its surveillance troop.[4] Instead of placing a full platoon, the Shadow also has an early-entry configuration of 15 Soldiers, one ground-control station, the air-vehicle-transport humvee and a launcher trailer, all of which are sling-loaded under a Chinook and can be placed in the headquarters and headquarters troop (HHT).[5]

While a simpler solution might be to simply create operational control of the brigade Shadow to the squadron, at any point the brigade commander can retask that asset, once again leaving the squadron without its own UAS.

At troop level, the platform used is the RQ-11 Raven. With its 60- to 90-minute flight time, "disposable" design (by not storing data onboard) and relative ease of use, it's a good system to be used from a stationary position like a tactical-operations center (TOC).[6] Unfortunately this does not translate well to a reconnaissance platoon that neither has the time to stop and set up the system or wait for the UAS to return so it can move.

Another issue is that with only two complete systems per troop, the commander is forced to split his UAS between named areas of interest (NAIs) and his maneuver elements. Instead, the platoons themselves should also have a UAS to assist in their missions, thus freeing up the Raven to focus solely on troop-level taskings.

While there are many different types of UAS available, the best for platoon operations is the quadcopter. Research has shown that quadcopters are the "most versatile and mechanically easy to construct autonomous

Figure 1. SGT Christopher Curley, an infantryman with small-UAS-operator duties assigned to 1-4 Infantry Regiment, Joint Multinational Readiness Center, Hohenfels, Germany, recovers a quadcopter through a second-story window during Combined Resolve X. Combined Resolve X included about 3,700 participants from 13 nations at 7th Army Training Command's Grafenwoehr and Hohenfels training areas. Combined Resolve X also tested the U.S. Army's regionally allocated combat brigades to Europe in a combat-training center rotation that had a Joint, multinational environment. *(U.S. Army photo by 1LT Matt Blubaugh, 145th Mobile Public Affairs Detachment)*

aerial vehicle."[7] This simplicity of construction has led to them being readily available in the commercial market and has seen their use by threat forces. During the Battle of Mosul, the Islamic State in Iraq and Syria flew more than 300 missions in one month, one-third of these being armed strike with off-the-shelf $650 quadcopters.[8]

Quadcopters are extremely easy to use, cheaper to replace and have an increased level of maneuverability over systems like the Raven. They are so agile that the Drone Racing League flies them over the seats and through the concourses of the Miami Dolphins stadium at speeds approaching 80 mph.[9] Quadcopters are also VTOL systems, so to launch one, operators just have to hold their hands outside their vehicles – unlike the Raven, which requires low wind conditions and being thrown, which can sometimes lead to a nearly 40-percent failed launch rate.[10] This means a scout platoon with a quadcopter can easily launch or recover this system on the move, be able to use it even in dense urban or forest environments, or even land the quadcopter to use the platform as a remote camera – all things the Raven could not attempt.

The use of quadcopters at the platoon level is already being done throughout the military. The Navy and Marine Corps Small Tactical Unmanned Aircraft Systems Office (PMA-263) ordered 800 quadcopters to include them organically in infantry squads.[11] At the Hohenfels Training Area, quadcopters with 1st Battalion, 4th Infantry Regiment, led to more fire missions than any other collection source.[12]

The Army should follow the Marines' procurement example and assign two systems to each scout platoon, one per section. With these systems, platoon leaders are given a flexibility and redundancy of sensors previously unavailable. UAS integration into the reconnaissance plan should become the rule, not the exception it currently is, leading to an increased effectiveness in regard to IC.

Improving counter-UAS

The increasing use of UAS on battlefields across the world has demonstrated not just their effectiveness but also the difficulty in effectively countering their use. In the ***Russian New Generation Warfare Handbook***, there is an example of Ukrainian units observing eight Russian UAS overflights per day, causing inhibited movement and instilling a fear of being spotted.[13] In 2014, near the Ukrainian village of Zelenopillya, Russian unmanned systems identified a halted Ukrainian column and inflicted heavy casualties through indirect fire.[14]

Currently the guidance given is that if small UAS (such as Ravens or quadcopters) are observed over a unit's position, it is presumed that position is already compromised and the unit must attempt to engage and destroy the UAS with any organic means possible.[15] The choice units currently face is to either stay still and hope they weren't seen or to open fire, trying to shoot down a small drone with no guarantee of success while giving away the unit's position. With larger systems, the size of the Shadow or Predator, the squadron currently has no organic means of countering these threats.

By adding electronic warfare (EW) to the squadron organization, the possibility of jamming enemy UAS becomes available. This technique has been proven in Syria by the Russians, who have been able to jam the Global Positioning System (GPS) components of U.S. drones.[16] The EW vehicles can be used to create an interference "bubble" to help prevent observation by threat systems. For larger systems that fly well above the range of small-arms fire, this would be a potentially effective counter.

At the scout-platoon level, simply shooting at the drone is not the most effective way of removing the threat. Instead, new anti-drone rounds or systems need to be implemented. One example is the IXI Dronekiller currently being tested by the Army and Marines. Weighing 7.5 pounds, possessing a range of one kilometer and a total training time of a couple of minutes, this weapon can scramble the GPS signal of smaller drones, forcing them to either land or go back to their controller.

A newer version the size of a M203 grenade launcher, with the ability to be mounted under the weapon, is also being developed.[17] Another possible answer is a 40mm-grenade round that launches a small net to entangle drones. Developed by a team of researchers at the Armament Research, Development and Engineering Center at Picatinny Arsenal, NJ, testing showed the round outperforms other net-centric tactics like dragging a net from another drone.[18]

Figure 2. SGT Nicolas Kotchenreuther, a Stinger team leader, rehearses firing Stinger missiles with SPC Cody Perez. Both Soldiers are assigned to 4th Squadron, 2nd Cavalry Regiment. *(U.S. Army photo)*

With Mk-19 and M320 systems readily available in the scout platoons, this could be a more readily available and cheaper option available for units to use to down enemy UAS.

For larger systems such as the Russian Dozor-100 or Forpost systems, which can reach altitudes of 4,200 to 6,300 meters,[19] scout platoons should have one to two Soldiers trained on how to use the FIM-92 Stinger. This would not only help defeat larger UAS systems but also give line units a desperately needed counter-close-air-support (CAS) ability. Already the Army Chief of Staff has made a priority an initiative to get Europe equipped with short-range air defense (SHORAD) Stinger teams to provide air defense to maneuver units.[20] The Stinger system could replace one of the four Javelin systems in the scout platoon.

Improved C2 vehicles

The current TOC system of two interconnected Deployable Rapid-Assembly Shelters (DRASH) is ineffective and inefficient. To establish the squadron command post (CP), two shelters must be put up in an area large enough to accommodate both, followed by generators hooked up, wires run, tables and computers set up, OE-254s erected and the satellite dish emplaced. All this takes time and makes it hard for the TOC to break down and "jump" quickly, especially if dealing with an indirect-fire situation. This set-up also creates a massive visual and electronics signature for enemy forces to detect and destroy.[21] Currently the operational force is seeking to standardize CPs that are austere, mobile, expeditionary and able to match mobility with the subordinate maneuver forces.[22]

The Army has already been testing these concepts. For the last six years, 2nd Brigade, 1st Armored Division, has been the Army Experimental Task Force for the Brigade Modernization Command and the Army's Capabilities and Integration Center.[23] Through testing, the brigade CP plan went from 11 Air-Beam tents off one large tent with three 40-foot wings – requiring a set-up and teardown time of between 10 and 20 hours – to four M1087 Expandable Vans, two M1079 2.5-ton vans, two Light Medium Tactical Vehicle-linked Sesolinc containers and one 20x32-foot tent.[24] This improved plan aligns with the Army's Command Post 2025 vision, which emphasizes integrated, scalable CP models over legacy systems that require hundreds of feet of cable, stacks of transit cases and multiple tents.[25]

Figure 3. Soldiers assigned to 2nd Armored Brigade Combat Team, 1st Armored Division, perform mission-command functions during the Army's Network Integration Evaluation 16.1 at Fort Bliss, TX. *(U.S. Army photo)*

Instead of the DRASH system, the squadron CP should use multiple M1087 expandable vans. The M1087 includes blackout lights, is maneuverable, is able to tow generators, can mount a turret ring and machinegun for defense, and is able to have a Quick-Erecting Antenna Mast (QEAM) installed. The 1-12th Infantry Regiment, 2nd BCT, 4th Infantry Division, tested this by installing a purpose-built table that housed all computer workstations, voice communications, associated supporting equipment with their cables and analog trackers.[26] This setup reduced the time from when the CP stopped to when it was operational, and likewise for teardown.

The squadron should take the preceding example of the M1087 and issue one each to the S-2, S-3 and S-4, and hold a fourth for other staff functions. Each truck would come with its own generator and turret ring with a crew-served weapon. With this set-up, the S-4 vehicle would serve as the combat-trains CP, and the other three vehicles can either be dispersed or put in a laager based on the tactical situation. With the addition of the four gun trucks to HHT, the machineguns mounted on the expendable vans and the two gun trucks currently assigned, the squadron command team and staff are now able to self-secure during movement.

The troop command also requires an improved command-and-control (C2) vehicle. For most troop TOCs, the vehicle used is a humvee truck with a shelter secured in the back. A QEAM is mounted on the side, plus other antennas are mounted for use while moving. While this vehicle works, the problem is that the full functions can only be used when the vehicle is stopped. While on the move, the troop command is responsible for all battle tracking, reporting and potentially updating products – all while logging everything into the daily staff log with no other support.

Another issue is that if someone has to be in the back with the radios, and if another Soldier is up front with the Joint Battle Command Platform (JBC-P), it is difficult for the two to communicate with each other. If the squadron requires an improved C2 vehicle to

Figure 4. Combined-arms battalion (CAB) mobile tactical CPs are M1068 tracked vehicles with integrated mission-command and radio capabilities, allowing commanders to "command from the hatch." *(U.S. Army photo)*

support the reconnaissance effort, this is doubly so for the troop command.

Instead of creating a vehicle from the ground up, a current version of the humvee family of vehicles could be modified to accomplish this goal. Examples include the front-line ambulance or the M1113 Expanded Capacity Vehicle. This new troop-command vehicle needs to allow someone to safely operate all the radios, update trackers and support the troop command while on the move. The new vehicle needs to have a QEAM mounted; multiple Single-Channel Ground and Airborne Radio System radios; a Harris radio system; One-System Video Remote Terminal (OSVRT) and JBC-P. The vehicle also needs to be able to tow a trailer with an Advanced Medium Mobile Power Systems generator installed inside. This would create a platform able to function in high-tempo operations without losing effectiveness.

If no other change happens, then at the very least the OSVRT needs to be installed in the vehicles of the TOC, platoon leaders, troop commanders, S-3, S-2 and squadron commander. As of now, per modified table of organization and equipment (MTOE), most of the squadron has no organic method to view the full-motion video of ISR platforms.[27] This system would allow the ability of drone feeds to be viewed at the platoon level while on the move. This laptop-like system has an adaptor kit so it can operate from almost every Army vehicle.[28] It was already tested in 2015 when a Stryker brigade used the OSVRT from the brigade to the company level during a National Training Center rotation.[29]

If adapted to view quadcopter unmanned aerial feeds, this would give the entire squadron leadership the ability to view feeds from all of its available UAS assets in real-time. This would reduce the delay of having to rely on others to describe what they are seeing to lower levels, but instead improve our overall situational awareness and ability to quickly react to developing situations.

Intel analyst at troop level

Operations in Afghanistan and Iraq highlighted an increased need of troop-level intelligence support. As stated in ATP 3-21.21, "The Army has identified that maneuver companies require an intelligence capability to support bottom-up intelligence refinement during long-term or extended operations."[30] This demand was filled with the use of company intelligence-support teams (CoISTs), but when most of the parent units returned home from deployment, the CoIST teams disappeared. This was because CoISTs were mainly composed of non-intel Soldiers, so when the deployment ended, they went back to their original duties.

Though the CoIST disappeared, the need did not. This needs to be changed with the permanent addition of an E-5 intelligence analyst at the troop level.

Figure 5. SPC Kevin Muirhead, a Soldier with the CoIST of 4th Battalion, 9th Infantry Regiment, Combined Task Force 4-2, in-processes a member of the local community during a medical civic-action program in Afghanistan in 2013. *(U.S. Army photo)*

This position would be responsible for many of the same responsibilities the traditional CoIST team had. These include collecting and analyzing patrol briefs, generating intel products for the commander, conducting intelligence preparation of the battlefield for troop operations, recommending priority information requirements and providing both situational awareness and situational understanding.[31]

An additional duty would include being in charge of the troop's UAS assets. The intel analyst would ensure all operators are meeting certification requirements, conduct training, ensure equipment is serviceable and report this to the squadron S-2 cell.

Since the squadron would traditionally be out in front of the brigade, there is a good chance subordinate units would capture enemy prisoners of war. The intel analyst would be responsible for collecting these prisoners, complete and maintain their packets, and track their current location and status. They would also be the first point of contact with any human-intelligence (HUMINT) assets working with the troop, enabling intelligence to be processed and analyzed more quickly than if they had to wait until returning to squadron. The troop commander could also attach the intel analyst to a forward unit to exploit any time-sensitive information and assist with material collection.[32]

This new position would be used as a developmental post for the S-2 section. New intel analysts would start at squadron, learning and improving their skills. Once they became promotable, they would pick up their sergeant in the troop intel slot. The troop commander then gains a trained intel Soldier with the knowledge of how to best prepare information for the squadron, and the new noncommissioned officer (NCO) gets experience operating in a high-tempo field environment. When the analyst returns to the S-2, he/she will have working knowledge of IC and processing at all levels of the squadron.

This new position would not require much in terms of equipment to become operational. The JBC-P already has Tactical Ground Reporting System access natively built into it, meaning it could potentially work from any vehicle in the troop. Personnel would also need access to an OSVRT system, but if these are added to the TOC and command vehicles, this would be easily accomplished. The only additional equipment would be a laptop to help create products and a radio on the operations-and-intelligence net to communicate directly with the S-2 cell or HUMINT.

Soldier, truck improvements

Currently cavalry Soldiers are equipped and expected to use the same equipment as any infantryman or truck driver. If the IBCT squadron is to be a specialized organization, completing a specialized task, it needs to be equipped as such. This means improving body armor; issuing suppressors, wrist-worn GPS and hearing protection with communication capabilities; and increasing the number of squad designated marksmen (SDM) rifles in the platoon. Trucks in line platoons would also have a swing-arm mount installed in the gunner's position with another automatic weapon mounted on it.

While body armor is extremely important and has saved countless lives during the Global War on Terrorism, it is essentially parasitic weight that does not contribute to the Soldier's effectiveness until it has to stop a lethal threat. Per a report commissioned by the Army Research Laboratory, "Increased Soldier load not only slows movement and increases fatigue but also has experimentally demonstrated to decrease situational awareness and shooting response times."[33] An example of the impact this increased weight has is that from 2004 to 2007, one-third of medical evacuations from the battlefield were due to spinal, connective tissue or musculoskeletal injuries – twice as many injuries as were sustained from combat.[34] Body armor is still very important for helping saving lives, but how it is used needs to be improved.

The newest system, the Modular Scalable Vest (MSV), aims to create a method for Soldiers to scale the level of protection based on the threat

Figure 6. SPC Hannah Carver-Frey, a chemical, biological, radiological, nuclear specialist with 10th Chemical Hazardous Response Company, participates in the final round of field testing for the MSV during a week-long series of evaluated tasks at Fort Carson, CO. *(U.S. Army photo)*

expected. The problem is that instead of allowing the troop commanders to delegate what to wear, most senior leaders will blanket-order that all pieces must be worn for Soldier safety. This "one size fits all" approach ignores the different mission requirements among the organization's subordinate units. While an infantry platoon conducting an assault on a defended position might require the additional six pieces of protective gear for the Improved Outer Tactical Vest (IOTV) or the new Blast Pelvic Protector for the MSV, a scout section sneaking into a listening post/observation post overwatching an NAI does not.

Also, this one-rule mentality goes against the Army Research Laboratory's recommendation, which stated that the service "should clearly delegate authority to company-level commanders to modify the level of protection as needed, based on the specific threat and mission."[35] This includes the possibility of leaving the body armor behind entirely if the mission requires it, such as a multi-day dismounted-reconnaissance patrol.

As with any new piece of equipment, fielding generally takes time; it's no different with the MSV. As units start replacing their old protective system, those not slated to receive them for a while (such as National Guard squadrons) should instead be temporarily issued the Soldier Plate Carrier System. First fielded in 2009, it weighs about nine pounds less than the IOTV.[36] Combined with the new Ballistic Combat Shirt, Soldiers with this system would have the same level of protection and maneuverability as troops with the new system.

In the same vein, Soldiers should be allowed to wear battle belts if they own them. These are already being issued as part of the new Load Distributing System developed by the Natick Soldier Research, Development and Engineering Center. Consisting of a load-bearing spine system and battle belt, and weighing only 1.5 pounds, the goal is to distribute weight to the waist to reduce injuries.[37] Until issued this system, Soldiers should be allowed to wear their own to get this same benefit.

Another improvement that needs to be implemented is in the area of hearing protection. The Defense Department's Hearing Center of Excellence wrote in an email that one in five Soldiers suffers from hearing loss, based on data from 2013.[38] This is backed by a Department of Veteran Affairs report that pinpointed tinnitus and hearing loss as the most common service-related disabilities among veterans, resulting in almost $1.1 billion paid out for hearing-related injuries in 2009.[39] While Soldiers are typically issued earplugs, few wear them while conducting operations. This is because they block out all noise, reducing the ability to hear commands and listen for both enemy and friendly troop movement.

Cavalry-squadron Soldiers instead need to be issued systems that combine both hearing protection and the ability to be integrated into existing radio equipment. One example is the Tactical Communication and Protective System (TCAPS), a high-tech hearing-protection system that can deaden loud noises while also improving ambient sounds necessary for situational awareness.[40] This headset is also designed to connect to a Soldier's communication gear to help improve overall C2. Initially fielded in 2014, more than 20,000 units have been issued since then.[41]

In addition, scouts should also be equipped with suppressors for their rifles. Lowering the noise from friendly weapons fire would not only help improve verbal communication during a firefight but also reduce the ability for enemy forces to quickly locate the scout's location. The Marines have already tested this by equipping an entire infantry battalion with suppressors.[42]

Other equipment that needs to be issued includes wrist-worn GPS receivers for team leaders to assist with dismounted tasks. The prevalence of these systems in combat-arms units, particularly the Garmin Foretrex series, has clearly demonstrated their effectiveness. While more susceptible to EW measures than the Defense Advanced GPS Receiver (DAGR), due to the DAGR having a communications-security fill, they are far easier to carry, are just as easy to use, require fewer batteries and have the same functionality. It was for some of these same reasons that in 2015 the Army reached out to industry leaders for

Figure 7. A Soldier wears TCAPS to protect his hearing in the field but also to help improve overall C2. *(U.S. Army photo by SGT Betty Boomer)*

wrist-worn GPS receivers for use in the Middle East.[43]

The 2015 Small Arms Capabilities-Based Assessment stated that "squads must have an organic precision-fire capability to engage select personnel targets from zero to 600 meters."[44] To fill this need, some units equipped their SDMs with the M14-based Enhanced Battle Rifle. Unfortunately, there are many cavalry squadrons, particularly National Guard formations, which do not have these weapon systems assigned. While units may still be sending Soldiers to school for the training, when those Soldiers return, there isn't a weapon platform for them to use the skills they learned. With the new 3x9x36 organization, the cavalry is moving toward at least three SDM rifles in every scout platoon. By establishing this per MTOE, the troop commander will now have improved precision-fire capability, and SDMs would gain an improved weapon system.

Operations worldwide have shown that gunners need to be able to effectively engage targets in "vertical danger areas" such as the mountains of Afghanistan. The increased probability of units fighting in dense, urban megacities – which will, of course, include high-rise buildings – highlights the need to have this capability. In Afghanistan, many trucks were equipped with a second weapon system attached to a mount in the gunner's hatch to address this problem. Whether using a purpose-designed swing-arm mount or a standard stovepipe welded to the inside of the turret, these "eagle mounts" gave gunners the ability to engage near-vertical targets with automatic-weapons fire.

These need to become standard equipment on platoon vehicles. Not only would it provide increased engagement capabilities, but in effect it would provide a back-up M240 or squad automatic weapon in case the primary M2, Mk19 or tube-launched, optically tracked, wire-guided missile became disabled.

Schools

These changes for the IBCT cavalry squadron means there needs to be changes in training as well. I mentioned in Part I sending the EW section to the Low-Level Voice Intercept Course. Units should also send scouts to learn how to use the FIM-92 Stinger for SHORAD capabilities and increase the number of SDM Course graduates across the squadron. Also, the intel analyst at the troop level needs to attend a course teaching tactical-site exploitation. As the brigade's lead element, the squadron needs to have subject-matter experts spread throughout the maneuver units to help exploit any possible intelligence gained from captured/abandoned enemy locations or personnel.

A key piece of training that needs to be included and expanded is integration of CAS and indirect fires. As the brigade's forward edge, the chance of the squadron being the first element to gain contact with the enemy during decisive action is extremely high. Yet there is little in terms of CAS and indirect-fire training in the NCO and officer developmental pipelines. This lack of training has resulted in a lack of CAS integration and ineffective use when used. Based on 22 observed battles, the Joint Close Air Support Joint Test and Evaluation Task Force found that CAS seldom achieved the outcome sought by the ground commander, with less than one-third destroying or disrupting enemy forces.[45]

To help counter this, the IBCT squadron needs to increase the number of Soldiers it sends to the Joint Firepower Course (JFC) and the Joint Fires Observer Course (JFOC). In most squadrons, the only graduate of either of these courses is typically the fire-support officer.[46] To help change this, the JFC should be opened to Skill Level 3 and 4 19D Soldiers.[47] The eventual goal would be to have at least one senior NCO or officer in each troop who is a graduate of this course.

There should also be at least two to three JFOC graduates in the troop, with ideally one per platoon. As the platoon is the most likely element to encounter the front edge of an enemy assault, it is the element that requires the ability to effectively coordinate artillery, mortar and CAS to destroy or delay the enemy. Some people point to the attachment of forward observers (FOs) from the artillery as filling

Figure 8. Michael Goodman from II Corps Consulting Inc. provides training to a student in JFOC's Class 03-13, located at Expeditionary Warfare Training Group-Atlantic, Joint Expeditionary Base Little Creek-Fort Story, VA. The course trains select Joint personnel in engaging targets with AC-130, naval surface fires and indirect surface fires, and on procedures for providing timely and accurate targeting information to a qualified Joint Terminal Attack Controller for Type 2 and 3 CAS, terminal attack controls and conducting terminal guidance operations. *(U.S. Navy photo by Brandon E. Holmes)*

this role, but FOs are not an organic part of the squadron. As an attachment, when they leave the squadron, that skillset leaves with them. Either the squadron needs to send its Soldiers to these courses, or the fire-support team/combat-observation lasing team detachment needs to be organically part of the unit per MTOE, since that knowledge needs to stay within the organization.

A broader change across the cavalry as a whole is making the Scout Leader's Course (formerly called Army Reconnaissance Course) and Cavalry Leader's Course mandatory training. For the Scout Leader's Course, officers would attend after completing their Basic Officer Leader's Course branch training, and sergeants would attend after completing an abbreviated Advanced Leader's Course (ALC). This new ALC would be only two to three weeks long, with focus on the administrative side of being a squad/section leader.

For the Cavalry Leader's Course, officers would have to attend after they have completed the Maneuver Captain's Career Course but would be encouraged to take it earlier. NCOs would take it after completing their Senior Leader's Course. The reconnaissance and security, intelligence-gathering and dissemination, planning and asset-integration techniques taught at these schools are essential to the cavalry's skillset and need to be integrated into every level of the squadron.

Barriers

These changes are important but are not without issues. Even with full support, there will be barriers to effectively transitioning the IBCT cavalry squadron to this hybrid organization. While there are many issues, the main ones will be cost, logistics and manpower. Even after the change has been made, the new squadron will face the potential issue of improper use.

With the addition of all these new vehicles, equipment and training, the primary problem will be that of cost. TCAPS costs $2,000 per headset,[48] and it cost the Marine Corps $700,000 to equip an infantry battalion with suppressors.[49] To add another TUAV platoon to each brigade would cost about $10 million each.[50] This does not even include Strykers, vehicles and training costs, to say the least. Yet some of these cost issues can be resolved using resources that will become available as force modernization progresses.

One avenue to cutting costs will be making the most out of the Marine Corps' reorganization. All the crew-served weapons and SDM rifles from the discontinued armor and infantry battalions could be used in the new squadron organization. Even individual gear, such as night-vision and rifles, could be used to help ease the costs associated with implementing the 3x9x36 platoon model.

Another possible way to cut costs would be through the fielding of the Mobile Protective Fires System. As these replace Mobile Gun System (MGS) vehicles in their normal units, they can be sent to newly reorganized IBCT squadrons. This would help reduce the cost of purchasing new vehicles.

The logistics required for this new hybrid organization will be much higher than with a standard IBCT squadron. By adding another family of vehicles, particularly a larger armored vehicle, the number of parts and supplies needed will grow. The increased maintenance requirement in regard to trained and equipped Stryker mechanics will also complicate the supply issue.

This is part of the reason why IBCT formations did not have heavy vehicles to begin with. Per Field Manual (FM) 3-96, "The IBCTs' lack of heavy combat vehicles reduces its logistics requirements ... not having heavy combat vehicles gives commanders greater flexibility when adapting various transportation modes to move or maneuver the IBCT."[51]

While these concerns are all valid, and the belief behind the doctrine is understandable, the fact is that the current IBCT squadron requires heavier vehicles that can enable it to effectively fight for information and time. Using the Stryker BCTs' expertise will help decrease the impact of these new logistic requirements.

The manpower required to field this new organization will also be an issue. With the addition of all the new elements to the squadron and troop, the Army will be forced to reassign or reorganize units to fill these needs. Adding onto the effect of increasing the IBCT squadron to the 3x9x36 structure, we'd see an increased demand for Soldiers for the formation. This comes at a time when the Armor Branch is the only operational-division branch to shrink since 2013.[52]

While the active-duty component could more easily fill these slots, the new formations will potentially strain National Guard units. Unlike the active-duty side, which recruits from across the entire country, the National

Figure 9. A U.S. Marine with Bravo Company, 1st Battalion, 2nd Marine Regiment, uses a suppressor while providing security on a company attack range, Twentynine Palms, CA. The U.S. Marine Corps has equipped one of its infantry battalions with suppressors at a cost of $700,000. *(U.S. Marine Corps photo)*

Guard primarily recruits from just the state in which the unit is located. This problem would potentially require units in states to be disbanded and their Soldiers to change their military-occupation specialty to fill these new positions. Increased bonuses and other enlistment incentives can help close this gap but would add to the overall cost of the transition.

Even after all these obstacles are crossed, there lies the very real possibility that the new squadron will run into an even bigger problem: improper use. With the massive increase in firepower, the brigade commander might view his cavalry squadron as a CAB and fight them as such. While MGS carries sabot and high-explosive anti-tank rounds, and is able to provide limited anti-armor capabilities, the vehicle is not a tank and should not be employed in the same manner as a tank.[53]

Also, if the brigade commander gets the squadron decisively engaged, at that point reconnaissance ceases and the potential for achieving and capitalizing on IC is lost.[54] It's the squadron commander's responsibility to teach and inform the brigade commander of this unit's capabilities and that its focus is to help win the reconnaissance fight, not lead an assault on the enemy's main body.

Conclusion

In March 2020 the Marine Corps announced it would drastically reorganize its entire force structure. Changes include the removal of all its tank battalions, bridging units, law-enforcement battalions and multiple infantry, artillery and amphibious vehicle units. Overall this move is expected to cut more than 12,000 Marines over 10 years and reduce costs by removing legacy systems, all to face the Corps' new projected threat.[55] This change was based on a realistic look at both the Corps' current capabilities and what it needed to change to meet its goal. This same process needs to be done with the IBCT cavalry squadron.

The current IBCT squadron is a paper tiger, unable to fight for information against near-peer threats. It is unable to win in the EW space, lacks the equipment to effectively counter UAS threats, does not have an effective C2 vehicle for squadrons and troops, and is overall deficient in firepower. The Army needs to decisively change the IBCT squadron's manning, training and equipping to be effective in the future fight for information.

While many of these proposed changes have been mentioned before, most have either not been implemented or are being phased in incrementally. These cannot be done piecemeal and expect to be enough. If we are the "combat arm of decision," we need to demonstrate that by deciding to overhaul the IBCT squadron to one that can accomplish its mission.

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Acronym Quick-Scan

ALC – Advanced Leader's Course
ATP – Army techniques publication
BCT – brigade combat team
C2 – command and control
CAB – combined-arms battalion
CAS – close air support
CoIST – company intelligence-support team
CP – command post
DAGR – Defense Advanced G[lobal Positioning System] Receiver
DRASH – Deployable Rapid-Assembly Shelter
EW – electronic warfare
FM – field manual
FO – forward observer
GPS – Global Positioning System
HHT – headquarters and headquarters troop
HUMINT – human intelligence
IBCT – infantry brigade combat team
IC – information collection
IOTV – Improved Outer Tactical Vest
ISR – intelligence, surveillance and reconnaissance
JBC-P – Joint Battle Command Platform
JFC – Joint Firepower Course
JFOC – Joint Fires Observer Course
MGS – Mobile Gun System
MSV – Modular Scalable Vest
MTOE – modified table of organization and equipment
NAI – named area of interest
NCO – noncommissioned officer
OSVRT – One-System Video Remote Terminal
QEAM – Quick-Erecting Antenna Mast
SDM – squad designated marksman
SHORAD – short-range air defense
TCAPS – Tactical Communication and Protective System
TOC – tactical-operations center
TUAV – Tactical Unmanned Air Vehicle
UAS – unmanned aerial system
VTOL – vertical take-off and landing

Recon and Security in the Urban Fight

by CPT Kyle D. Woods

The 2nd Brigade, 3rd Infantry Division's dramatic capture of Baghdad in April 2003 from Iraqi Republican Guard forces is legendary among today's armored force. The Spartan Brigade's Thunder Run ranks alongside Eagle Troop, 2nd Squadron, 2nd Armored Cavalry Regiment's overwhelming victory at the Battle of 73 Easting in 1991 as proof of American armored supremacy in combat.

The 2-3 Infantry Division's actions in April 2003 are distinguishable by the terrain where the battle was fought. The Spartan Brigade fought through dense urban terrain in its rapid and forceful seizure of Baghdad's government district.

Since World War II, American military doctrine has, in writing, discouraged armored forces from participating in the urban fight.[1] However, military necessity has often pressed mechanized forces into the urban fight. American tankers and mechanized infantry have come to the rescue of their light counterparts in World War II, the Korean War, the Vietnam War and many times during the most recent war in Iraq.[2] In each conflict America's armored Soldiers have encountered fighting in larger and larger cities. This trend is likely to continue.

The world continues to urbanize, especially in economically less-developed nations that are at a higher risk for armed conflict. By 2030 nearly 9 percent of the global population will reside in 41 megacities – defined as cities with a population of more than 10 million citizens.[3] For example, by 2025 Lagos, Nigeria, and Kinshasa, Democratic Republic of the Congo (DRC), will each be home to more than 15 million citizens.[4] That makes these cities roughly as populous as Los Angeles today.[5]

The development level of Nigeria and the DRC has left these cities lacking in comparative infrastructure and services. Nigeria continues to struggle with internal conflict caused by the fundamentalist Islamic terror group Boko Haram, and the DRC continues to experience civil unrest stemming from multiple internal and external sources.

As nations like the DRC and Nigeria continue to urbanize, the Army's mission to stand ready for rapid deployment anywhere on the globe must account for these megacities. For the Army's reconnaissance and security (R&S) experts, doctrine must be written to account for our role in these potential situations. While Field Manual (FM) 3-98, ***Reconnaissance and Security***, provides for roles and responsibilities of the cavalry squadron in stability operations, little to no attention is paid specifically to urban operations, particularly during decisive action.[6]

With this in mind, the armored force as a whole should develop a generation of junior leaders better prepared for eventual conflict in megacities through: (1) development of a doctrinal template for how to fight the R&S fight in megacities; (2) foundational instruction on the history of armor and reconnaissance in the urban fight; (3) and integration of urban training into

Figure 1. Map showing global distribution of top 400 "urban areas" with at least one million inhabitants in 2006.

Tasks	
5-75. Tasks for reconnaissance-in-force include:	
	Penetrate the enemy's security area and determine its size and depth.
	Determine the location and disposition of enemy forces.
	Attack enemy positions and attempt to force the enemy to react by using local reserves or major counterattack forces, employing fires, adjusting positions and employing specific weapon systems.
	Determine weaknesses in the enemy's disposition for exploitation.
	Locate obstacles and create lanes as specified.

Table 1. FM 3-98, *Reconnaissance and Security Operations*, specifies that units should be prepared to conduct reconnaissance in urban environments for only one form of reconnaissance: reconnaissance-in-force.

the Objective-T training system.

Foundation: change doctrine

Many operations orders from cavalry and armored units at echelon publish the following bypass criteria: "Bypass criteria: Bypass built-up areas and urban terrain." This typically is sound advice given the standard missions at the National Training Center (NTC) and home-station preparation for NTC. However, necessity in the operating environment (OE) has left commanders with no reasonable alternative to committing their R&S organizations into urban environments. Almost always these formations have deployed into combat scenarios with little to no urban R&S doctrine. Even after years spent fighting in urban areas throughout the U.S. Central Command area of operations (AO), our R&S manuals lack plans for execution of urban R&S by cavalry squadrons.

While it is true that we must always apply the mission factors of mission, enemy, terrain, troops available, time and civil considerations to mission planning – which theoretically allows doctrine to be applied to any set of terrain or circumstances – the unique nature of urban warfare requires specific attention. Two reasonable and simple steps are available for the creation of urban R&S doctrine: (1) explicitly indicating which tactical tasks can be executed by R&S organizations in urban terrain; and (2) identifying which forms of R&S each echelon can execute within an urban environment.

Figure 2. Soldiers from 3rd U.S. Cavalry Group in 1944. U.S. cavalry groups often were forced to seize and retain key terrain or move into urban environments to answer priority information requirements in a timely manner. *(U.S. Army photo)*

Doctrinal framework

Establishment of a doctrinal framework through clear identification of tactical tasks for urban R&S is the first step in preparing cavalry squadrons for combat in an urban environment. Cavalry units in World War II planned and trained to execute reconnaissance operations almost exclusively. In practice, these missions ended up accounting for less than 10 percent of their actual combat operations.[7]

To prevent this lack of preparedness for future urban operations, R&S doctrine should establish a select group of tactical tasks that R&S organizations can train to accomplish in urban environments. Currently the only explicit mention of urban terrain among reconnaissance tasks is the task under the form of recon known as reconnaissance-in-force to "enter AOs in complex terrain not previously occupied by friendly forces, such as urban environments."[8]

Experience at NTC indicates that cavalry squadrons are often tasked to isolate urban areas in support of their brigade's freedom of movement and maneuver. Ideally a squadron would be tasked in an urban environment to isolate, secure, retain and destroy.

Cavalry squadrons are always fighting to maintain a healthy number of trained dismounts. Each of these tactical tasks would lean heavily on the dismounted capabilities of each type of cavalry squadron, but it is possible for squadrons to become proficient at

these tasks. These tasks would not be the primary tasks trained by the cavalry squadron, but they would be trained at least to a proficient level by Subjective-T standards to enable the squadron or brigade commander to employ the squadron in an urban setting if necessary. Training these tactical tasks at home station or in the combat-training centers would provide units with an experiential foundation should they be called upon to perform these tasks in an urban setting at war.

Alternatively to training a set number of tactical tasks, R&S doctrine could identify which echelons can execute the various R&S operations in support of their brigades in the urban fight.

The second step in providing a doctrinal framework for the execution of R&S operations in urban environments is organizing the forms of R&S by echelon. Security doctrine already clearly lays out which echelon of units may conduct screen, guard and cover missions.

For reconnaissance operations, the planning factors for area, route and zone reconnaissance would be raised above their current echelon. Rather than depending on a section to complete a route reconnaissance, that level would increase (most likely) to a platoon or troop, depending on the brigade combat team (BCT) cavalry squadron type and the threat level. Similarly, area reconnaissance would likely become a troop mission, with zone reconnaissance becoming a squadron operation due to the requirements to reconnoiter lateral routes and all areas within the zone.

Also, the nature of urban OEs requires more personnel to account for subterranean areas and multistory structures. Commander's reconnaissance guidance established in FM 3-98 enables commanders to use a few words to provide the necessary guidance to enable efficient reconnaissance operations in all spheres, including urban environments.

Establishing guidelines for leaders to plan different R&S operations at their echelon should be coupled with effective use of commander's reconnaissance or security guidance. A thorough review of the capabilities of each BCT cavalry squadron based on its current modified table of organization and equipment would provide the hard data necessary to determine the doctrinal width and depth for security operations these squadrons could reasonably provide in various urban settings.

Instead of tens of kilometers across desert terrain, squadrons would be counting city blocks. Each BCT cavalry squadron should have its own plan for how to fight for information and conduct security operations for its brigade in an urban setting. A strong doctrinal foundation on how to execute urban R&S operations would greatly complement a program of instruction in officer and noncommissioned officer (NCO) developmental schools focused on the history of R&S operations in urban environments.

Instruction: learn from mistakes

Once urban R&S doctrine is firmly established, the armor community must instill the lessons-learned from our experienced veterans into our junior leaders. I was fortunate enough to have a Thunder Run veteran as a mentor when I was a young platoon leader; my platoon sergeant had served as a young specialist gunner in the scout platoon of 1st Battalion, 64th Armor Regiment, during 2nd Brigade's historic mission.

While senior NCOs and officers in our branch probably feel that our force has spent enough time in urban terrain, every year we commission thousands of officers and pin stripes on thousands of NCOs who do not have direct-action combat experience. The last platoon leaders to serve in America's armored-cavalry regiments in combat are now field-grade officers. The sergeants of 2003 are either retired or are first sergeants or command sergeants major. As a force, we are rapidly losing that hard-fought combat-veteran experience and risk losing their lessons-learned if we fail to properly codify and institutionalize their lessons.

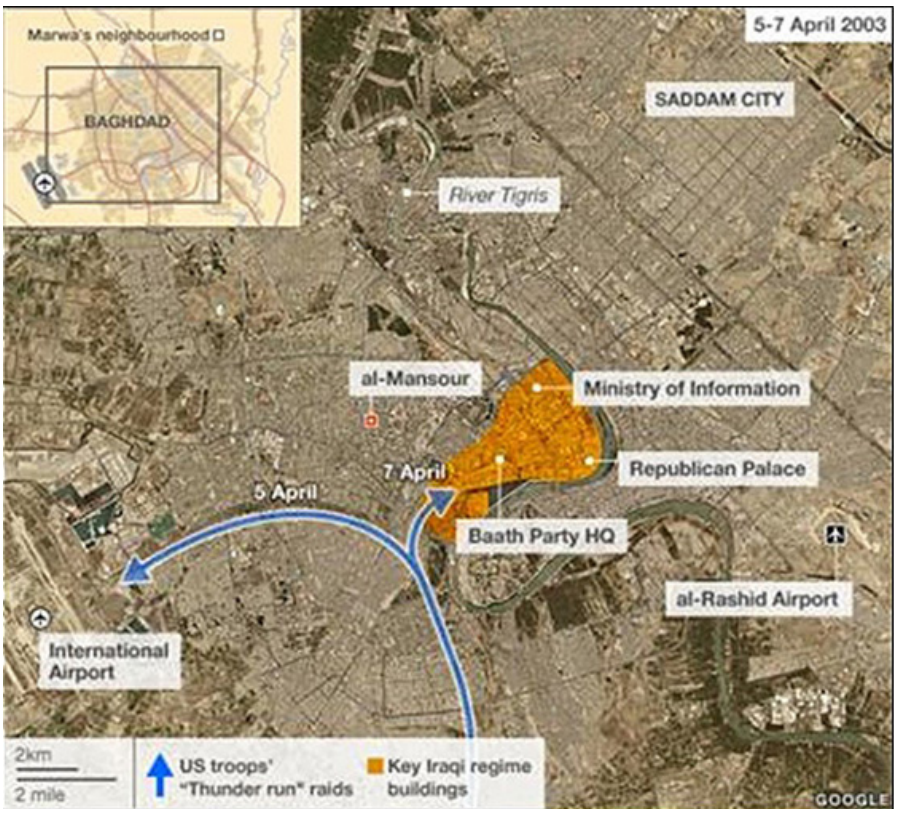

Figure 3. The 3rd Infantry Division's mechanized Thunder Run through Baghdad in 2003 demonstrated the potential for mechanized units to conduct operations in urban terrain during large-scale combat operations. *(Adapted from FM 3-98)*

Figure 4. U.S. Army M1 Abrams tanks maneuver in the streets as they conduct a combat patrol in Tall Afar, Iraq, Feb. 3, 2005. The tanks and their crews are attached to 3rd Armored Cavalry Regiment. The Army has an opportunity today to chronicle and capture the firsthand accounts from a cadre of leaders who understand urban operations and proofed their knowledge in combat. *(U.S. Army photo by SSG Aaron Allmon)*

There are multiple options available at minimal cost for the Armor Branch to take lessons-learned and disseminate them to our up-and-coming R&S leaders during their time in the generating force. U.S. Army Training and Doctrine Command (TRADOC) possesses the unique capability of reaching each officer and NCO during their Army careers. However, little to no time is currently devoted to the formal instruction of urban R&S operations for our junior leaders during their time in TRADOC. The Cavalry Leader's Course (CLC) incorporates urban elements in at least the first graded tactical-decision exercise (TDE), and the Maneuver Captain's Career Course (MCCC) incorporates an urban operations order for a Stryker-based infantry company.

As we have done with other training objectives, such as Army Values training, we should interview our armor leaders on their past combat experience in urban terrain and create an archive to be used during instructional blocks in the Armor Basic Officer Leadership Course (ABOLC) and the various NCO Education System (NCOES) schools. Following the development of a foundational block of instruction on R&S operations in the urban OE, TRADOC should package various urban R&S videos and lessons, then publish them for use by leaders across the force.

The first step to teaching the lessons-learned by the current and previous generations of R&S professionals to our junior leaders is instruction in ABOLC and NCOES. To build on the lessons-learned by R&S experts in urban operations in the past two decades, it is critical that a leadership-development program is incorporated into the basic officer course and multiple levels of cavalry-scout NCO developmental schools. The Army today has an opportunity to chronicle and capture the firsthand accounts of thousands of its own professionals who served through urban combat operations on a large scale. The battles of Fallujah, Sadr City, Mosul, Baghdad and more have left our force with a cadre of leaders who understand urban operations and proofed their knowledge in combat.

Unlike Operation Desert Storm, our armored force was heavily involved in urban fighting during the aforementioned operations. This has built a generational wealth of R&S experts who can lend their voice to developing and publishing the best possible urban R&S doctrine our force has ever had.

Resources required

The only resources required to portray the tactical scenario and decisions the leaders faced in the moment would be the interviewees, a camera and a terrain board or similar table where they could review their actions. Thorough research would likely find corresponding news or home-video footage of many of the engagements to bring these battles to life and show our new officers and NCOs a fraction of the reality of R&S operations in the urban fight. Ideally these programs would be targeted for their specific echelon of developmental school. For example, ABOLC would incorporate interviews with scout- and tank-platoon leaders from urban fights, while the Senior Leader's Course would incorporate section sergeants from the military-occupation specialty 19D and 19K communities.

Targeting the videos to the actual echelon of training and positioning the instruction at the correct time in the training glidepath of each school would be critical. For officers, the instruction should occur sometime after or in the latter portion of tactics training. Placing the urban R&S instruction at the right time in the course would maximize the value of the instruction, and it could avoid relying on follow-on courses like the Scout Leader's Course (formerly known as the Army Reconnaissance Course) or Reconnaissance and Surveillance Leader's Course to carry the full weight of urban-operations training within TRADOC.

Realistically, every hour of the method of instruction for these courses is meticulously planned and resourced. By setting aside a half day of instruction – or even if just assigning the viewing of these videos as homework with an hour blocked out for discussion and review – it would provide a significant improvement to the instruction our junior leaders now receive.

Once we have developed a strong instructional program in TRADOC, we can execute the second step: publishing that information to the force. The instructional videos developed as classroom instruction or homework for our officer and NCO developmental schools could easily be packaged and published to the force. Mobile-training teams from the schoolhouse are expensive and difficult to coordinate for units in U.S. Army Forces Command to attend. By electronically publishing these developmental programs on an Army system like the Army Training Network or Army Knowledge Online, TRADOC could make these learning tools accessible to our junior leaders worldwide with minimal cost.

Junior officers and NCOs could reference the same videos they discussed and learned in class and use them in their own training plans to spread the tactical lessons-learned in combat by our R&S professionals across the force. Use of these videos as TDEs or as part of unit leadership-development programs would ensure the institutional knowledge gained during the urban-warfare operations of the past two decades would not be lost among our next generation of cavalrymen and -women.

Using the two-pronged strategy of classroom review of lessons-learned during urban R&S operations and dissemination of the same material to the force at large, our armored force can retain the institutional knowledge gained firsthand in combat.

After the establishment of urban R&S doctrine and teaching our junior leaders the lessons-learned in the urban operating environment, the most important step remains. Without practical application and execution in the field, we will not be able to successfully apply our urban R&S doctrine in combat.

Execution: get repetitions in field

The final and most difficult step in building an R&S force capable of executing operations in the urban

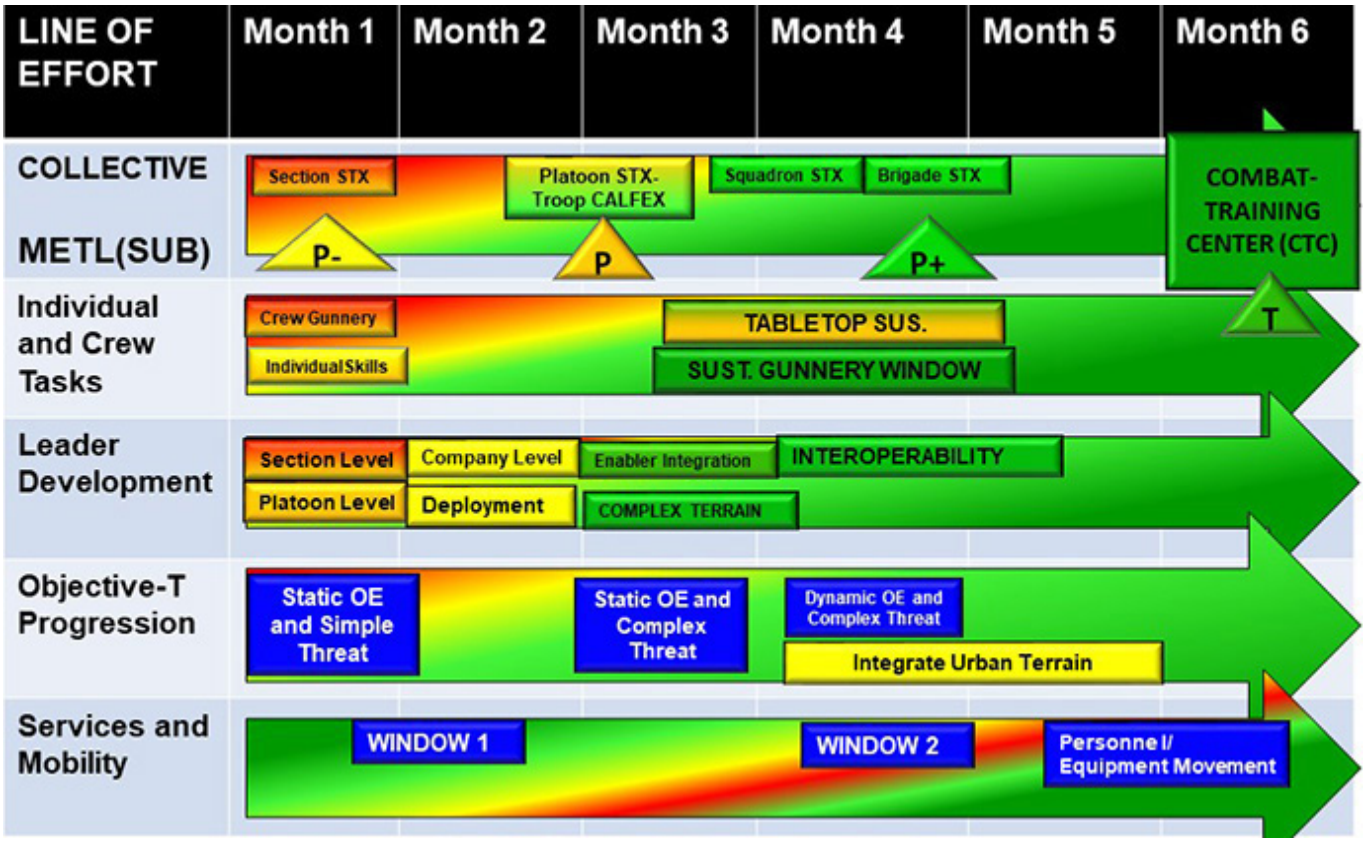

Figure 5. The road to a T rating: "a way" of integrating urban-terrain training into a standard combat-training center train-up for a cavalry squadron. Applying urban-terrain training at the squadron level as units transition to a dynamic OE would ensure sections and platoons are fundamentally sound. *(Graphic by author)*

environment is training in the field. While urban operations should not take precedence as the priority for R&S organizations in the field, there are a couple of methods to place urban training in the right priority level for squadron commanders and to execute it in a resource-starved environment.

The Army's new training system, called Objective-T, establishes clear criteria to reach each level of readiness. To reach a "trained" or "T" rating, units must be externally evaluated, and they must have conducted their respective mission-essential tasks (METs) at night and in a chemical, biological, radioactive and nuclear (CBRN)-contested environment. Adding urban terrain to the requirement to reach a T rating would ensure that units execute this training.

After the addition of urban training to the requirements to reach a T rating, the next step would be ensuring that units posted in locations without reasonable urban-warfare training sites (which are high-cost and high-demand) are able to execute urban training in the Close-Combat Tactical Trainer (CCTT) or Virtual Battlespace Simulator 3 or analogous simulated battlespace.

First and most important to executing quality urban R&S training in the field is integrating urban OE training into Objective-T requirements. Objective-T's evaluation criteria are a significant change for the evaluation of unit readiness. By imposing criteria such as external evaluation, the requirement to train at night and under contested CBRN conditions, the Army would be moving closer to creating homogenous training plans for all units that share the same METs.

By adding the urban OE for maneuver organizations, or specifically R&S organizations, Objective-T could ensure that commanders factor in this type of OE to their training plans. By restricting it to the highest readiness level, commanders would retain the ability to prioritize urban training last, or not at all if their guidance is only to reach a "proficient" level based on competing requirements at the brigade or division level.

Once codified within Objective-T as a requirement, installations would see an uptick in demand for their urban training spaces. To prevent units from having a training requirement they are incapable of achieving, it is critical that units are provided the necessary resources to execute urban training. This remains true even if it comes in a simulated environment.

Second and equally as important as integrating the urban OE into Objective-T is ensuring the training standards are executable by subordinate units. The Army has invested millions of dollars to develop simulation centers at all major installations to ensure Soldiers can receive training from the individual level all the way to the division level in a simulator. Individual marksmanship is trained in the Engagement Skills Trainer (EST). Crews are trained in the Remote Virtual Tactical Trainer and the CCTT. Battalion, brigade and division staffs execute command-post exercises (CPXs) at their unit mission-training centers that ensure staffs can perform the necessary planning and CP functions at all levels.

By creating the requirement in Objective-T for urban training and allowing the use of simulators, commanders could execute urban R&S training through CPXs and in the EST and CCTT to ensure proficiency for their units. Units are already required to conduct a CPX to reach the highest readiness rating for their staffs, and the deliberate incorporation of an urban R&S operation in their planning would require no more resources or requirements. Our existing CCTT simulators have urban terrain that could easily support company/troop-level maneuver and below, ensuring that all our armor vehicle crews can train in the urban OE without burning any fuel.

Moving forward

In conclusion, the Armor Branch has a unique opportunity to capitalize on existing combat expertise in urban R&S operations to develop a first-ever urban R&S doctrine for our mounted force. Through the establishment of doctrine by specifying tactical tasks for cavalry squadrons in the urban OE or identifying echelons that can perform forms of R&S operations in urban environments, we can build a foundation across the force.

Building on this foundation and leveraging the human capital available in the force, the Armor Branch can develop a series of interview videos and TDEs based on real-world combat scenarios from urban operations in the past 20 years to train junior officers in the generating force and publish these videos for the force at large.

Finally, and with the most difficulty, by incorporating an urban OE into existing Objective-T evaluation criteria for R&S organizations and by allowing the use of simulated training environments to act as this urban terrain, the branch can train the techniques, tactics and procedures developed by junior leaders to enable R&S operations in the urban fight.

We owe it to the Soldiers of the future to provide a framework for the execution of R&S in the urban environment. In every major conflict in our Army's history, we have employed mounted troops within urban environments out of necessity. We must recognize the reality that our next conflict will likely occur in a country with large urban environments or possibly even in a megacity. With this in mind, we can move forward by identifying the best possible employment methods for our R&S personnel in those scenarios to enable the success of the Army within urban OEs.

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Acronym Quick-Scan

ABOLC – Armor Basic Officer Leadership Course
AO – area of operations
BCT – brigade combat team
CALFEX – combined-arms live-fire exercise
CBRN – chemical, biological, radioactive and nuclear
CCTT – Close-Combat Tactical Trainer
CLC –Cavalry Leader's Course
CP – command post
CPX – command-post exercise
DRC – Democratic Republic of the Congo
EST – Engagement Skills Trainer
FM – field manual
MCCC – Maneuver Captain's Career Course
MET – mission-essential task
METL – mission-essential task list
NCO – noncommissioned officer
NCOES – Noncommissioned Officer Education System
NTC – National Training Center
OE – operating environment
R&S – reconnaissance and security
STX – situational-training exercise
TDE – tactical decision exercise
TRADOC – (U.S. Army) Training and Doctrine Command
TRP – troop

Figure 6. U.S. Soldiers of 350th Infantry Regiment liberate the Italian towns of Isola Vicentina and Sandrigo April 29, 1945. *(Photo by Laura Kreider, U.S. Army Garrison Italy)*

The Growing Vacuum of Today's Live-Fire Ranges and their Future Requirements

by 1SG(R) Frank Belonus

Militaries and law-enforcement agencies of the world continue to adapt their training based on lessons-learned, emerging tactics, techniques and procedures, and emerging technology and capabilities. For many, live-fire is the pinnacle of training realism, validation and qualification, yet there is a growing vacuum in live-fire facilities' infrastructure and capabilities when it comes to meeting these organizations' near-future requirements.

Today's live-fire ranges have not conceptually changed much in the last 50 years. The ranges lack true flexibility and adaptability, and they are limited in the overall scope of what can be trained on them.

With that in mind, the future of live-fire ranges may be something completely different than what is seen today. Imagine projected imagery that reflects different environments:

- Targets may be realistic, three-dimensional holographic images that accurately reflect the threats of today, moving and acting like an actual foe.
- These type of targets are capable of being engaged through simulations such as lasers that are already integrated into the latest platforms and weapon systems being used, or engaged with actual munitions in live-fire.
- The targets are infused with realistic signatures and sensor-triggering capabilities for further realism.
- Targets may be maneuvered against Soldiers and may return fire.
- Unseen hit indicators cause immediate, realistic effects on targets and provide instantaneous feedback during training, and from multiple perspectives for future review.

All this done on terrain that allows freedom of maneuver with very few restrictions, allowing 360-degree engagements.

But the reality is that there is an evolutional requirement needed today to bridge the "now" and these future concepts. The current and near-future requirements are what will drive the initial evolutional change as well as the true modernization required in training and life-fire ranges until technology evolves to meet the future described.

Mindset must change

The first approach to filling the vacuum in live-fire ranges to meet future requirements is mindset. It is what allows us to see beyond the traditional to what ***could be*** and what ***will be*** required based on emerging technology, future-force capability, future threats and environments. In other words, we must start working today for what will be needed beyond tomorrow and not just focus on fulfilling today's needs at today's standards.

Parallel evolution and collaboration between customer and industry is required. This means a customer conveys a clear vision of future platforms, capabilities and training requirements, coupled with an understanding of emerging technology, industry direction and advancements. This results in an educated industry that understands future-force concepts and capabilities. It allows industry to shape its tactical employment through experience, knowledge-sharing and a shared vision.

A shared vision allows an industry to pull the latest technology from various sectors and disciplines, be it robotics, simulations, sensors, digitization, optics, communications, ballistics, metals and alloys. This is a natural part of change management and evolution for any company that strives to remain relevant through innovation, but the customer plays a key role in driving innovation in the right direction and in mitigating the industry's response time to fill needs requirements.

Research-and-development investment is required from both industry and the customer in future training and live-fire ranges if the customer wants to remain globally dominant. Technology provides the advantage, but being capable and effective in using that technology allows the

customer to be dominant. Training and live-fire produces and validates that needed capability, and that will never change.

Simulations are invaluable tools that greatly enhance training, but they will never replace the need for actual live-fire. It still is crucial that Soldiers manipulate their actual equipment – be it personal equipment and weapon, or complex combined-arms fires, or everything in between.

Driving future requirements

There are many factors driving future requirements of live-fire ranges. Those factors include urbanization, an individual's flexibility and adaptability, technology, ability to implement and adapt lessons-learned, realism, better training automation and management, and enhanced training feedback.

Urbanization. According to a United Nations report, 55 percent of the world's population already lives in urban areas, and this is expected to rise to nearly 70 percent by 2050. Today the highest urban-populated regions include North America at 82 percent, Latin America and the Caribbean at 81 percent, and Europe at 74 percent. As the world's population continues to migrate toward cities, threat forces continue to mitigate advanced military capabilities and technology by forcing the fight into this complex terrain. Therefore it's crucial to understand this multi-dimensional terrain, and how to operate and survive in it is more critical than ever.

(This is not to say there is no longer a need for conventional, open-terrain capability and training because today's military forces need to be able to transition through the full spectrum of operations in various types of environments. Complex terrain such as urban and subterranean environments have become the norm for militaries, both in direct and supporting roles.)

Recent urban combat has shown that being engaged from multiple threats in windows and on rooftops at close range is common. Lessons-learned have also shown that engagements in complex terrain are fluid, with both the shooter and threat forces often moving while engaging or being engaged. Technology and capability are often diminished in this environment.

With that said, the ability to engage at extended ranges is still required in cities, though the terrain may be severely restrictive. Survivability is still increased through stand-off and accuracy superiority at range, but potential threats from a multi-dimensional domain at close range also threaten survivability in this terrain. Issues in command and control, maneuverability, communications and fires control are all further challenged in this environment.

Therefore adaptive, tailored training and live-fire ranges are needed to ensure a ready force in this world of urbanization. Unfortunately, most modern urban training and live-fire facilities lack the density and realism to prepare Soldiers for what they face worldwide today and will face in the future.

Flexibility and adaptability. Militaries and law-enforcement agencies around the world focus on developing agile and adaptive individuals who can think on their feet and make decisions rapidly. These individuals are constantly evolving forces integrated with the latest in technology and capability. They must adapt constantly to various threats, their capabilities and to ever-changing environments. Their ability to adapt is honed in training. This means training facilities and ranges must be just as adaptive and flexible to meet training requirements.

Technology. The evolution of technology continues to move forward at a blinding pace. It is allowing us to see more, shoot farther and do more with less. Unmanned systems on land, sea and air are already a reality. The near future will have manned and unmanned systems interconnected and working in unison. Advancements in conductivity will allow unique combined-arms engagements as well. Air and ground forces will become more effective and lethal. Automation and artificial intelligence will continue to evolve and make great changes in capability and in how things are done.

All these things will continue to change strategy, operations and tactics from the highest to the lowest levels. The constant is that training will inevitably require a complete overhaul to support the new way of doing things. Live-fire ranges will need to adapt to this new norm and to the integration of emerging technologies and capabilities.

Niche technology focused on equalizing the battlefield and exploiting weaknesses will continue to be a threat, and it will be unpredictable. Improvised explosive devices (IEDs) have proved effective against even the most formidable advanced militaries of the world. Drones and weaponized drones have also proved effective to some extent. Niche technology and the countermeasures implemented affect operations and tactics, changing how we do things. Therefore, training and live-fire ranges will require rapid adaptation to address niche technology and its effects.

Evolutions in simulations and augmented/virtual reality will soon be integrated into existing and future platforms and systems. With the flip of a switch, you'll be able to enter a virtual world from within your actual tank or from any other system or platform. Laser-engagement systems will also be integrated, eliminating the time-consuming process of mounting and removing current laser-engagement systems. Training facilities and ranges need to also evolve to support this evolution in technology, and they must be able to bridge the virtual and live training worlds.

Lessons-learned. A military's ability to rapidly collect, implement and adapt to lessons-learned and best practices will greatly affect its survivability and success. At a lower level, situational training with recently learned lessons, and the exercising of new battle drills based on capability and lessons learned, makes an enormous difference.

One example of this in recent operations was the use of IEDs for shaping operations. The IED would disable or destroy a vehicle in a kill zone and block a route, which would then trigger an ambush of those in the kill zone and those blocked on the route. Battle drills were developed to counter this,

but training and live-fire ranges still need to support this and other types of training requirements driven by lessons-learned.

Realism. Greater realism equates to better training and better-prepared militaries and law-enforcement agencies. Realism is the cornerstone to quality training, but it goes far beyond that. Realism exercises those things we often do not think about like "switchology," which is the ability to manipulate switches and dials without having to search for them – or even to look at them, in some cases. Realistic training conditions the mind to know what right looks like – for example, vehicle identification or even thermal-signature identification. This becomes significantly important in preventing fratricide, for instance.

Realism also becomes quite important when training to maximize the capability of the technology used. For instance, an unmanned platform with sensors will require cues to integrate its capability into training properly. Realism may include realistic movement and exposure from the threat. Realism also tests survivability drills and countermeasures properly, such as the reaction to incoming direct and indirect fires and effects like the reaction to anti-tank guided missile (ATGM) drones or lasers. Realistic training also means mitigating predictability. The threats of the world are unpredictable and capitalize on your predictability.

Better training automation and management. Automated software should be integrated with targets, cues and operators on live-fire ranges to randomly adjust scenarios by crew or shooter based on inputted engagement requirements. This will mitigate false conditioning and predictability. It will also streamline the process, allowing increased throughput.

Enhanced training feedback. Audio, visual and sensor-aided feedback greatly enhances learning and understanding. With that said, capability improvement is still needed when providing feedback and conducting after-action reviews (AARs). Evolving technology, data-collection tools and interoperability, coupled with trainers and subject-matter experts who know how to maximize these tools, will greatly enhance training feedback and the learning curve.

Live-fire range considerations

Technology is also affecting those in the live-fire-range industry as well. Evolving improvements in materials, manufacturing, capabilities, interoperability and realism continue to improve live-fire quality.

Mindset. Live-fire ranges are purpose-built. They serve a specific or limited set of purposes such as a qualification range. They are built with engagement criteria such as distance and type of target in mind. There needs to be a shift in mindset, though; we need to view them with a different perspective. They will always be needed to validate basic marksmanship, but ranges should be more adaptive and inclusive of training needs. Ranges should support live-fire rehearsals of today's battle drills – whether it be offensive armor attack in a wedge formation, react to IED-initiated ambush, incoming ATGM or sniper attack.

This will require different target configurations, range capability and maneuver space. Combat is multi-dimensional, especially in an urban environment. Live-fire over flat terrain, always at ground level and looking in one direction with limited left and right limits does not constitute properly training and conditioning forces so they are prepared for what they may face in the future.

Variable scenario generator, management. Range-management software can be developed and tailored to a specific range to manage scenario development and range execution. This software knows all the variables in targets, ranges, safety requirements and scenario requirements. It can produce multiple scenarios based on the parameters entered, then randomly select them for each exercise.

For example, a tank crew conducting Table VIII qualification exercises has specific types of engagements they are required to exercise. The range-management system will develop several scenarios to meet these requirements based on targets available, range requirements and safety requirements. Then, as each tank crew conducts Table VIII, they will face one of these scenarios the system randomly selects. This prevents crews gaming the range and the same scenario from being used over and over. The versatility also allows greater distribution of target use, increasing target longevity.

Another benefit of the software is that it allows input to remove certain targets as they malfunction or become unusable from impact damage. Then the software adjusts to scenarios that do not use the specified targets. This reduces training down-time for maintenance.

The range-management system should be integrated with target-activating range sensors, hit indicators, timing/scoring software and other monitoring systems such as audio and video. Collectively this will provide proper feedback and validate results. This is all then integrated into an AAR suite that provides integrated, high-quality feedback. This feedback will allow input beyond traditional hit/no hit through maximizing technology, identifying reasons for poor performance as well. This facilitates automatic scoring with minimal interaction required from evaluators/scorers.

Autonomous targets. Integration of autonomous, robotic targets are still in its infancy but has great future potential. These targets provide greater range flexibility, add realism and mitigate some infrastructure needs. In turn, they decrease maneuverability restrictions, which increases their cost-effectiveness.

Autonomous targets will inevitably replicate any type of target. They will be easily integrated into existing ranges and interoperate with existing conventional targets. The autonomous targets will therefore integrate into the range-management system. They will also be facilitated into more creative live-fire training events such as a suicide car bomb or a vehicle approaching a checkpoint.

Pre-programmed routes can replicate threat and civilian movements. For example, an input command can cause different reactions such as all the civilian targets running for cover.

Inputted commands can also direct targets already engaged and "down" to either move out of play and out of the way, or to move to a designated point to be reconstituted and put back into play. They can also be used to work in tandem with traditional targets to reflect realistic actions – such as human targets dismounting from a vehicle to attack or provide cover.

Integrated simulations and live-fire capabilities. Technology is near the point where targets will soon accurately register hits from both simulated engagements and actual engagements without having to transition the range to support one form or the other of training. This will likely be accomplished through an evolution in hit sensors, all integrated into each target lifter. This advance – combined with lightweight, mobile target packages – will allow greater flexibility in training and training environments. The need for mutually supporting range, range-management system and infrastructure is inevitable as future platforms will likely have these types of simulations capabilities integrated into them.

Greater target realism. Realistic training requires realistic targets. To achieve the desired realism, potentially cost-effective three-dimensional imagery could be used on larger targets. This may also include electronic or holographic imagery when units are integrating sensors and combat multipliers such as unmanned aerial vehicles. These may be remotely projected with hit-indicating technology, allowing air and ground use, thus enhancing air/ground live-fire coordination and capability. This would also be integrated into the range-management system. Greater realism also includes proper signatures during day, night and movement. Enhanced battlefield effects also need to be improved.

For example, the "return fire" effects, when used, could be puffs of smoke to help identify targets. Small-arms night-fire ranges could have muzzle flashes. Threat-vehicle targets could better replicate return fire, and they could be networked into the vehicle-integrated simulations software to replicate effects in sight systems.

Realistic thermal signatures. Current systems simply provide "hot spots" on larger targets. However, thermal signatures should closely replicate what the target is, providing realistic training and proper conditioning. Simulated human targets should also produce proper thermal signatures that allow proper night-vision and night-optics engagements. Emerging technology also needs to address new, creative and cost-effective ways to not only achieve this but to increase duration of effectiveness after repeated impacts.

Multistage targets. Armored vehicles in defense are either in turret defilade or hull defilade. Therefore targets replicating armor vehicles in defense should reflect these two positions visually and through other cues, such as thermal signatures. Maybe the target could "pop up" in turret defilade for 30 seconds before normal target exposure to better replicate realism.

Enhanced target-lifter survivability with reduced infrastructure requirements. Emerging technology will inevitably reduce the signature and weight of target lifters, allowing reduced infrastructure requirements and portability for flexibility. Future lifters may be carrot-shaped and in a sleeve that is inserted into the ground to greatly minimize infrastructure requirements and virtually eliminate the need for target bunkers for stationary targets.

Electronics, hydraulics or the combination of the two will cause the lifters to rise out of the tube for maintenance and service purposes. Lifters are then easily moved to other tubes for range reconfiguration. Cost-effective lightweight material and increased survivability of targets will reduce the workload on lifters; this will affect their technical requirements as well.

Re-engineered methods of lifting will also impact future lifters. Enhanced wireless long-range target controlling, integrated into the range-management system with built-in hit indicators, will allow a properly networked approach. Power sources will also be impacted by advancements in rechargeable batteries and alternative power solutions and distribution.

Urban, subterranean realism

Constant and rapidly increasing urbanization globally will only increase the need for proficiency in this environment. Operations in this environment produce unique vulnerabilities and unprecedented challenges. The complexity is only amplified when adding large numbers of "civilians" and traffic to the equation. Threats may come from rooftops, windows, ground level and even from subterranean areas.

A lack of understanding of this complex environment, and a lack of proper training in this environment, was again highlighted in unnecessary losses during recent combat. Most urban training areas are woefully inadequate in depth and complexity, and they lack enough live-fire requirements for forces to properly train. Most urban-training areas are built for survivability, but they lack flexibility and realism.

With this in mind, future urban training and live-fire complexes will need to be completely redesigned with full requirements and functions in mind. This may require using buildings with subfloors and false walls that hide technology and target lifters, a large number of targets and autonomous targets replicating "civilians." The civilian targets could transition into a threat target to fit a given scenario. Remotely controlled, interactive threat and civilian targets that can talk back would also add realism. Remote-controlled, full-sized vehicles would be needed, too.

Another important aspect of realism requires that depth, complexity and restrictiveness be included to replicate multiple types of environments such as "shoothouses" with adjustable ballistic walls to match required floor plans for live-fire rehearsals. Realism would also include survivable and/or expendable clutter such as furniture or vehicles.

The critical need for this type of realistic training environment will only grow. Therefore it needs investment. Research-and-development and related technology must be leveraged to find cost-effective, creative solutions to meet these needs.

360-degree live-fire

Combat occurs in a 360-degree environment. The greatest challenges to a 360-degree range are land requirements, safety requirements and risk. These challenges can be somewhat mitigated by the use of sub-munitions and training rounds, but they still would be virtually impossible to achieve on most modern ranges. This aspect of training should still be exercised through simulations – at a minimum, though. Those who design future ranges should consider at least multidirectional ranges and targets.

Technology and innovation will soon allow virtual range towers, eliminating their requirement on the actual range. Command, control and safety will all be done from a remote location: a range command center. Advanced day-and-night observation capability from multiple directions, range sensors, integrated battle-management systems and vehicle conductivity – both audio and visual (sight optics and turret/vehicle mounted cameras) with the range command center – will mitigate a tower's need. This range command center can be networked to multiple ranges as well.

Portable digital AAR packages linked to the range command center will allow AARs to be conducted on-site, but the range command center will have multiple complete, multi-screened suites with special integrated software to provide a detailed debriefing of any training conducted.

AARs should also include perspectives from the threat's point of view as well as the friendly point of view. Imagery and sensor feedback from drones and other combat multipliers would also be integrated into the range-management system, triggering feedback during exercises. Feedback could also be captured for AAR use and historical documentation. This will allow sensor-to-shooter tools to be integrated in live-fire.

Scenario-driven training

Ranges should be able to adapt to scenario-driven live-fire training as well. Realistic targets, threat and no-threat autonomous and remote-controlled vehicles and personnel can also support shoot/no-shoot drills on live-fire ranges. Range infrastructure and configuration should consider this type of training in the design phase.

Small-arms ranges. Militaries and law-enforcement agencies globally want to implement lessons-learned and integrate emerging technology to improve their live-fire marksmanship, training and qualification programs. Today's basic form of qualification simply evaluates one's ability to engage with a weapon at variable ranges from a fixed position, but it lacks the consideration of many other factors that the shooter will face. Greater emphasis is being given to the use of cover and concealment, magazine changes while engaging, multiple stationary and moving targets, exposure time of the shooter to the threat, weapon transition and night shooting, just to name some examples. Consideration should also be given to the environment in which Soldiers or law-enforcement personnel will operate so that training can be adapted to it.

Modern simulations systems have begun addressing some of these requirements, but our live-fire ranges and qualifications programs haven't adapted very well. The U.S. Army recently announced potential changes to its qualification requirements to include some of these factors, but changes will be required to existing live-fire ranges to properly implement. For example, ranges will need to be modified to reflect multiple environments, unpredictable moving and stationary targets, elevated targets and integration of emerging technology to provide realism and immediate feedback.

For militaries, enhanced basic-qualification ranges of the near future may not look much different than those of today, remaining focused on the fundamentals of marksmanship and the individual Soldier's ability to hit targets on varying ranges. But more qualification for those in combat arms on close-quarter battle ranges, tactical ranges and urban live-fire ranges may also be needed.

Small-arms qualification ranges. Real-time feedback on shot impact at the firing point by devices like a "location of miss and hit" electronic shot-detection and location system is outstanding, but it should also show the impact when using simulation weapons. This expands the use of the range. This will allow initial marksmanship training to be done on the range without firing actual bullets, making it more cost-effective to conduct initial or corrective marksmanship training.

Modern simulated weapons are usually actual weapons with simulation-capable modifications to them, but these weapons will likely need to be better ruggedized to withstand the elements. These simulated weapons also need to be integrated into the range-management software wirelessly to provide feedback capability from the weapon on things like sight picture and trigger pull. This feedback can be done with actual weapons as well. This feedback, along with cameras on the shooter, will allow rapid identification of fundamental flaws, needed corrections and the AAR of other factors, such as magazine changes.

Three-story building façades with windows between shooting lanes allow basic qualification of elevated targets in complex terrain. Emerging construction techniques, composites and ballistic protection will facilitate longevity and easy maintenance of such a structure. Targets can be presented from multiple windows and rooftops. A greater number of targets is required, but this allows variable scenarios and prevents shooters knowing where the targets are at each range. This also reduces range-maintenance delays and increases target life.

The integration of robotic, autonomous moving and stationary targets can also help increase targets without increasing infrastructure. Today's robotic targets can be programmed to drive a pre-programmed route or remain stationary. These are also three-dimensional and can present a realistic target regardless of the direction in which they move. Routes programmed for moving targets should travel from one form of cover to another to provide realism. These capabilities of robotic targets are also integrated into the range-management system.

Qualification ranges should not be known-distance ranges. Targets should

not be exactly in 50-meter increments of range. They should vary their distances, plus or minus 10 meters, to allow an increased number of targets to be used. Qualification ranges are based on point-of-aim at various ranges, not precision adjustments based on known distance.

A couple of the qualification engagements should be fired from around a corner and behind cover such as that found in an urban area. A 45-degree, four-foot-high, three-foot-long "wall" should be placed to one side, slightly behind the normal firing position. This can be portable or fixed. The wall is at a 45-degree angle to the range to allow continued muzzle orientation downrange while using cover. Engagements from behind the wall can be from both prone and kneeling positions.

As discussed, tactical and urban live-fire ranges should also include battlefield clutter such as cars and walls. Targets could be presented from behind some of these as if the threat is using them for cover. Civilian "no-shoot" targets should also be integrated. These targets can appear in a building's window or as a robotic moving target dashing from cover to cover. Multi-target lifters can also present a non-threat target, then the same target can present as a threat target.

The range-management system described will be used for all these ranges as well, integrating many tools for command-and-control, safety and quality AARs. Tools such as monitors at the firing point and ruggedized monitors/electronic tablets will allow playback of videos taken from multiple angles, and all the other data captured by the management system would reenforce feedback and lessons-learned on the spot. All this will also be captured and on display at the virtual tower, with artificial intelligence helping highlight individuals who need further attention and training.

Conclusion

The need for realistic live-fire training and qualification that integrates survival and combat skills with marksmanship accuracy in a variety of situations and environments has never been more important. It is crucial for Soldiers to sustain their fighting edge on today's battlefields. Emerging technology, combined with lessons-learned, allows us to adapt our live-fire ranges to ensure more lethal, survivable Soldiers/law-enforcement personnel in any environment.

The future of simulations integrated with live-fire is not far off. Rather than waiting, though, there is plenty we can do with today's technology. There will be a cost to modernizing today's live-fire ranges, but with that said, what price do you put on Soldiers'/law-enforcement officers' survivability, lethality and dominance on the battlefield of tomorrow?

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Acronym Quick-Scan

AAR – after-action review
ATGM – anti-tank guided missile
IED – improvised explosive device

The Russian BMPT-72 and the Problem of Direct-Fire Support in Armored Formations

by 2LT E.R. Chesley

The tank was originally developed as a direct-fire support platform for infantry, but today the tank is a finely tuned machine designed very specifically to kill other tanks, a task it performs far better than any other weapons system. Unfortunately, in becoming a tank-killer, the tank has lost most of its ability to engage other types of targets.

While the tank has been liberally equipped with weapons and ammunition for dealing with troops, personnel carriers, trucks, field fortifications and air targets, all of these weapons and ammunition represent stopgaps rather than perfect solutions. The tank in and of itself lacks adequate direct-fire capability to deal efficiently with the peripheral threats on the modern battlefield.

Traditionally the tank has been supported in the offense and the defense by mechanized infantry. Mechanized-infantry troops and carriers combine to form a weapons system uniquely suited to support the tank by destroying non-tank targets. However, a tactical gap has developed between the tank and the mechanized-infantry squad that renders the latter ineffective in its fire-support role. The Russians have noted this gap, and they have developed the BMPT-72, a system designed to fill the direct-fire-support role within their armored formations.

This article provides an overview of the BMPT-72 tank-support vehicle and advocates for the creation of an American equivalent.

What is BMPT-72?

The BMPT-72 is an almost completely unique vehicle and, because there is no real equivalent, it is worth asking what exactly it's designed to do. The BMPT-72 is not an infantry fighting vehicle, armored personnel carrier (APC) or cavalry reconnaissance vehicle, and it is certainly not a main battle tank (MBT), so what role does it fill?

The BMPT is the world's first dedicated tank-support vehicle (TSV), a type of vehicle designed specifically to provide direct-fire support for tanks. The BMPT is built on a modified T-72 MBT chassis, meaning it cannot carry infantry. Unlike a T-72, it does not possess a hard-hitting, high-caliber main gun. Instead it is armed with two 30mm autocannons, four anti-tank guided missile (ATGM) tubes and a coaxial 7.62mm machinegun, all mounted in an unmanned turret with two automatic grenade launchers mounted in the hull of some models. This array of firepower allows the BMPT to efficiently destroy a range of battlefield targets, while its powerful chassis makes it as maneuverable and survivable as the tanks it supports.[1]

Figure 1. The first model of BMPT-72. Note the unarmored ATGM tubes, hull-mounted grenade launchers above the tracks and Active Protection System tubes barely visible at the base of the turret. *(Photo copyright Vitaly Kuzmin. Licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.)*

To better explain the role a TSV might play on the battlefield, I will detail how and why the BMPT-72 came to be.

Origins of BMPT-72

In the Russian military, the armored assault is predicated on the idea of close coordination among armor, artillery and mechanized infantry. This close cooperation proved difficult to achieve as infantry carriers are generally too slow to keep up with tanks and too vulnerable to survive on a modern battlefield. Thus the Russians saw a tactical gap developing between the mechanized-infantry squad and the tank. In the midst of this revelation, the Russians experienced acute deficiencies in direct-fire capability during their invasions of Afghanistan and Grozny.[2] [3] [4]

These tactical issues led to the BMPT-72's development, designed to counter the gamut of battlefield threats by offering the suppressive capability of a mechanized-infantry squad in a package that was as protected and maneuverable as the tanks it would accompany.

TSV for U.S. Army

A purpose-built TSV would greatly improve American lethality against the type of mechanized threat that near-peer adversaries pose. TSVs could provide obvious and not-so-obvious advantages to maneuver formations in all sorts of tactical situations:

Figure 2. A Russian army BMPT-72 with a T-80 and T-90. *(Photo copyright Vitaly Kuzmin. Licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.)*

- A formation of MBTs and TSVs facing a much larger mechanized formation could prioritize targets by vehicle type, with MBTs focusing on the anti-tank fight while TSVs eliminated light armor and dismounts. This division of labor would change the "correlation of fires" in favor of U.S. forces. This would also mean tanks could carry a greater proportion of sabot rounds, increasing their endurance and anti-tank capability.
- In urban environments, TSVs could provide direct-fire support to MBTs and dismounts with the advantage of being able to fire at higher angles. The TSVs also create less collateral damage than a tank's main-gun fire. For obstacles requiring greater firepower than 30mm cannons, ATGMs could be swapped for unguided direct-fire obstacle reduction rockets.[5]
- TSVs could carry mine rollers and plows in breaching operations to breach and proof obstacles. Distributing obstacle-reduction equipment to the lighter TSVs would reduce mechanical stress on the already heavier MBTs, and they would be free to overwatch the breach operation.
- A TSV with an unmanned turret would be exceptionally survivable and easily repairable if damaged. Also, an elevated unmanned turret like the one found on the BMPT-72 would allow the TSV to fight without exposing its crew to direct fire.
- A TSV's cannons could easily destroy a *boyevaya mashina pekhoty* (BMP – Russian fighting vehicle) and a *bronetransportyor* (BTR – Russian armored personnel carrier), but given an airburst round or an anti-air-capable fire-control system (FCS), the TSV could turn a Hind (Russian helicopter) into temporarily airborne modern art far more quickly and easily than a man-portable anti-tank system air round. TSVs could even accept small modular radar arrays and swap ATGMs for surface-to-air missiles to provide tactical air defense with gun and missile systems. Adoption of an air-defense anti-tank system (ADATS)-type weapon would allow one missile to perform both anti-air and anti-tank functions.[6]
- TSVs could also be co-opted to provide direct-fire support to infantry formations or guard mobile artillery pieces operating close to the front. Any role requiring flexible direct-fire support could be filled by a TSV.

Modularity

A key aspect of a TSV should be modularity. By creating turret and hull systems that are easily modifiable, even in theater, the TSV could be quickly and easily adapted to a variety of "roles within a role." Although the role of a TSV is to provide direct-fire support to tanks, other missions and a range of different threats on a range of different battlefields would make it difficult to create a one-size-fits-all platform.

For example, a TSV moving into an urban area would require different subsystems than one assigned to accompany armored formations in an attack or defense against a sophisticated mechanized threat in open country. Alternatively, in the case of an urban environment, a commander might want explosive or semi-armor-piercing ammunition, a Common Remotely Operated Weapon Station-mounted machinegun or automatic grenade launcher, an acoustic gunfire-detection system and the previously mentioned obstacle-reduction munitions, along with applique armor to increase all-aspect protection without endangering dismounts.

Against a mechanized threat, a commander might want armor-piercing and high-explosive ammunition, ATGMs, advanced day-night optics and an explosive reactive armor (ERA) package. By designing modularity into the platform, the TSV could fulfill multiple roles on a variety of battlefields.

The Stryker can be seen as an example of the benefits of modularity. Despite the Stryker's distinct lack of survivability and cross-country mobility, the Army has leveraged this basic platform into a range of vehicles with unique capabilities. As an example, the Army's current short-range air defense (SHORAD) solution – the Stryker-based A1 IM-SHORAD – sees a Stryker chassis equipped with an anti-aircraft gun, missiles, radar and electronic-warfare systems.[7] [8] [9] The Army also apparently intends to equip the vehicle with emerging laser anti-drone weapon systems.[10]

By using a modular platform as a base on which various weapons and systems can be attached, the Army has created a platform to deal with conventional air threats as well as the

emerging threat of small unmanned aerial systems. Unfortunately, while a big step in the right direction, any Stryker-based system remains woefully incapable of accompanying armor. A more mobile and better protected, but equally modular, platform could present a solution to a range of tactical problems that at present are filled by stopgap solutions.

Organization

One critical, non-materiel question to be asked when considering the adoption of a new platform, especially a conceptually new platform that is not simply replacing an existing system, is how the new weapon should be integrated into an existing organization.

Let's consider an armored brigade combat team. If TSVs are integrated independently from the combined-arms battalions (CABs), perhaps as one or two companies in the brigade engineering battalion (like the Stryker main-gun system in the Stryker BCT), or in a novel "maneuver fire-support battalion" with one or two companies of mechanized infantry, there would be an benefit in terms of maintenance and organization. If these platforms were grouped together, the brigade commander would have greater control over how they were used, and he or she could mass their effects. If centralized, TSVs could be controlled and commanded by officers and Soldiers who have the experience and background to make the best tactical use of the platform. Also, centralization of these platforms would make resupply and maintenance more straightforward.

On the other hand, integration of TSVs into the CABs by supplementing or replacing the mechanized-infantry companies would provide greater tactical efficiency. The Russians found that integrating combined arms at the battalion level allowed better and more regular combined-arms training. Integration at the battalion level would lend itself to tactical efficiency as more training opportunities would be available and tactical leaders would be more familiar with each other's systems and tactics.

The Russians eventually found that managing the training, maintenance and supply of many different platforms proved to be an overwhelming burden for battalion commanders and the CAB structure was eventually abandoned, but there are several important differences between U.S. and Russian battalions.[11]

First, U.S. battalion commanders tend to be much more experienced than their Russian counterparts and, critically, tend to have a much larger staff.[12] Second, Russian formations tend to be less flexible at battalion levels and retain more initiative at echelons-above-battalion, making them less capable of integrating combined arms at a tactical level.

As to the issue of maintenance and supply, if the TSV was developed on an Abrams chassis, these problems might be even less of an issue than they are now. Also, despite past Russian failures, the United States has seen success with tactical combined arms as exemplified by the armored-cavalry troops (ACTs) organic to armored-cavalry regiments (ACRs), which I will discuss later.[13]

Another important consideration is the fact that the Russians have returned to the use of CABs in the form of their battalion tactical groups, which are, at present, in wide use.[14]

I propose that a sort of best-of-both-worlds solution could be achieved in terms of organization. In the CABs, TSVs could be integrated as separate TSV companies within the CAB – or even integrated at the company level along the lines of the ACR's ACT, with one or two platoons of TSVs operating with two or three platoons of Abrams.

Also, at the brigade level, one or two companies of TSVs could be maintained as a more flexible resource for use by the brigade commander. These brigade-level assets could include TSVs equipped for air defense, infantry fire support or security missions, with the added benefit that these niche-support vehicles could be operated by Soldiers with relevant military-occupation specialties (MOSs) such as the 11 or 14 MOS series.

Bradley and Desert Storm

There is the question of why the Army should pursue an entirely new platform when the Bradley already exists. This is a good question because the Bradley is a proven platform, and it is similar to a TSV in many ways. During the 1991 invasion of Iraq, the Bradley worked closely with the Abrams as part of the ACT and acted as both a reconnaissance vehicle and, in many cases, a makeshift TSV.

At the Battle of 73 Easting, a microcosm of Operation Desert Storm, Bradleys used ATGMs to engage targets outside the range of the Abrams main gun and used autocannons against softer targets such as APCs, infantry and field fortifications.[15] There are even accounts of Bradleys destroying multiple tanks at close range, but despite their performance, there are limits to the efficacy of the Bradley that can be uncovered by looking closely at the 1991 invasion.

First, Desert Storm, as the name reminds us, occurred in an open desert where visibility conditions were limited by severe weather. This meant that coalition armor was often able to use superior optics and FCS to see through dust and engage enemy targets from beyond the range at which the low-quality export-model T-72s could respond. The fact that Iraqi armor was often unable to lay effective direct fire, even at close ranges, underscores this point.[16] This lack of effective fire-control capability meant that Bradleys were less exposed to enemy direct fire and their much weaker armor did not present an issue.

That being said, in this situation, it is important to consider that there were far more casualties among Bradley crews than Abrams crews.[17] [18] [19] The Bradley is vulnerable to direct fire and, in a European conflict, armored formations would be exposed to accurate direct fire, and the Bradley would be forced to either remain far behind the armor or suffer inordinate losses. Therefore one of the key principles of the TSV concept is that they should be as survivable as the MBTs they support.

The second issue with the Bradley relates to its limited mobility. While post-Desert Storm sources stated that the Bradley was able to keep pace with the Abrams, there were some issues, notably with reverse speed.[20]

Figure 3. An M2 Bradley Fighting Vehicle operates in desert conditions at the National Training Center, Fort Irwin, CA. *(U.S. Army photo by SGT Eric M. Garland II)*

The Abrams reverse speed is about double that of the Bradley, which resulted in vulnerable Bradleys being left behind by rapidly reversing Abrams. Also, the Abrams is flat-out faster than the Bradley, and a TSV built on an Abrams chassis would probably be about 10-20 tons lighter still than an Abrams, meaning that more rapid and shocking attacks would be possible.

The Bradley is a good weapon system and an important part of any maneuver formation, but it will not prove an effective substitute for a purpose-built TSV. Although creating a new weapons system from scratch may not be ideal, there is no need to develop a completely new vehicle when the Army already has many of the parts necessary to simply "assemble" one.

Approach to acquisitions problem

While simply shoehorning a pre-existing platform like the Bradley into a new tactical role would be cheaper than creating an entirely new vehicle, the cost of creating a TSV need not be prohibitive. The Army would be able to pursue a more "evolutionary" approach to the acquisitions process, as many of the subsystems necessary to create an effective TSV are already battle-tested and relatively little ground-up design work would be required.[21]

The TSV could make use of a redesigned Abrams chassis with the entire crew moved into the hull to make room for an unmanned turret. Private industry has already created an Abrams with an unmanned turret, and it has recently displays mockups of a new version of the same concept.[22] The TSV would require a new unmanned turret, but there are a variety of suitable weapons systems in the U.S. inventory now. These include the Bushmaster and several new larger-caliber autocannons; the tube-launched, optically tracked, wire-guided missile; Hellfire and Javelin missiles; and a full selection of machineguns and automatic grenade launchers. With these options already on hand, design work could focus on creating a new housing for pre-existing weapons and systems.

It might also be desirable to rearrange armor around the TSV to enhance all-aspect protection at the expense of a bit of frontal-aspect protection, but this type of redesign could be accomplished relatively easily by making use of ERA or applique armor.

Ultimately, there is no need to reinvent the wheel for a system that represents more of a conceptual change than a technological one.

Mechanized infantry

On the subject of mechanized infantry, the Russians have not discounted their value in the combined-arms team, and neither do I.[23] In fact, I believe that an American TSV would free the infantry to focus on missions for which it they are more uniquely suited, such as clearing and patrolling close terrain, reducing bypassed enemy formations and assisting in defensive actions from well-sited and prepared positions. Reducing the exposure of mechanized infantry to anti-tank weapons by removing them from the bleeding edge of the battlespace would allow infantry-vehicle concepts that more closely conform to the dismounted mission.

The Bradley is relatively well-armed and -armored because it was conceived for high-intensity Cold War conflict against T-72s and BMPs.[24] It pays for this substantial combat capability by having limited space for dismounts and less cross-country mobility than a lighter platform. If mechanized infantry were not forced to closely accompany MBTs in combat, their exposure to direct fire would be decreased and infantry vehicles could return to an APC concept, typified by lightly armed and armored platforms that are highly mobile and provide protection from artillery, machinegun and light anti-tank weapon fire.

As an example, during the Vietnam War the lightly armed and armored M113 APC was often found to have better mobility across difficult terrain than even dismounted troops due to its light weight and amphibious capabilities.[25] Lighter, faster and more capacious vehicles would allow the infantry to focus on missions at which they excel by allowing dismounts to maneuver to an objective more rapidly and in greater numbers.

Also, TSVs could provide more effective direct-fire support for infantry than any presently available platform, making up for the loss of firepower from their old transport vehicles.

TSVs in Russian military

To date, the BMPT-72 has not been widely incorporated into Russian Army structure. While this might seem to discredit the concept, there are several reasons for this apparent lack of interest.

While the BMPT-72 has not been

widely integrated, it has been accepted for service, and the Russian Ministry of Defense (MoD) has begun to take deliveries of the platform. It seems that despite ongoing development, the MoD has only just deemed the BMPT-72 to be acceptable but probably not fully so. Despite the limited adoption, development is proceeding on future models of the BMPT-72, indicating an ongoing interest in the concept. The next model of TSV will reportedly make use of the Armata chassis and be even more heavily armed.[26]

When looking at Russian arms development, it is important to consider the MoD's relatively limited financial resources. Despite devoting a proportionally large amount of money to "defense," Russia has historically been unable to field all its newest and most effective gadgets.

The Armata platform is a perfect example. It seems likely that Russia would like to adopt the T-14 and other Armata-series vehicles, but it has proven more financially viable to acquire greater numbers of older, but still very capable, tanks and armored vehicles.[27] Acquisition of the BMPT-72 will likely proceed at a limited rate due to financial difficulties rather than lack of interest.

Another consideration is the fact that the most recent model of the BMPT-72 was apparently specifically designed for the export market.[28] This may play a role in its limited adoption, as Russian export vehicles are generally inferior to their domestic acquisitions.

Algeria has apparently fielded a substantial number of imported BMPT-72s alongside imported T-90s, and Kazakhstan has enthusiastically incorporated the BMPT-72 into its force structure, even going so far as to commence domestic production under license.[29] [30] One possibility is that Russia may be making shrewd use of an opportunity to field an advanced testbed by selling it to other countries and closely monitoring its performance before pursuing final development for themselves; however, this is entirely my own speculation.

As a final note on the subject, a Chinese corporation has developed a TSV similar to the BMPT-72. The QN-506 is built on the Type 59 tank chassis and features an even wider range of weapons than the BMPT. However, it is unclear whether the vehicle will be adopted for service in the Chinese army.[31]

Conclusions

My proposal here is not novel. The BMPT-72 demonstrates that Russia, the world leader in armor theory, is pursuing solutions to the problem of direct-fire support in armor formations. This is not even a new idea in the West. In 1996 an article was published in ***ARMOR*** that provided a detailed proposal for a vehicle built on an Abrams chassis, designed to provide air defense and direct-fire support with autocannons and missiles.[32] However, the collapse of the Soviet Union and the beginning of the Global War On Terrorism resulted in an almost complete lack of interest in developing platforms for symmetric warfare.

With a resurgent Russian military, focus is returning to the armored fight. The U.S. Army has about 20 years of resting on the laurels of Desert Storm to reckon with. Given the wide range of anti-tank threats on the battlefield, the tank's limited ability to deal with these peripheral threats and the mechanized infantry's increasingly limited ability to accompany armored formations, it seems clear that a new solution to the problem of direct-fire support in the armored formation is warranted.

Figure 4. The latest model of BMPT-72 destined for the export market. Note the redesigned turret and lack of forward-facing grenade launchers. *(Photo copyright Vitaly Kuzmin. Licensed under a Creative Commons Attribution-Non-Commercial-NoDerivatives 4.0 International License.)*

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Notes

[1] Dr. Lester W. Grau, "Preserving Shock Action: A New Approach to Armored Maneuver Warfare," ***ARMOR***, September-October 2006.

[2] Yago Rodríguez Rodríguez, ***Revista Ejercitos*** on-line, Oct. 13, 2018, https://www.revistaejercitos.com/2018/10/13/bmpt-terminator-i/.

[3] Grau, "Preserving Shock Action: A New Approach to Armored Maneuver Warfare."

[4] CPT Charles K. Bartles and Dr. Lester W. Grau, "A New System Preserves Armor Dominance of the Future Battlefield: BMPT 'Terminator-2'," ***ARMOR,*** April-June 2015. This article represents the main source of my ideas on this subject. I would highly recommend reading this article in its entirety to better understand my article, specifically the Russian basis for developing the BMPT-72.

[5] Or rockets could make use of high-explosive squashhead-type warheads, which have exceptional effects against obstacles.

[6] Dr. Asher H. Sharoni and Lawrence D.

Figure 5. The Object 787, an early prototype TSV. *(Photo copyright Vitaly Kuzmin. Licensed under a Creative Commons Attribution-NonCommercial- International License NoDerivatives 4.0.)*

Figure 6. The Russian Army BMPT-72. Note that the turret has been modified with armor surrounding the ATGM tubes and some other changes, but the hull retains the grenade launchers. *(Photo copyright Vitaly Kuzmin. Licensed under a Creative Commons Attribution-NonCommercial- International License NoDerivatives 4.0.)*

Bacon, "Forward Area Air-Ground Defense: Do We Need A Dual-Role Hybrid Air-Ground Defense System for the Armored Forces?", ***ARMOR***, July-August 1996: "[ADATS] is a single-stage, multi-purpose, highly accurate, day/night and adverse-weather missile system. It has a true and unique dual-target capability for engaging low-flying aircraft, advanced attack anti-tank helicopters and armored vehicles."

[7] "Department of Defense authorization for appropriations for Fiscal Year (FY) 2015 and the future years defense program." According to GEN Raymond Odierno, "The analysis found that the Stryker, as currently designed, lacks sufficient off-road mobility to maneuver in the same operational environment as armored brigade combat team (ABCT) combat vehicles. Although the Stryker provides improved force protection against underbody threats, it lacks protection against direct fire and indirect fire threats." This was in 2015 and little (nothing) has changed.

[8] Eric Miller, "Stryker Problems Highlight Testing Shortfalls," ***Defense News***, Nov. 1, 2004, http://pogoarchive.pub30.convio.net/pogo-files/alerts/national-security/ns-siav-20041101.html. In an attempt to convince the House Armed Services Committee to block purchase of two Stryker brigades' worth of platforms, retired COL Douglas Macgregor stated that the Stryker lacks the "firepower, protection, mobility and organic logistical support to be a full-dimensional warfighting organization, and its operational utility will continue to be limited to peace support or paramilitary police operations."

[9] "AUSA 2019: General Dynamics unveils Stryker A1 IM-SHORAD air-defense armored vehicle," Army recognition, Oct. 22, 2019, https://www.armyrecognition.com/ausa_2019_news_show_daily_coverage_report_united_states/ausa_2019_general_dynamics_unveils_stryker_a1_im-shorad_air_defense_armored_vehicle.html.

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[13] Field Manual (FM) 34-35, ***Armored Cavalry Regiment and Separate Brigade Intelligence and Electronic Warfare Operations***, Chapter 2 (organization) describes the ACR's organization in the 1090s with two tank platoons and two Bradley scout platoons per company.

[14] CPT Nicolas J. Fiore, "Defeating the Russian Battalion Tactical Group," ***ARMOR***, Spring 2017. Describes the Russian battle tactical group and provides an overview of their use in Ukraine.

[15] Transcript of taped interview with officers of Troop E, 2/2 ACR, and scout-platoon leader from Troop G, 2/2 ACR, March 3, 1991, https://mcoepublic.blob.core.usgovcloudapi.net/library/ABOLC_BA_2018/Research_Modules_B/ 73_Easting/2-2_ACR-1.pdf. This source provides

a thorough overview of the tactical-level battle at 73 Easting and includes a number of cases where Bradleys were used to provide direct-fire assistance for Abrams. Examples can be found on Pages 8, 15, 19, 22, 23, 27 and 29.

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[21] Bartles and Grau, "The Russian Way of War." Includes an explanation of "evolutionary" acquisitions and elaborates on its advantages.

[22] I have personally seen the unmanned turret Abrams prototype at the Maneuver Center of Excellence's Armor Restoration Shop. As for the private-industry mockup, I saw a model of it at the Maneuver Warfighter Conference in 2019 and confirmed that it was conceived as an Abrams chassis with a new unmanned turret.

[23] Grau, "Preserving Shock Action: A New Approach to Armored Maneuver Warfare": "It was not an infantry fighting vehicle (BMP) and the Russians were not discounting the value of mechanized infantry in the combined-arms team. They were recognizing that the mechanized infantry may not be at the critical point at the critical time."

[24] Diane L. Urbina, "Lethal beyond all expectations: The Bradley Fighting Vehicle" – in Chapter 12 of George F. Hofmann and Donn A. Starry (editors), ***Camp Colt to Desert Storm: The History of U.S. Armored Forces,*** Lexington, KY; The University Press of Kentucky, the author discusses how the Bradley was steadily upgunned and uparmored in response to the threat of Soviet armored forces.

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[26] Petri Mäkelä, "Check out Russia's Deadly 'Terminator' Tank That Was Built for Urban Warfare," ***The National Interest***, Aug. 13, 2019: "There is also a Terminator-3 version that is based on the T-14 Armata platform. The issues with the T-14 have delayed the introduction of the Terminator-3 into the future."

[27] Tomas Malmlöf lecturing at the Center for Strategic and International Studies on "The Russian Military of 2035," May 24, 2017, https://youtu.be/iKhOgYA2L30?t=1020. Lecturer starts discussing procurement around the 17-minute mark.

[28] Mikhail Voskresenskiy, "Russian MoD Decides to Buy 'Terminator' Combat Vehicles – Here's Why," Aug. 25, 2017, https://sptnkne.ws/fqtC: "The Terminator 1 and the Terminator 2. They're both earmarked for export and haven't been purchased by the Russian Defense Ministry."

[29] "Finest Armour in Africa: Algerian Army Receives New Batch of T-90SA Battle Tanks," Jan. 11, 2020, https://militarywatchmagazine.com/article/finest-armour-in-africa-algerian-army-receives-new-batch-of-t-90sa-battle-tanks: "Serving alongside the T-90SA are BMPT-72 Terminator 2 tank-support vehicles, for which Algeria was the first foreign client."

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[31] Kyle Mizokami, "China's 'Terminator' (TSV) Is Bristling With Weaponry," Nov. 7, 2018, https://www.popularmechanics.com/military/weapons/a24793656/chinasterminator-tank-support -vehicle-is-bristling-with-weaponry/.

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Acronym Quick-Scan

ACR – armored-cavalry regiment
ACT – armored-cavalry troop
ADATS – air-defense anti-tank system
ATGM – anti-tank guided missile
APC – armored personnel carrier
BCT – brigade combat team
BMP – *boyevaya mashina pekhoty* (Russian fighting vehicle)
CAB – combined-arms battalion
ERA – explosive reactive armor
FCS – fire-control system
FY – fiscal year
MBT – main battle tank
MoD – Ministry of Defense
MOS – military-occupation specialty
SHORAD – short-range air defense
TSV – tank-support vehicle

Volcano Minefield Planning at the Brigade Combat Team and Below

by CPT Gregory Shepard and CPT Doni Wong

For the past several years, the National Training Center (NTC) has operated using decisive-action training environment scenarios after nearly a decade of counterinsurgency (COIN) training. Before the COIN era, brigade-sized defenses at NTC included large-row minefields constructed using conventional mines such as the M15 or M21 anti-tank land mine.

While many of the U.S. Army's senior leaders at the brigade level and above may recall these training events at NTC in the 1990s, many current planners at the battalion level and below have not participated in them.

Moreover, changes in U.S. landmine policy from 2004, 2011, 2014 and 2020 restrict the munitions available to current planners[1] who did not defensively plan in the 1990s.

The U.S. Army can currently only use mines with a self-destruct mechanism.[2] As a result, defensive obstacle plans rely on the artillery-delivered remote anti-armor minefield, area-denial artillery munition and Volcano delivery system for emplacing large minefield obstacles.

Though the Volcano minefield system transitioned to the focal point of most brigade combat team (BCT) defensive plans at NTC, observer/coach/trainer (O/C/T) observations and discussion during after-action reviews (AAR) have highlighted the task-force staffs' unfamiliarity with the system and its employment.

Unfamiliarity with the system results in failure to identify the proper triggers required to ensure the mines are deployed and still active when the enemy arrives, and/or creates unrealistic expectations for what the operators can achieve with the Volcano system. Moreover, many of the requirements for Volcano employment are influenced by multiple warfighting functions, including intelligence and command and control.

To successfully emplace a minefield, a task-force staff must know the limitations of the Volcano system and be comfortable with using the R>EACT (rate, emplacement, arming, command approval and travel) formula.

Planning for defense

Proper and thorough intelligence preparation of the battlefield (IPB) sets the conditions for a successful defense. Achieving the task-force commander's intent is ensured by understanding the enemy's composition, capabilities, most likely order of battle and most likely course of action (CoA) – and bringing it all together. Successful IPB reduces the number of likely enemy CoAs from infinite to a few likely ones and is a primary driver in the development of the task force's plan.

Likewise, identifying the reconnaissance assets required to observe named areas of interest (NAIs) to further determine the enemy's actions by observing for specific indicators is done during this process. The indicators observed guide commanders and their staffs through the decision-making process and actions to counter the enemy. From here, the characteristics of the defense and engagement-area development can be used to form a cohesive plan that addresses the current situation.

Determining how to best use all assets available to the task force (indirect fires, obstacles, information-collection assets, survivability positions, etc.) should not be done in a vacuum or by a single warfighting function. Including the engineer team who will assist in constructing or deploying the obstacles in the planning process is critical. Understanding the engineers' capabilities and limitations is vital to creating a realistic and feasible obstacle plan.

Likewise, engineers must be able to describe to the task force the obstacle's possible effects and the limitations on its construction, especially regarding time. Building a shared understanding and habitual working relationship with the engineer team and the maneuver commanders they are supporting accelerates the plan's link-up and dissemination. Also, this will aid the reduction of poor or overly vague guidance from maneuver commanders regarding what they want the obstacle to accomplish. The engineer's advice can help ensure the ground commander's intent is still met while working within the limits of personnel,

Figure 1. Volcano system within an ABCT.

time and equipment. An example of this is the employment of Volcano minefield systems

Volcano minefield employment, considerations

The Volcano system in the armored brigade combat team (ABCT) and the Stryker BCT (SBCT) are similar in design but vary in capabilities. Specific obstacle effects are achieved by combining minefield patterns in different ways. For example, a single-row pattern creates a single minefield obstacle approximately one kilometer long.[3] For a more detailed explanation of how to arrange minefield patterns to achieve specific effects, see Army Technical Publication (ATP) 3-90.8, ***Combined Arms Countermobility Operations***, and confer with the supporting engineer unit's leadership.

During the planning process, the task-force staff considers the number and pattern of minefields required to create the intended effect. Though it is possible to reload the Volcano system and execute successive minefields, the time required for emplacement may not always be available. For example, the standard planning factor for reloading a Volcano system is less than one hour. However, observations and multiple AARs as an O/C/T have shown us that most engineer units do not train this task to standard.

Problematic lack of reload training

This lack of training is problematic when the squad or platoon is attempting to reload a Volcano system for the first time. Moreover, some engineer units only plan to use the two Volcano system operators to execute the reload because the rest of the engineer platoon is generally recovering from 36-48 hours of continuous obstacle construction.

In this case, the expected reload time is a few hours. If the task force is only approved for a four-hour-duration[4] minefield, the first minefield may be close to entering the self-destruction window by the time the same Volcano system begins employing any subsequent minefields.

Figure 2. Volcano system in an SBCT.

R >EACT formula and execution criteria

Volcano minefields are comprised of scatterable mines (SCATMINES) that have a self-destruct time and therefore must be treated as situational obstacles.[5] A situational obstacle is defined as an obstacle a unit plans and possibly prepares prior to starting an operation but does not execute unless specific criteria are met. It's important to understand that situational obstacles use an event-based criteria or trigger and not a time-based criteria.[6]

Again, it is imperative for the task force to conduct a comprehensive IPB during the military decision-making process to identify what routes the enemy is likely to travel. Once the likely enemy routes are identified, the task force staff can use the R>EACT formula to help aid in planning for the Volcano emplaced minefield.

- **R** = Expected travel time of enemy forces from the NAI associated with the minefield to the minefield's templated location. The task force needs to use its IPB to determine enemy rates of march along expected avenues of approach and how those rates may be affected by terrain, light/visibility and weather.
- **E** = Emplacement time of system. The emplacement time is the amount of time it takes for the Volcano system to drive through the centerline of the minefield and deploy the SCATMINES. For planning purposes, this is assumed to be several minutes but should be rehearsed by the emplacing unit as the emplacement time is also affected by terrain, light/visibility and weather.
- **A** = Arming time of the mines. The arming time is the amount of time it takes for the mines to arm themselves once fired from the Volcano system.
- **C** = Command-approval time. The command-approval time is the entire process from observer to Volcano operators. It includes the time required for the observer to identify and report the enemy's location and the time for the approval authority to receive all specific event-based triggers and make a decision. It also includes time for the approval authority to communicate to the emplacement authority, and time for the emplacement authority to communicate to the crew operating the Volcano system. The command-approval process is much more complex than perceived by everyone in the approval process due to the difficulties units face with establishing effective communications over distance at NTC. It is important for all those involved in the command-approval process to understand the primary, alternate, contingency and emergency (PACE) plan for how each element will communicate.
- **T** = Travel time of the Volcano system. The travel time is the time required for the Volcano to physically drive from its hide site to the templated minefield location and then from the minefield location out of the engagement area behind the battle positions. It is important to ensure the effects of terrain, light/visibility and weather are included in this time as well.

Once task-force planners calculate the total "EACT" time, they establish an NAI at an appropriate distance away from the templated minefield along the enemy expected avenue of approach such that "R" is greater than the total sum of the "EACT" times (see examples in Figures 3 and 4). After establishing the NAI, task-force planners specify a primary and alternate observer for the NAI, integrate the NAI into the information-collection matrix

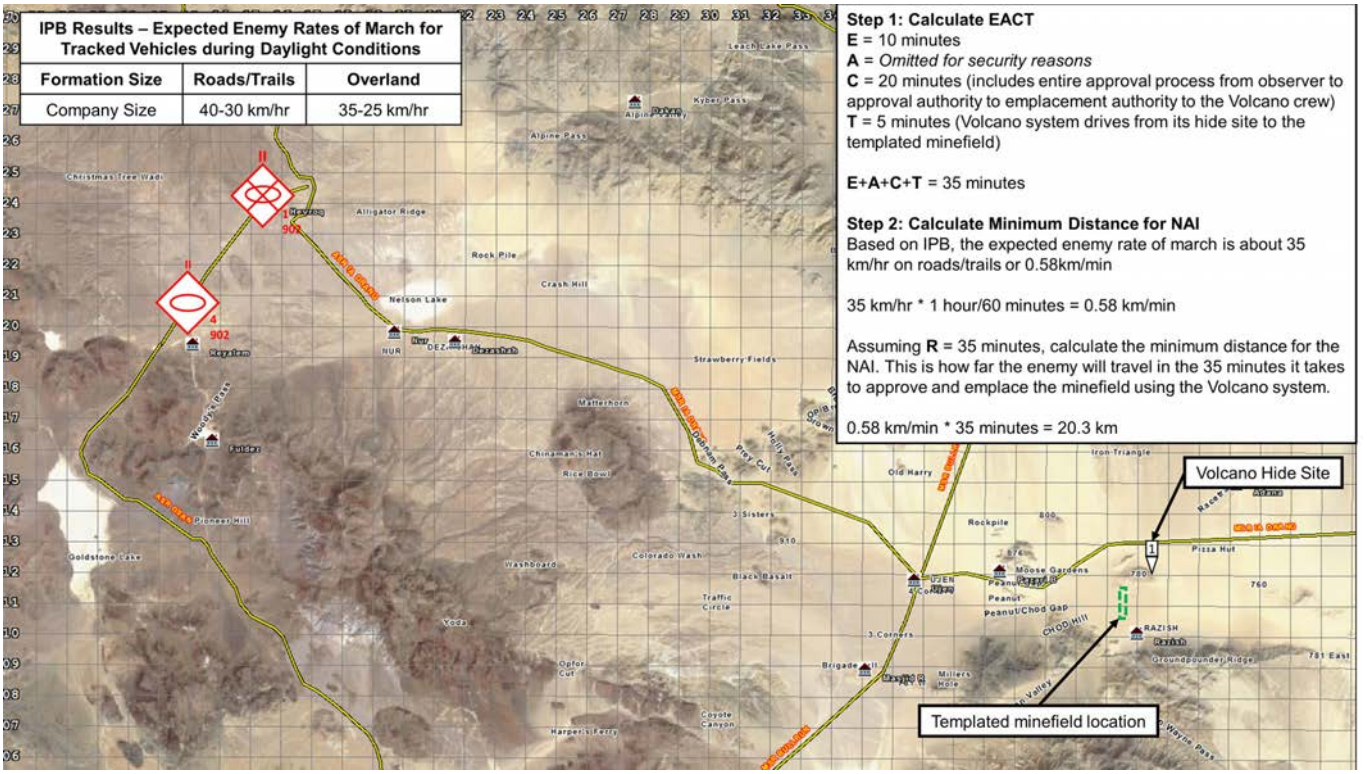

Figure 3. R>EACT formula example.

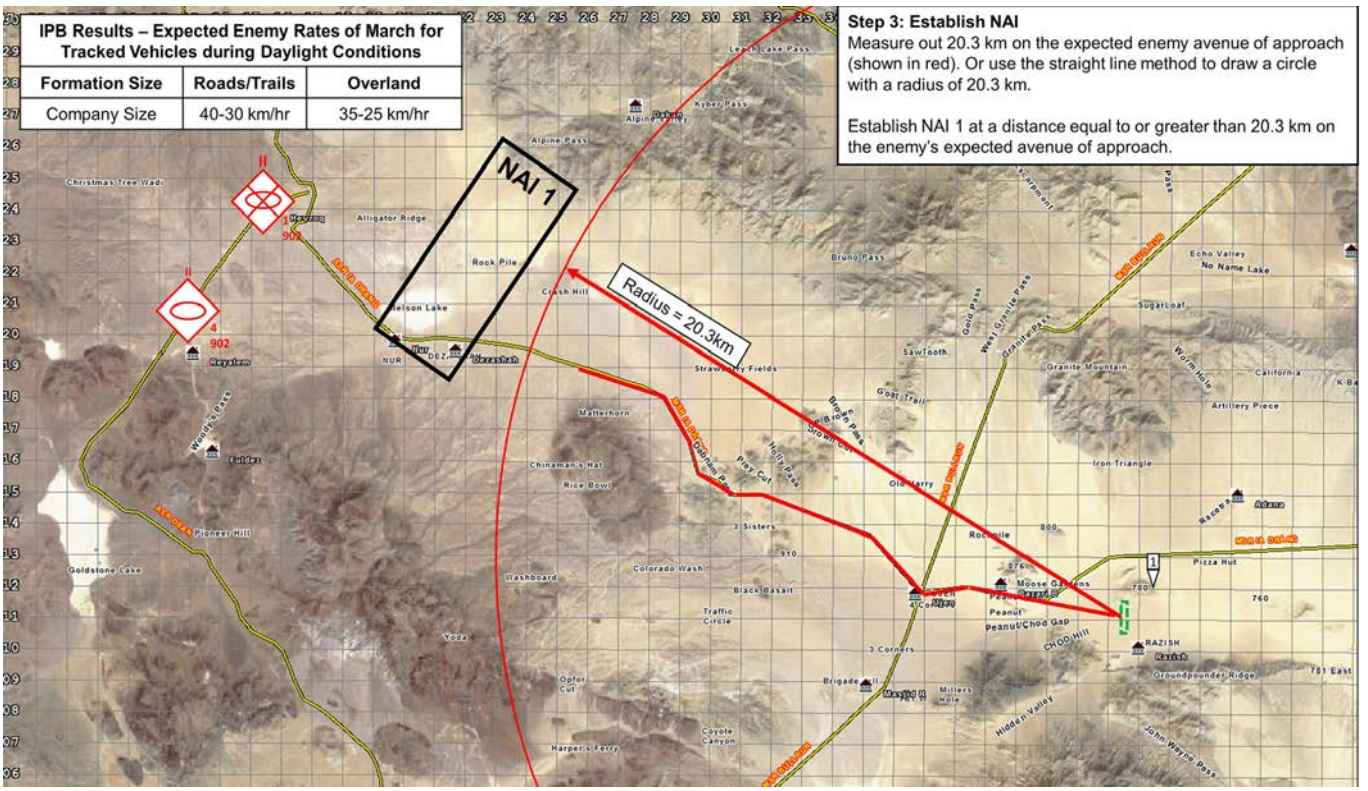

Figure 4. R>EACT formula example No. 2.

and create a decision point associated with the NAI. A fully developed decision point is critical and must contain a comprehensive set of criteria founded on event-based triggers to determine if and when the minefield will be executed.

The execution criteria for emplacing the minefield must be clearly defined by the task force staff using event-based triggers. The observers, the approval authority and the emplacing authority must all have a clear understanding of the triggers. For example, is it a friendly event-based trigger such as the cavalry troop, forward in the screen, withdrawing behind the minefield? Or is it enemy event-based with six to eight enemy vehicles driving through the NAI? Or is it both? What if the reconnaissance asset is forced to withdraw due to a reason beyond being decisively engaged – is the Volcano minefield still emplaced without observation? Or, if the reconnaissance asset identifies six to eight enemy vehicles driving through the NAI but the reconnaissance asset can maneuver and force the enemy to withdraw from the avenue of approach, is the Volcano minefield still executed?

All personnel within the command-approval process must understand the event-based triggers that define the specified execution criteria of the minefield as well as the conditions that may cause them to become invalid.

Understanding the event-based triggers that meet the execution criteria is important enough to warrant a separate rehearsal of the complete approval process. This rehearsal benefits the task force in three ways:

- The unit can run through various scenarios to ensure everyone clearly understands the event-based triggers;
- The rehearsal allows the unit to test its PACE plan to ensure it is applicable; and
- The rehearsal provides the unit with an understanding of exactly how long it will take to approve the minefield's emplacement. Having a clear understanding of the event-based triggers reduces the likelihood of a premature or delayed emplacement of the minefield.

Recommendations for way forward

Task-force staffs need to understand that the Volcano minefield delivery system is limited and is planned using the doctrinal patterns. Confer with the supporting engineer unit for details about capabilities.

Task-force staffs also need to understand and use the R>EACT formula to plan for the execution of a Volcano emplaced minefield. Ensure an NAI is included in the information-collection matrix with a specified primary and alternate observer.

Volcano minefields must use event-based triggers. The execution criteria must be clearly defined using event-based triggers and understood by all personnel involved in the command-approval process. Rehearse the command-approval process to ensure various scenarios concerning event-based triggers are understood and to avoid premature or delayed execution

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CPT Doni Wong is a graduate student at the University of San Diego in the Master of Arts in Leadership Studies program. His previous assignments include reconnaissance-troop commander in 1-91 Cavalry (Airborne), 173rd Infantry BCT (Airborne), Grafenwoehr, Germany; Armor Basic Officer Leader Course (ABOLC) troop commander, 2-16 Cavalry Regiment, 199th Brigade, Maneuver Center of Excellence, Fort Benning, GA; and platoon leader and company executive officer, 1-22 Infantry Battalion, 1st ABCT, 4th Infantry Division, Fort Carson. CPT Wong's military schools include ABOLC, Airborne School, Ranger School, Maneuver Captain's Career Course and Cavalry Leader's Course. His awards include the Bronze Star Medal and Meritorious Service Medal with one oak-leaf cluster.

Notes

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[2] U.S. Department of Defense, ***DoD Policy on Landmines*** [memorandum], Jan. 31, 2020.

[3] Project Manager Close-Combat Systems (PM CCS), "Volcano Multiple Delivery Mine System," ***PdM Area Denial***, www.pica.army.mil/pmccs/areadenial/legacymines/volcano.html.

[4] Ibid.

[5] ATP 3-90.8.

[6] Ibid.

Acronym Quick-Scan

AAR – after-action review
ABCT – armored brigade combat team
ABOLC – Armor Basic Officer Leader Course
ATP – Army technical publication
BCT – brigade combat team
CoA – course of action
COIN – counterinsurgency
IPB – intelligence preparation of the battlefield
Km/hr – kilometer/hour (Figures 3 and 4)
NAI – named area of interest
NTC – National Training Center
O/C/T – observer/coach/trainer
PACE – primary, alternate, contingency, emergency
PM CCS – Project Manager Close-Combat Systems
R>EACT – rate, emplacement, arming, command approval and travel
SBCT – Stryker brigade combat team
SCATMINES – scatterable mines

Armored Warfare during the Spanish Civil War (1936-1939): The Experience Reconsidered

by COL(R) Anthony J. Candil

Historians of armored warfare have often misinterpreted the role of armor in the Spanish Civil War. Some of them said the war was just a "laboratory"; others concluded there were few, if any, lessons to be drawn from it. The confusion of historians is understandable because the conflict was not a demonstration of brilliant tactics and great battles, but was rather a series of attritional battles.

The Spanish Civil War was of interest to the U.S. War Department's Military Intelligence Division (MID).[1] Through Army attachés stationed in major embassies in Europe, MID received technical and tactical information concerning weapons that the Germans, Soviets and Italians used in Spain. Although the information the attachés gathered was often random and incomplete, they and their sources saw trends in the development and use of modern weapons, especially the tank and antitank guns. The attachés' efforts provided MID with information that could be analyzed about the nature of a possible future European war; that the U.S. Army could not or would not make use of the lessons of the war in Spain was not due to a lack of information!

The Spanish Civil War was the first encounter between tanks in combat, although limited. However, the employment of tanks on the Spanish battlefield allowed many aspects and possibilities of armored warfare that later would make it a key decision tool for modern warfare.

Doctrine still developing

Each nation that provided armor to the Spanish Civil War harbored its own views about how to employ tanks in operations. The Germans were still developing their thinking, while the Soviets had already embraced concepts stressing "deep battle" by offensive actions – and even codified them in their army regulations of 1936. The Italians were committed to their theory of *guerra celere*, so far experienced only in Ethiopia against a much weaker foe.

However, the circumstances of the war in Spain made it impossible for the nations' ideas to be tested except on a few limited occasions. Tanks became tactical weapons normally employed in support of offensive operations or to bolster defenses.

Neither the Nationalists nor the Republicans in Spain employed *blitzkrieg* tactics for the simple reason that German doctrine at that moment was purely theoretical and had not been fully worked out, even for the German army, much less for the rudimentary Spanish Nationalist forces. Combined-arms operations involving air-to-ground support, though, became important for Nationalist offensives during the last two years of the war. This occurred despite the fact that the opposing armies were inadequately developed to create any other forms of combined-arms operations. Much of the time, the defense enjoyed an almost-World War I level of effectiveness, and though Francisco Franco Bahamonde – the Spanish general who led the Nationalist forces in overthrowing the Second Spanish Republic during the Spanish Civil War – was successful in most of his counteroffensives, they foreshadowed those of World War II only to a limited degree.

As a matter of fact, the German *blitzkrieg* theory was embraced only after the campaign of France in 1940, leading to unforeseen consequences for the German army. However, the word *blitzkrieg* was expressly mentioned in 1935 in an article in the professional magazine ***Deutsche Wehr***, stating that "countries with a rather weak food industry and poor in raw materials should try to finish a war quickly and suddenly by trying to force a decision right at the very beginning through the ruthless employment of their total fighting strength." (That was certainly Spain at the time.)

A more detailed analysis of the term was published in 1938 in the official German magazine ***Militär-Wochenblatt***, but such references are rare, and the word *blitzkrieg* was also scarce in the Wehrmacht's official military terminology during World War II.

If the hope of military thinkers was that the Spanish Civil War would bring a return to battlefield maneuver by using tanks, Spain's experience was clearly a disappointment.

Tanks through attaché eyes

Not much has been written on the employment of armor during the Spanish Civil War and, in comparison to what happened during World War II, the proper employment of armor was easy to overlook. Nevertheless, the Spanish Civil War was a kind of foreword for what was to come; the lessons obtained in Spain confirmed what we know today as essentials of armored warfare.

In fact, the presence in Spain of key officers of the armored forces of Germany, Italy and the Soviet Union – who during World War II acquitted themselves very well and even faced each other or fought alongside each other on some occasions – adds more interest to this chapter of Spanish history.

As mentioned, in 1936, the U.S. Army shared with the armies of Europe a special interest in the war in Spain. It was the first time since World War I that European weapons were used by Europeans against Europeans. Although most of COL Stephen O. Fuqua's[2] reports – as U.S. military attaché in Madrid throughout the war – concerned the non-technical "infantry war" of individual soldiers, the focus of interest for most of the American military attachés in Europe became tanks and antitank/antiaircraft weapons.

Even though they were removed from the fighting, the attachés in Paris and London, and to a lesser extent in Rome and Berlin, provided information that supplemented the sketchy technical and tactical data Fuqua sent from

Figure 1. COL Stephen O. Fuqua (left, in civilian clothes), U.S. Army attaché at the U.S. Embassy in Madrid, Spain, visits a battlefield near the "Fuentes de Ebro" ("sources of the Ebro" – the Ebro is a river in Spain) in 1937 in Aragon. A full regiment of the newest Soviet BT-5 tanks (50) was nearly annihilated by the Nationalist defense by the end of August 1937. Fuqua is talking with two unidentified Republican officers. *(Author's collection)*

Spain to Washington.

The main conclusion reached by the attachés and their sources was that the tanks used in Spain were inefficient. They lacked the armor and armament necessary to successfully meet an enemy equipped with heavy machineguns and antitank weapons, and they were continually plagued with mechanical malfunctions. U.S. COL Raymond Lee, military attaché in London, submitted a report in Spring 1937 that contained an excerpt from an article by Sir (CPT) Basil H. Liddell Hart, a British soldier, military historian and strategist known for his advocacy of mechanized warfare. Within it, Liddell Hart stated that the tanks used in Spain were "obsolescent and of poor quality."

In a certain sense Liddell Hart was correct. With the rapid technical development taking place during the 1930s, much equipment was soon displaced by more advanced technology. Yet it would be wrong to assume from his statement that the tanks used in Spain were old and discarded models, because they were not. So, although Liddell Hart may have been theoretically correct in arguing that these tanks were obsolete, in a practical sense the tanks used in Spain were the standard weapons of their respective armies at the time. The information gathered by the attachés about the Nationalist tanks appeared to be relatively accurate and consistent. For example, although the attachés never mentioned the German Panzer I by name, they provided an early description of its basic characteristics.

U.S. Army LTC Sumner Waite, military attaché in Paris, submitted a report at the end of January 1938 that said: "Whatever types of tanks the Soviets sent to Spain, they all seemed to share an unfortunate flaw." Attaché reports indicated that Russian tanks were susceptible to destruction by fire, apparently more than the Italian and German tanks.

According to an article by CPT Ed Bauer of the Swiss army, forwarded to MID by U.S. LTC John Magruder from the U.S. Embassy at Bern, the part most susceptible to combustion was "the rubber sheathing covering the roller bearing which supports the caterpillar drive."

Another report from Lee early in 1937 had made a similar observation about how easily the synthetic rubber the Soviets used on their tanks burned.

The Nationalists soon discovered it and exploited the flaw.

Italian experience

As mentioned, the tactical employment of armor during the Spanish Civil War reflected, for the most part, the contemporary doctrines of the nations that provided materiel and training assistance to each side. Accordingly, the Nationalists used a peculiar version of German *blitzkrieg* tactics or, at other times, an Italian method of combined-arms operations integrating infantry and armor. Much has been said of the role of military intervention in Spain pertaining to the testing and evaluation of new weaponry and tactics, especially in the case of the German Condor Legion, which came to play so important a role in the Nationalist forces. What has not generally been appreciated is that this sort of advantage accrued much more to the Soviet military command than to the Germans; whereas the Germans were skeptical and carefully selective with the lessons they chose to draw from the Spanish conflict, the Soviet approach was much more extensive and more credulous.

Italian tankers in Spain faced conditions radically different from those of the Ethiopian War of 1935-36, where the poorly equipped Ethiopians were overwhelmed by a relatively modern Italian army. The Italians found the tables turned against them in Spain, and this was reflected in the relatively high level of their casualties. Even more significant, however, was that the Italian General Staff failed to draw any

useful lessons in tank warfare from the Spanish experience. As a matter of fact, when Italy entered World War II in 1940, her armored units – including many L-3 CV 33/35 light tanks – would face heavier tanks even more formidable than the BT-5 or the T-26B, and the results on the battlefield would be disastrous.

The first Italian mechanized unit in World War II in North Africa consisted of organic assets organized in a hurry and in a situation already seriously compromised. However, these Italian mobile units – although with inferior means and scant media logistics – fought the British troops by opposing powerful and highly mobile tactics within the limits of what was possible. Their use, fragmented with little strategic policy, negatively influenced the result of the disastrous campaign of 1940, and all Italian mechanized units ended up being needlessly sacrificed in the final Battle of Beda Fomm Feb. 7, 1941.

The Italian Special Armored Brigade (also known as Armored Brigade Special Babini, named after its commander, GEN Valentino Babini, who went to Spain in 1937) was a mechanized unit of opportunity – quickly established in November 1940 in North Africa at Babini's request by Marshal Rodolfo Graziani's High Command in Libya. It was created to group the various operationally separated armored units in the theater to constitute a sufficiently powerful and mobile unit that could thwart the efficient and dangerous mechanized units of the British Western Desert Force. The Special Brigade was destroyed nevertheless, and most of the Italian troops were taken captive, including Babini, who had fought bravely. Babini was captured at the battlefield of Beda Fomm.

In Spain, after the city of Santander was captured in the northwest, the commander of the Italian *Raggruppamento Reparti Specializzati* (RSS) (the English equivalent is Special Units Task Force), then-COL Babini reported[3] to the Italian High Command about the good results of the intensive training program undertaken for all Italian crewmen after Guadalajara (a Nationalist offensive using Italian troops and *blitzkrieg* tactics that was a Republican

Figure 2. This is the Italian light tank Fiat L-3 CV 35 made by Fiat-Ansaldo. A total of 155 tanks were provided by Fascist Italy to Nationalist Spain. The first L-3 tanks arrived in Spain in late August 1936, the first modern tanks entering service in the Spanish Civil War. Outgunned – they were armed with only two fixed machineguns – they were not a match to Soviet tanks. They did not even have a turret; to aim the machineguns, the whole tank had to move. Some 60 Italian tanks survived the war and even continued in active service until the early 1950s in Spanish cavalry units. *(Author's collection)*

victory). Nevertheless, the Fiat L-3 light tank was considered technically perfect, stating that "when the crewmen were expert and ready, the tank became almost perfect, achieving optimum results."

However, it was clear that the L-3 tankette was not up to the task of making a breakout at the front, and a cannon-armed gun was necessary no matter what. For that reason, and while waiting for such a better tank, antitank guns were towed into battle, at least one per platoon. The RRS was a mix of light tanks and antitank units. Later it was equipped with an air-defense-artillery (ADA) unit and 20mm antiaircraft guns.

In May 1938, the Italian War Department published an information booklet titled "Notice on the employment of small infantry and artillery units at the Spanish Civil War."[4] This booklet was relevant for two reasons: first, the paper was about the employment of tanks; and second, it was mainly addressed to the Italian military command in northern Africa. The Spanish experience made the Italian War Department acknowledge that a future major war of high intensity would be different from World War I. When analyzing the employment of tanks, the booklet brought into light two main issues: cooperation with infantry, especially considering the cross-country speed of tanks, and the problem of refueling and resupplying tanks in combat.

The Italians considered cooperation between tanks and infantry an issue because they were never able to achieve simultaneous efforts when tanks and infantry were on the attack in Spain. It was a fact that requesting tanks to move in the open at the infantry's pace was almost suicidal. On the other hand, Italian tanks in Spain were often used on their own until they ran out of fuel or outpaced their infantry support – then they were just sitting ducks for the Republican antitank and heavy weapons. The Italians' document, though, didn't take into account Babini's proposal after his return from Spain: to organize combined assault light task forces made up of light

infantry (*bersaglieri*) and engineers, together with tanks. Babini limited his scope to requesting that the infantry speed up its movement.

By Fall 1938, the Italians had organized within the frame of the Italian Volunteer Corps, a kind of armored task force (RRS/*Raggruppamento Carri*) that included:

- One headquarters company, including a platoon of L-3 flamethrower tanks;
- One tank regiment with three tank battalions (one manned by Spanish soldiers), three tank companies each (all with Fiat L-3 tanks);
- One mixed mechanized battalion consisting of one motorized-infantry company on trucks, one company of machineguns on motorbikes and an armored wheeled car company;
- One engineer battalion reinforced with a machinegun company; and
- One fire-support battalion, which included one motorized 65mm assault battery, one antitank company (with German 337mm Pak guns), one mixed antitank battery (with Italian 47mm guns and Russian 45mm guns) and one air-defense company (with 20mm Breda-35 guns).

Lack of cooperation

Nevertheless, full cooperation was always lacking between tanks and infantry. In fact, combat in Spain proved that there were rivalries between tank-unit commanders and infantry commanders – to the point that "before the battle everyone was asking for the other's support, especially the need for tanks, but on the day after, nobody wanted to admit that the other's cooperation had been essential."[5] However, no matter what, there were many mistakes when employing tanks – for example, tanks were often used as supply trucks carrying ammunition or to block road crossings in static positions. Italian tank officers sometimes complained about a lack of clear missions for tank units.

Refueling while in combat was challenging, mostly due to the Italian Fiat L-3 CV33/35 tank's technical performance, which had a limited range for operations deep in enemy territory. Since refueling was an issue, a special organization was set up to refuel either individual tanks or tank platoons.

As a follow-up, the Italian War Department's document addressed the appropriate armament for the assault tank. Superiority of cannon-armed tanks over the machinegun-only armed tanks became evident in Spain. On the other hand, the usual procedure then adopted of towing antitank guns, with some tanks while in combat, was considered slow and impractical when challenging the heavier and better-armed Republican tanks. According to the document, the adopted solution lacked the high mobility needed for quick intervention. Therefore the need for cannon-armed tanks, operating with the light assault tanks armed only with machineguns, was now an inescapable demand. The proposed solution was to organize mixed tank platoons of four tanks, with one cannon-armed tank for three machinegun-armed tanks.

However, there's no reference or statement within the Italians' booklet about the light machinegun-armed tank as an "obsolete" vehicle. Light tanks such as the Fiat L-3 were still considered useful for scout and reconnaissance purposes, as infantry-support platforms and to achieve surprise on enemy forces, even if they were inferior when facing heavier tanks. No reference at all, though, was made of armor forces penetrating the depth of enemy deployment. The main idea still was that of cooperating with the infantry. Nevertheless, an alarm bell was ringing in the mind of Italian tank officers. They realized the lack of their tanks' capabilities and the absence of organizational effectiveness for the employment of tanks in the Italian High Command's thinking. They should have considered the experience and lessons-learned in Spain.

Almost all Italian tank-unit commanders in Spain tried to present the Spanish Civil War's lessons-learned to their superiors; it was clear that any future conflict would require a good understanding of how to employ tanks and armor on the battlefield. The Italian army should count on modern armored cars with high firepower, they thought, and medium tanks cannon-armed with 360-degree turning turrets should replace all Fiat L-3s during a future major war. Tank officers also proposed that the Fiat L-3s be used for reconnaissance purposes only and that modern trucks, efficient logistics, armored self-propelled artillery and good command, communications and control assets would be essential during a future major war.

The Italian High Command missed its opportunity to learn adequate lessons from Spain and consequently didn't improve Italy's armored forces before the next war. Looking at how Italian armor did during the first months of World War II, it's obvious that the Spanish experience had been almost completely forgotten. Initially, Italian armored forces appeared still equipped with the Fiat L-3 light tank in spite of the fact that it was inadequate to break out through enemy positions. The Fiat-Ansaldo M-11/39 – the first Italian cannon-armed tank – entered combat in September 1940 in northern Africa, and the much better M-13/40 tank entered combat in October 1940 in the Greek campaign. However, both tanks were already inferior to what the Allies could deploy by then.

Lacking adequate capabilities, Italian armor was mostly nonexistent. The Special Armored Brigade organized in Libya by Babini – achieving at first some limited success – was destroyed at Beda Fomm by the British army, as mentioned. The armored division Centauro participated in the Greco-Italian War and received its first M-13/40 tanks in December 1940; it deployed the tanks in January 1941, losing many of them to Greek artillery fire.

With the experience they had fighting in Africa, the Italian armored division was reorganized in 1942 into a six-battalion (three tank and three infantry) structure, combined with a field-artillery regiment that included two battalions of self-propelled guns and one antiaircraft battalion, plus reconnaissance and engineer battalions. The reorganization was too late, though.

If the lessons-learned in Spain had been understood and implemented, results on the operational level afterward could have been different for

Italy. Maybe they would not have been as successful as the German *panzertruppe*, but they would not have suffered such humiliating defeats as they did in Greece and Africa. Sadly for the Italians, the lessons were there.

Encapsulating Babini on the need for tanks and their role in modern warfare, everything can be condensed into one sentence: "Tanks for all, tanks spearheading, tanks for all missions." Therefore, the need was for more and better tanks than the Fiat L-3.

On the other hand, the discourse was no longer about more cooperation between tanks and infantry. According to Babini, it was about "tanks and their supporting infantry, which had the mission of protecting the tanks from assault weapons, antitank weapons and artillery." Within the same document, Babini proposed the future employment of armor: "All support means for the infantry, in the offensive, should be armored and must include heavy tanks for achieving a breakthrough, medium tanks for close support and for penetrating in depth, both cannon and machinegun-armed, and assault tanks' machineguns, armed to go alongside the infantry."[6]

Even while the Spanish Civil War was still raging, Italian tankers continued implementing some of the lessons and experiences learned. By the end of April 1938, the Italian tank battalion (*Raggruppamento Carri/*CTV) made a special report on the results of recent operations on the Aragon Front and the splitting of the Republican zone in two. Signed by Babini, the report confirmed all that was learned after the capture of Santander. It opened the way for a new debate, especially on employment procedures, an idea perhaps already grasped by the Germans as well.

High-mobility units useful

In the chapter dealing with "conclusions and remarks," Babini's report[7] addresses the "confirmed exceptional usefulness of the high-mobility units (*unita celeri*) when in battle." Entering into details, he stated that if the tank battalion within the Italian tank unit would have had the structure of a true high-mobility unit, the outcome of the Battle of Guadalajara would have been very different. On the other hand, Babini was clear on how armored troops should be organized:

- Tanks should be fitted to the nature of the mission;
- Tanks should be organized into tactical units; and
- Tanks should be used in mass employment.

On the issue of infantry and tanks being separate for reasons of mobility and speed, Babini's solution was to create heavy-tank task-force units where infantry and combat engineers were integrated and subordinated to the tank-force commander. At the same time, Babini addressed the need for close coordination and support of tactical aviation.

The relative success of the Italian military's small high-mobility units, together with the mirage of the Nationalists' final victory, merely reconfirmed the Italians' otherwise generally inadequate priorities and policies, as World War II demonstrated later.

German conclusions

Perhaps the only European military command that drew the correct lessons was the German command, which concluded correctly that the Spanish conflict was a special kind of war, from which it would be a mistake to draw any major new conclusions or lessons. However, even the Germans did not altogether draw proper conclusions about the need to improve their basic antitank weapons and hurry up production of newer, more efficient and better armored tanks, as the invasion of Poland in 1939 proved. Most of the German armored units were still equipped with Panzer I and Panzer II light tanks during action in Poland.

According to reports sent to Germany by LTC Wilhelm von Thoma, the experience from the Spanish Civil War ultimately helped speed up production of gun-armed tanks, especially the Panzer III and IV types. However, the misleading results of the Nationalist victory probably gave the Germans some false reassurance, since when Operation Barbarossa started, the bulk of the panzer force still had more tanks of the Types I and II in its inventory than the better-armed Type IV. (The Panzer IV was the only tank capable of confronting the T-34 and KV-I Soviet tanks, which were superior to anything within the Germans' available armory.)

The Spanish Civil War demonstrated to the Germans the convenience of engaging enemy tanks at maximum range – some German reports mentioned no less than 3,000 meters – a distance considered more than adequate by today's standards but out of question at the time unless the mighty 88mm guns were used. However, the Spanish Civil War produced other conclusions for the Germans about tank operations: "The combination of tanks with motorized infantry qualified armored units to accomplish many combat tasks in which both types of units complemented each other. (Failure to do so was the main reason to explain Soviet mistakes.) The speed of tanks on the march and in combat made command and timely appraisal of the situation very difficult. Close cooperation with aircraft was therefore necessary for command, reconnaissance and combat. (This was clearly understood by the Nationalists and the Germans since the very beginning.) Only the employment of tanks in depth promises success. (A two-mile-wide front was considered the smallest front for the employment of an armored division then.) Employment of tank-only units was considered only suitable in rare cases and adequate mostly against limited objectives."

Thoma added that Franco, as a typical general from the old school, wanted to distribute the available tanks among infantry units but, on the other hand, most of the Nationalist victories happened when tanks were employed in a concentrated way, even if in close coordination with other arms. Nevertheless, it seems that Franco and Thoma were always at odds on this issue, and as the latter recalled: "The Spaniards learned quickly but forgot also quickly."

Panzer success unclear

How important the German panzer component in the Spanish Civil War may have been for the final victory is hard to say. True, the war did give the

Figure 3. The panzer Kpfw Ausfuhrung A is on display at the Spanish army's tank museum near Madrid, Spain. This type was one of the first light tanks provided by Germany to Nationalist Spain by the end of September 1936. These tanks were not "real" tanks, in a sense, as they were armed only with machineguns. However, they constituted the bulk of the German panzer arm at the time. The more powerful and better tanks that would be employed during World War II were yet at an early stage of development. Panzer I tanks were supplied to Spain both in Versions A and B that were practically identical. The total number of Panzer I tanks supplied was 122. The surviving tanks remained in service with the Spanish army until the early 1950s. *(Photo by COL Anthony J. Candil)*

Germans an opportunity to see tank tactics practiced in a live situation. However, Franco and the Nationalist generals – veterans of the North African counterinsurgency campaigns of the Rif War (in Morocco) – were conditioned to the requirements of a civil war in which it was necessary to grind down local opposition thoroughly, territory by territory, rather than bypass it. Their interest in *blitzkrieg*-type mobile warfare was intermittent at best, leaving the panzers mainly confined to an infantry-support role.

Thoma's observations determined that by firing steel-core armor-piercing (AP) ammunition, the dual-machinegun armament of the Panzer I could disable a T-26 or BT-5, both of which were scarcely better armored than the Panzer I at short range. However, this was not very good, as the Soviet tanks all carried the excellent 45mm Russian cannon. All the Spanish/Soviet gunners had to do was open fire at the longest range possible to destroy a Panzer I, allowing the latter no opportunity to do more than scratch its paint.

It was no wonder that captured Soviet tanks were greatly prized on the Nationalist side. The captured T-26s that the Nationalists managed to return to action ended up constituting the most potent component of Franco's armored force. Then again, the Panzer I was undoubtedly quite effective in an infantry-support role for as long as there were no Soviet tanks along the way.

Despite the important lessons-learned, the Germans did not plan the Wehrmacht's development around the Spanish experience. They failed to draw proper conclusions about the need to improve antitank weapons and protection. Nor can it be said that clear evidence exists that the superior Soviet tank designs spurred them into rapid improvement of their own better tank types.

German lessons from Spanish Civil War

According to Mary R. Habeck, beyond unsatisfactory results, German officers drew two main conclusions about the use of tanks early in the Spanish Civil War. The first was an affirmation of the initial lessons: Russian tanks performed better than Italian and German ones. Russian tanks were considered excellent for defensive action but were also a good offensive weapon. The second lesson was that it was difficult to make conclusive decisions about tactics based on the Spanish experience because conditions had been specific to that conflict alone; in the first place, too few vehicles had participated, and secondly, the terrain in Spain had been particularly difficult for the successful use of tanks in comparison to the northern European plains.

The German General Staff concluded that the belligerents had not used the tanks "in accordance with their offensive purpose." Both German and Soviet tanks had been subordinated to infantry and had been mostly treated as heavy-infantry weapons. For all these reasons, the German High Command refused to draw any major conclusions about tank tactics or their operational use. Instead they reserved judgment until tanks could be used in a larger conflict.[8]

More details and lessons-learned were recorded in the official report on the Spanish Civil War from the German Army General Staff (*Generalstab des Heeres*) dated March 30, 1939: "Panzer tanks were never used in action in a battalion-size unit by the Nationalists. Usually in small packets, the panzers were attached directly to and escorted the infantry as armored heavy-infantry weapons. Based on the judgment of the troops and their achievement in the Panzer I Ausf A, 'Krupp' variant, [the tanks] covered 5,000 to 8,000 kilometers each and the Ausf B 'Maybach' covered 2,000 to 4,000 kilometers each. Both tanks were considered a success from the viewpoint of mechanical reliability.

"Light tanks are useful only when armed with flamethrowers, since they can't hit anything by firing their machineguns while moving. However, they themselves are vulnerable to machineguns firing special ammunition. The nozzle for the small flamethrower can be readily secured in the right-hand machinegun mount in the Panzer I. However, a longer range is desired because relatively high losses occur to the crews.

"In general, the panzer tanks employed in Spain in small numbers and without other supporting weapons have mainly been shown to be inferior, very seldom superior to the antitank defense. They were also only available in small numbers. The 45mm gun of the Russian tanks shot high-explosive shells in an arcing flight path. The effectiveness of these shells was unsatisfactory. It also shot armor-piercing shells at a flatter trajectory. Due to poor steel quality, the penetrating ability of the Russian [AP] shells is significantly lower than the corresponding German [AP] shells. The Russian AP shells can only penetrate 40mm armor plate at a range of 100 meters. In addition, up to 75 percent of the base fuses fail to detonate."

In a way, the Spanish Civil War established the axiom of the main battle tank as we understand it today. As British MG J.F.C. Fuller, senior British army officer, military historian and strategist, stated: "The three types of tanks that I have seen in Spain – Italian, German and Russian – are not the result of tactical study but are merely cheap mass production from the standpoint of a machine." Fuller seemed to be advocating for a gun-armed tank, with full protection and high reliability as a weapon system. Fuller was not fair in his appreciation because by then, in 1936, not even the British army was in much better shape than the three main nations involved in the Spanish Civil War.

British tanks unsatisfactory

British tanks, except for some heavily armored variants, were unsatisfactory. Most were weakly armored, and early in World War II still carried only machineguns. Emphasizing mobility, as Fuller did, the British had not paid enough attention to the ability of their tanks to fight other tanks. Even worse, if possible, the standard "cruiser" tanks were unreliable, often breaking down.

An improved design was delayed by lack of attention; British tank design caught up with German design only near the end of World War II. By the mid-1930s, the British armored force was split between the relatively new Royal Tank Corps and a few reluctantly mechanized cavalry units that only slowly had adjusted to the change from horses to armored vehicles. Tank fanatics like Fuller and Liddell Hart with their attitudes hampered the armored units' development.[9]

Liddell Hart[10] made some interesting references about the employment of armor during the Spanish Civil War: "It was a great mistake to consider the Spanish Civil War as proof of inefficiency of the mechanized forces. On the contrary, the mechanized troops proved that they should move cross-country by preference and in a wide front. … When employed in such a way, they contributed a great deal to the achievement of success. If mechanized troops were used extensively at their advantage, they contributed very efficiently to the defense. The most suitable procedure for the defense was the mobile defense rather than a strongpoint-based defense."

Soviet experience

Against the 122 Panzer I tanks Germany supplied to the Nationalists during the war, the Soviet Union supplied the Republicans with some 281 T-26 and 50 BT-5 heavier tanks. The first notable impact of Soviet participation was felt on the Central Front in combat around Madrid from mid-October to November 1936. Key combat participants were the Soviet crewmen who entered battle Oct. 29 with a mobile counterattack against advancing Nationalist troops. However, Republican commanders were never able to develop effective combined-arms operations, so successful tank attacks were generally poorly supported and never sustained for long.

Mistakes made by the combined Soviet-Spanish leadership were not correctly understood, and the disbandment of existing armored formations proved disastrous in 1941. The superiority of their equipment gave the Soviets some dangerous peace of mind, and by 1941 the T-34 had not been yet introduced in sufficient numbers. The Soviets also never understood the importance of close cooperation between air support and armor. They also didn't grasp the key role of mechanized infantry working together with

Figure 4. This is a T-26B Soviet light tank furnished by the Soviet Union. Those tanks started to arrive into Republican Spain in October 1936 and were real tanks with a main gun and machineguns. They were heavier than the ones provided by Germany and Italy to Nationalist Spain and better protected. The Soviet Union provided 286 T-26B tanks to the Spanish Popular Army, and more than 130 ended up in the service of the Nationalist Army by the end of the war. They remained in active service until the early 1950s. This picture was taken near a memorial for the civil war on what was once the battlefield of the Ebro, which took place in 1938. *(Photo by COL Anthony J. Candil)*

Figure 5. This Soviet BT-5 tank is on display at Russian Museum at Kubinka. This type of tank was sent by the Soviet Union to Republican Spain by mid-1937. Only 50 BT-5 tanks were supplied, and none survived the war nor saw service in the aftermath. Faster and heavier than the T-26 tank, the BT-5 was the forerunner of the future T-34, and they fought against German panzers in the early days of the German invasion of the Soviet Union in 1941. *(Photo by COL Anthony J. Candil)*

tanks. Despite these shortcomings, their organization of armored units proved more efficient and has even lasted until today: three tanks per platoon, 10 tanks and three platoons per company, 30 tanks and three companies in a regiment, and one independent tank regiment per division.

As Habeck,[11] one of the leading Western specialists in armored warfare, writes, "Soviet officers, unlike their German counterparts, believed that the conflict presented a valid picture of a future great war. The Soviet command staff became convinced that the Spanish war was a reliable model of modern war and treated each new experience of combat as a valuable lesson for how the Soviet army should fight in the future." Soon after the Soviet military intervention in Spain began, GEN Kliment Voroshilov issued orders detailing the specific tactics and technology that his men were to study and test.[12]

The Soviets formed a commission[13] to review the organization of the Red Army's tank forces. Soviet experience in the Spanish Civil War led commanders who served there to recommend against the use of large mechanized formations, chiefly due to technological limitations in communication and vehicle effectiveness. The Soviet 1935 tank corps had two tank brigades and one motorized rifle brigade in its force structure, totalling 348 tanks. However, the Soviet tank corps was disbanded in favor of a motorized division that had 275 tanks and more infantry. The most important aspect of this change was that the new 1939 motorized division wholly emphasized the infantry-support role, with little focus on exploitation into the depth of an enemy force's disposition.

The Republicans were heavily influenced by the Soviet practice of massed armor attacks. It is interesting to note that the Soviets were notably reluctant to let Spanish crews operate their vehicles. Because they were unfamiliar with the peculiarities of the Spanish terrain, this attitude caused them to be overly cautious with their tanks. Initially, operations orders reflected a high degree of indecisiveness due to Soviet leaders' caution. The Soviets finally agreed to mixed crews for political reasons, but this often caused more problems and resulted in considerable squabbling, which sometimes degraded mission accomplishment.

Furthermore, the Republicans were often known to move their tanks without any artillery preparation and without the support of infantry. This made them vulnerable to enemy antitank weapons and even to hand grenades or incendiary devices. Therefore, results on the battlefield were often disappointing, even when the Republicans held as much as a 3:1 advantage in the number of tanks.

Red Army learns lessons

Probably no other major European army devoted as much attention to the presumed lessons of the Spanish Civil War as did the Soviet Red Army. The study of operations in Spain, as well as the study of German and Italian equipment, was massive, but the question is whether in fact Red Army commanders learned accurate lessons or managed to deceive themselves, as historian Stanley G. Payne concludes.

Soviet commanders obviously made a fundamental mistake in taking the Spanish conflict as a valid scenario for a future European war. The armies in Spain for the most part lacked the weapons, firepower, leadership and training to provide many lessons applicable to major mid-20th Century campaigns. Payne noted that this was especially true when Spain's topography was compared with that of Eastern Europe. Mountains played a major role in the Spanish struggle but are almost absent in European Russia, most of Poland and eastern Germany. However, Payne said, it should not be forgotten that German armor managed to get through the Ardennes' hilly terrain on two occasions and through the Balkans in the invasion of Greece in 1941.

The most important mistake that Soviet commanders made when trying to learn from their experience in Spain pertained to armor doctrine and organization. They also overlooked improvements the Red Army was able to make in many individual technical areas, ranging from administration and engineering to specific weapons systems. Soviet tanks were by far the best in Spain. With that said, they also revealed notable shortcomings, which allowed Soviet planners to accelerate the T-34's development. As a result,

the T-34 became one of the best tanks in World War II. The experience of the Spanish war was not uniquely decisive, but the intensive studies on the war certainly played a role in the development of better Soviet armaments and even in its technical execution.

The Soviet army's lessons from the war in Spain were summarized in a 1939 study. The study began by noting that lessons from Spain were important since all modern combat arms had participated in the fighting, and the results were likely to be absorbed by all modern European armies. Specific tactical lessons of the conflict were highlighted, including:

- Infantry attacks needed to be supported by tanks;
- Coordination needed to be made among infantry, armor and artillery; and
- Tanks were vulnerable to antitank defenses without such coordination.

Regarding the use of tanks in the defense, the report singled out the role of tanks as a key element in carrying out local counterattacks based on several examples of the First Armored Brigade in 1937. The study was extremely cautious in drawing any lessons about the use of armor in-depth since there were no experiences of the use of large armor formations in Spain. The report was skeptical about the possibilities of using independent tank groups to achieve breakthroughs in the face of well-prepared defenses. The Soviet General Staff's view was that the full potential of tanks had not been displayed in Spain and that the Soviet army should continue to pursue plans to use tanks, but on a mass scale with artillery support. On the other hand, Marshal Georgy Zhukov's later successful use of mechanized formations to defeat the Japanese army at Khalkin Gol in 1939 further reinforced the advocates of armored warfare.

Armor-infantry cooperation was not the only area of concern in Soviet analyses of their experiences in Spain. Command, control and communications were poor, and radio equipment – because of technological flaws and lack of experienced operators – never worked well. More problems pointed out by Soviet observers included the lack of reconnaissance before tank attacks. This forced the Republicans to attack blind many times, and it demonstrated the inadequacy of depending on sheer movement to save the tanks. Also, vehicles traveling at 35 mph did not guarantee that they would not be hit by artillery, and the speed increased the chances of falling into antitank traps. Further, visibility from inside the tanks was too poor, and the motion of the vehicles caused inaccurate fire.

(However, if the Soviet army sometimes drew inaccurate lessons from the war, it was not alone. For example, for most French military observers, the Spanish war tended to reconfirm the importance of the defense and of antitank warfare.)

Tank losses

The result of these combined problems was inordinately high losses of Republican tanks, which led to some interesting conclusions on the Soviet side about the future employment of armored units. Thus, from October 1936 to February 1937, the Republican forces lost no less than 52 tanks, or between 25 to 30 percent of their deployed tanks destroyed for each day of battle. By mid-September 1937, the Republicans had only 170 tanks serviceable out of a total of 256 T-26 tanks delivered since mid-October 1936.

Another view argued that if the Soviet Union had sent 256 tanks to Spain, in a half-year of combat, 63 had been lost, but multiplying these by two, it would mean that 126 would be lost in a year. Therefore, the normal rate of attrition for tanks in a year would be around 50 percent of the total force employed – no doubt about it, a high figure.[14]

Nevertheless, it should be taken into account that because tanks arrived in several shipments, and because the fronts where tanks became employed were widely separated from each other, the Republicans never used more than 70 to 80 tanks at once except at some special occasions. This practice was the same for the Nationalists. With these parameters in mind, one can estimate that the rule for yearly permanent tank losses could be much higher, between 300 to 400 percent

Figure 6. Soviet leadership conducts a review of Soviet armored fighting vehicles used to equip the Republican People's Army during the Spanish Civil War.

– in other words, three to four times the initial strength of the combat force. The conclusion was that tanks would suffer massive destruction in a major war.

Key historical moment

Soviet GEN Dmitry Pavlov thought nevertheless that tanks had fought well in short, independent battles such as at Jarama, and they performed even better when they had cooperated properly with infantry, artillery and air support at Guadalajara. Pavlov concluded that the infantry was helpless against tanks, while artillery and air forces did not present serious problems for an armored attack. Certainly, tanks needed the infantry, but the infantry needed the tank just as much.

In sum, Nationalist armor and antitank tactics were generally more sophisticated and effective. The Nationalists compensated for the smaller caliber of their tanks' weapons by falling back at the appropriate time to bring enemy tanks within range of antitank guns and the 88mm guns of the German Condor Legion, which proved to have excellent anti-armor weapons. The Republican People's Army never became a cohesive skilled army, though sometimes it fought well enough.

Overall the Spanish Civil War was a low-intensity war punctuated by occasional battles of high intensity. There is no question, however, that Soviet assistance postponed the Republicans' defeat, though at no time was Soviet assistance of enough magnitude to give the Republicans a major chance for victory.

German and Italian assistance was not much more decisive than the Soviet one, but Italian dictator Benito Mussolini certainly made a major commitment to victory in Spain. The technical quality of German assistance was distinctly higher than the Soviet one. Overall, the German and Italian escalation in military aid in November and December 1936 raised the stakes to a point where Soviet dictator Josef Stalin was not willing to make a direct bid for victory in the hope of more favorable geostrategic conditions in Europe.

The Spanish Civil War was the first conflict in Europe after World War I where an extensive use of tanks took place since their appearance on European battlefields in 1915. It happened certainly at a key moment in armaments history, when production was increasing in many European countries, but especially in Great Britain, France, Germany, Italy, the Soviet Union and even Czechoslovakia. For many, the Spanish Civil War was seen as a kind of laboratory to test their equipment and doctrine.

Many authors insist that the Spanish Civil War provided few clear tactical lessons. However, it did provide many. The crucial aspect was whether those lessons were considered. Tank employment in Spain was certainly unique, but a bright observer could draw important conclusions about the nature of armored warfare.

Lessons-learned

Lesson 1: learn the examples of numbers, crew training, tactical understanding. The Spanish Civil War demonstrated especially that tanks should not be split into small factions and used in small numbers by non-trained crews, and that senior commanders needed a better tactical understanding of the tank's capabilities. Using the Spanish experience to validate any preconception of armored warfare as the French did – and the British also to a point – was a misuse of the lessons. A British military attaché in Spain during the war wisely observed that "the greatest caution must be used in concluding general lessons from this war."[15]

Both warring parties split their tank units and divided them piecemeal among their infantry, but this was especially true of the Nationalists. At the Battle of Teruel, they assigned tank platoons and even tank sections to larger units such as brigades or divisions. The tank became nothing more than a supplementary fire platform.

The course of the Spanish war in 1938 was discouraging for anyone who thought that tanks were the decisive weapon of the future. Even though more tanks than ever took place in the conflict, they had not yet made a convincing impact in any battle, nor had they made an overwhelmingly positive impression on any of the war's observers.

Lesson 2: exercise caution in drawing on lessons-learned. Most military analysts in the mid-1930s had some firm facts about tank-warfare procedures in Spain. However, a study at the U.S. Army Infantry School at Fort Benning, GA, by CPT Thomas Stark mentioned that in 1939, "The lack of detailed information precluded any comprehensive analysis."[16] Spain was certainly not a "proving ground for *blitzkrieg*." After failing to take over Madrid in the winter of 1936, it became obvious that Franco never wanted a quick ending to the war, but there were some significant technological lessons.

Lesson 3: armored warfare would be expensive, and not everyone would be able to keep pace. To start with, the Spanish Civil War showed that tank vs. tank combat would be the main mission for main battle tanks from then on. But it showed too that armored warfare would not be cheap, as better power packs and better armaments – combined with better and improved armor – would escalate at high speed both purchase prices and operating costs for a substantial tank fleet. It was clear that not all countries would be able to cope, certainly a reason why the crippled economy of Spain never allowed the development of a reasonable armor force for the Spanish army.

Lesson 4: employ proper tank-infantry tactics. According to Spanish GEN Ignacio Despujol Sabater, who retired from the army in 1931, bad employment of tanks mainly applied to the Republicans; however, in November 1936, during the Battle of Madrid – as can be seen in the documentary "Spain in Arms" – Nationalist tanks advanced in a line equally spaced by about 60 meters. Infantrymen strung out between the tanks rather than clustered behind each tank for cover. Similar tactics were evident during the Battle of Teruel. It was obvious that the Nationalists had much to learn about tank-infantry cooperation.

Evoking the memories of some Spanish Nationalist combatants, they usually smiled when speaking of tanks. They recounted as a common exploit

Figure 7. Italian troops man a 10-centimeter howitzer at Guadalajara, Spain, in 1937. *(Bundesarchiv)*

how to approach a tank without risk from its blind side. Then they would throw a bottle of gasoline on the tank, followed by a hand grenade. The tank often burst into flames. Moroccan soldiers were experts in capturing or destroying Russian tanks with blankets, which they lobbed into the roadwheels or the tracks' cogs, which sometimes threw the tracks out and stalled the tank. Then they resorted to another blanket soaked with gasoline, which they tossed over the turret and set afire. Adequate infantry cooperation would have rendered such actions impossible. Yet it was not the fault of the tanks; the blame should lie on the commanders who employed the tanks under such conditions.

Lesson 5: tanks were also vulnerable to antitank guns. When tanks proved incapable of the tasks first assigned to them, such as clearing the way for the infantry, the immediate use was to employ them as assault artillery guns. Accompanying the infantry and laying broadside to provide fire support made them more vulnerable to antitank guns. Nationalist troops at the Battle of Brunete made wiser use of their tanks, employing them in close liaison with the infantry.

Mechanized operations did not play any role in the war because neither side had enough mechanized equipment. This reason may appear naïve, but one makes war with what one has. The Spanish army had neglected tanks and mechanized equipment before the war. During the war, this continued to a point that resembled the latest maneuvers from the pre-war time of peace (for example, the rebellion of Asturias in 1934). Public opinion and morals imposed a form of war applicable to the mass of the mobilized population, not just to an elite group of warriors.

In addition, the consideration of making use of everything they possessed, men and arms, played a capital role in Spain in the armies' composition. Because of that, the troops adopted certain methods of combat, and equally, they lacked certain aspects of combat.

Therefore to the question of the utility of armor and tanks, the Spanish Civil War supplied no answer. As to the question of the use of tanks, it answered by the force of circumstances that employed them in close liaison with other arms. The war sought to use all the weapons possessed in the best way. The main difference was that on the Nationalist side, these were combined for maneuver. Both sides employed recently designed tanks, but they often discovered that those tanks were not always ideally suited for the missions they were tasked to perform.

Balanced assessment difficult

A balanced assessment of armored warfare in the Spanish Civil War is difficult to find. Works that focus on World War II or deal with the whole history of the tank either avoid this issue altogether or treat it cursorily, just as a quick introduction to more interesting events. Therefore, this article's review of tank employment in Spain should help a better understanding: 1) The technological superiority of Soviet armor came to matter only at the tactical level; 2) neither German nor Russian doctrine received fair tests; and 3) by default, what happened in Spain degenerated into a series of *ad hoc* tactical adjustments by commanders who were understandably more concerned about accomplishing missions than proving theories.

The Spanish Civil War certainly was not a successful testing ground for armored warfare. To be fair, much of the land where the main campaigns and battles were fought was unsuitable for massive use of armor. Moreover, contemporary tanks were not developed enough, nor were the other arms trained to cooperate with them to conduct the sort of operations envisaged by the mechanization theorists of the 1920s and 1930s. Therefore, it must be no surprise that the Spanish commanders did not think of any other use for tanks beyond the role of infantry support.

The only partial exceptions were Republican GEN Vicente Rojo's plan to seize Zaragoza in 1937 and the Nationalist breakthrough on the front of Aragon in March 1938. However, these were operations limited in time and space.

Nonetheless, there was a difference between the Republicans and the Nationalists. Both based their use of armor on the Spanish pre-war doctrine. The Nationalists, however, remained attached to this concept, and their German advisers, surely aware of their armor's limitations, seem to have been satisfied with merely introducing minor tactical innovations such as using larger tactical units and employing antitank guns in support. Indeed, the evidence shows that the Germans were mainly worried about organizational matters and the Spanish commanders' poor understanding of elementary tank tactics. However, above all, there was a single, coherent policy.

By contrast, the evidence does not show any coherence on the Republican side. Officers were trained following the Spanish regulations in force before the conflict. However, the Republican command issued instructions based on recent battlefield experience, which in some points differed significantly from pre-war doctrine. How did an officer reconcile the teachings of the staff college, where he learned that tanks must not pursue the enemy, with the new instructions from Rojo about advancing deep into the enemy rear?

This problem was worsened by the nature of most of the Republican officer corps. When the regular officer corps of foreign armies elsewhere were hard put to assimilate the procedures of armored warfare, it is easy to understand why the improvised officers of the Spanish Republican army so often failed to use and understand armor effectively. As it has been said already, it was not so different from present times, especially when tanks are still subordinated to the infantry.

The fighting in Spain ended on the last day of March 1939, and five months later Europe was at war. There was no time to ponder the data gathered and the conclusions reached. War followed war too quickly. Yet Spain held clues to the war that came in Europe. The weapons used by the Germans, Italians and Soviets in Spain were not outdated relics or surplus to their armies. They were largely their armies' standard equipment, and they were employed based on tactical doctrine learned in peacetime training in Germany, Italy and the Soviet Union. Light, fast tanks sent to Spain by Germany and Italy proved vulnerable to antitank guns and to the heavier-armored and -sarmed Soviet tanks. And all tanks were in peril when employed singly or in small groups without the protection of artillery or aviation. The attachés and their sources insisted that tanks had to be employed in mass and in combination with infantry, aviation and artillery to be effective.

The use of tanks in Spain also demonstrated that the advantages of heavy armor and armament outweighed the corresponding loss of speed. Effective antitank guns, especially when combined with obstacles, served to slow or destroy enemy tanks. And as the tanks of the future became heavier, there was a corresponding indication in Spain that antitank weapons would likewise become larger and more powerful. The Germans' successful use of the 88mm gun as both a direct-fire weapon and an antiaircraft gun was an indicator of the direction in which defensive weapons could develop.

The stabilized conditions at the front when tanks arrived at the war, coupled with the relatively small numbers of vehicles deployed, created circumstances where the different theories of operations elaborated by the foreign countries supplying them could not be executed. Instead, tanks became tactical weapons normally employed in support of operations, either offensive or defensive.

Tanks showed some value in pursuit, as demonstrated by the Italians at Malaga, and as a counterattack force, as shown by the Republicans at Madrid, but this was only true if used before the enemy had organized the terrain and brought forward antitank weapons. However, tanks did participate in urban combat in some villages and cities, where they were most vulnerable to antitank measures and improvised devices. Nevertheless, one lesson was clear: tanks, even during limited operations, required mobile infantry support to negate antitank defenses.[17] Whatever promise independent tank and mechanized action held, combined-arms operations involving tank and dismounted infantry were to be expected.

German personnel avoided engagements with Russian tanks whenever possible and increasingly limited themselves to instructional duties. Spaniards commanded the tanks in battle as they had before the Germans' arrival, and it would not be until the war's closing months, at the offensive in Catalonia, that the tanks would participate in an operational decisive offensive. Tank vs. tank engagements, where they did happen, continued to favor Republican tanks, but it was to no avail because in a few weeks the Republic lost the war. Despite the personnel turnover rate and the small number of tanks available, the tank's great potential as a close-support weapon for non-mechanized infantry assaults became apparent, and the yet unfulfilled promise of independent operations did not make this less truthful.

The Soviet experience also indicates that tanks, although they were real purpose-built offensive weapons, were often a front commander's most effective stop-gap, especially when neither artillery nor air support was available (this is precisely what the Germans tried to do in Normandy in 1944). The positive psychological impact of even just a single T-26 company on the defenders of Madrid was fully understood by both sides.

When considered in their true perspective, rather than in hindsight-aided assessments of later German successes against Poland, France and the Soviet Union, tank actions in the Spanish Civil War, especially the opening engagements, appear neither as flawless manifestations of later *blitzkrieg* doctrine nor as unqualified indications of the Soviets' intention to use long-range independent operations.

In the United States, attaché reports from Spain reinforced the somehow parochial attitude of most of the U.S. Army's leadership at the time, and even that of the ground combat-arms branches. The then-Chief of the Army's General Staff, GEN Malin Craig, stated that a balanced army could never "dispense with a proper proportion of horse-mounted cavalry and horse-drawn artillery."[18] The field artillery also continued to view the tank as an infantry-accompanying weapon, an idea that had not changed much since 1918.

Most U.S. Army attachés stationed in Europe, starting with Fuqua, the attaché in Madrid, who was a former Chief of Infantry, reported that lightly armored tanks armed only with machineguns were unable to overcome determined enemy fire. These lessons were misread in the United States, and in 1939 the M2 medium tank, although underpowered and underarmored, was introduced. Fuqua's opinion was that tanks did not prove themselves in separate offensive operations in Spain because they were effectively challenged by antitank guns – therefore his main conclusion was that tanks were only useful when in support of attacking infantry.

Regarding military operations in Spain, GEN Craig's view was that tanks were not successful due to antitank weapons, insufficient armor protection, mechanical defects, tactical errors in their employment and inadequate support from artillery and aviation. In the meantime, MG Adna Chaffee[19] was also paying close attention to events in Spain. A report he received from the General Staff stated that tanks used in

Spain were unsuccessful in almost all operations. The problems identified were many, such as inadequate crew training and poor discipline, mechanical deficiencies, insufficient terrain reconnaissance, lack of infantry and artillery support, the questionable use of tanks against strong obstacles and villages, inadequate numbers and the reported superiority of antitank guns. As far as the new mechanized cavalry was concerned, the Spanish Civil War only provided ample evidence of what not to do.

American mechanized and armored-cavalry pioneers at Fort Knox, KY, believed that the new weapons of the war – armored cars, self-propelled artillery, tanks and mechanized-infantry vehicles – required new mission-oriented tactics rather than the tank tactics inherited from World War I and demonstrated in Spain. The consensus among American armor specialists was that tank tactics used during the Spanish Civil War were unsound and that tanks were improperly used.

During the 1930s, the military debate revolved around the issue of mechanization. After World War I it was clear that airplanes and tanks had appeared on the battlefield and were there to stay, but there was not a clear view on how they would be employed. The interwar era found, therefore, all major armies in the world seeking an improved solution to use the tank as a tool to end the trench-machinegun-artillery deadlock. Conservative thinkers, including most general staffs, were not impressed by the new technologies. Spanish military minds were not particularly isolated on the issue and, as many others, considered the new machines, especially tanks, to be roleplayers. They still believed the battlefield belonged to the infantryman and, to a certain extent, to the horse.

Worthy of military interest

In Spain, tanks restored mobility and maneuver to the battlefield. In so doing, they proved that war and tactics could consist of more than launching bloody frontal assaults by massed infantry. Nevertheless, even if the Spanish Civil War was quickly overshadowed by World War II, for a brief time in 1939 it was Europe's most modern war, fought with weapons newly developed since 1918 and pitting industrialized European nations against each other. It is truly worthy of military interest.

Spanish army COL(R) Tony Candil has lived and worked in Spain, the United Kingdom, Belgium and Italy. He currently lives in Texas. COL Candil's assignments included defense assistant attaché at the Spanish Embassy in London, United Kingdom; defense assistant attaché at the North Atlantic Treaty Organization headquarters, Brussels, Belgium; Spanish Joint Defense Staff, Plans and Policy Division, Madrid, Spain; and director of the Armored Vehicles Program (Leopard II main battle tank) at the Spanish Ministry of Defense, Madrid. His military schools include Armor Officer's Advanced Course of the U.S. Army Armor School, Italian War College, Spanish Staff and Command School, British Defence Intelligence Course, German Army Armor School and the Spanish General Military Academy (equivalent to the U.S. Military Academy). He has a bachelor's of science degree in physics from the University of Madrid; a master's of arts degree in administration from the University of Navarre, Spain; a master's of arts degree in international relations from St. Antony's College, Oxford, United Kingdom; and a doctor of philosophy degree in Eastern European Studies/history from the University of Edinburgh, Scotland. COL Candil's awards include the commander of the Victorian Order (United Kingdom), Medalha Do Pacificador (Brazil) and Honor Cross (Germany).

Notes

[1] The American ambassador and the American military attaché to Spain also recognized the war as a testing ground. The ambassador, Claude G. Bowers, used that very phrase after the war: "Spain then was to be the testing ground. Here would be staged the dress rehearsal for the totalitarian war on liberty and democracy in Europe. …" COL Stephen O. Fuqua, the U.S. attaché, wrote in Spring 1937 that "it is generally accepted that the civil war in Spain had not only been a laboratory for testing equipment, particularly of German and Russian designs, but a dress rehearsal for the next war."

[2] James W. Cortada, ***Modern Warfare in Spain: American Military Observations on the Spanish Civil War, 1936-1939***, Williamsport, MD: Potomac Books, 2012. During the Spanish Civil War, foreign military officers wrote highly elaborate reports of their experiences at the front. One was attaché COL Stephen O. Fuqua of the U.S. Army, who later became a major general. His presence was highly unusual, for most military observers were less-experienced captains, majors and lieutenant colonels. Fuqua's reports contained important observations about Spanish armament and troop movements, and he managed to acquire Nationalist propaganda and information despite being situated entirely within the Republican military lines. His reporting was considered so valuable that during World War II, Fuqua was tapped to be ***Time*** magazine's military commentator.

[3] "Esperienze dalla Offensiva Santander," RRS/CTV, Sept. 15, 1937.

[4] "Note sull'impiego delle minori unità di fanteria e artiglieria nella guerra di Spagna," Italian War Department, May 1938, published Rome.

[5] According to Babini: "Bisogna finalmente avere il coraggio di confessare questo bisogno generale di carri nel senso dinamico della parola. Succede questo: alla vigilia della battaglia tutti pretendono i carri ed nessuno ne può fare a meno; il giorno dopo la battaglia non si riconosce più il grande compagno d'armi. Perché non c'è posto per tutti anche nei consuntivi tattici?"

[6] Putting Babini's words in today's procedures, he was then asking for main battle tanks and armored infantry fighting vehicles.

[7] Babini becomes sometimes a bit confusing when talking of "tank units" (*unità carriste*) or "high-mobility units" (*unità celeri*), concepts he mixed often.

[8] GEN Heinz Guderian, ***Achtung – Panzer!***, Stuttgart, Germany: Union Deutsche Verlagsgesellschaft, 1937.

[9] Corelli Barnett, ***Collapse of British Power***, Amherst, NY: Prometheus Books, 1986.

[10] Sir Basil Liddell Hart, ***The Memoirs of a Captain***, but first presented in Liddell-Hart's book ***Europe in Arms***, New York: Random House, 1937.

[11] Mary R. Habeck, ***Storm of Steel: The Development of Armor Doctrine in Germany and the Soviet Union, 1919-1939***, Ithaca, NY: Cornell University Press, 2003. Habeck is an associated professor of strategic studies at Johns Hopkins University. Her book is a masterpiece on armored warfare and development.

[12] Robin Higham and Frederick W. Kagan, ***The Military History of the Soviet Union***, London: Palgrave Macmillan, 2000. Copious and detailed reports were sent to Russia by the Soviet military advisers, ultimately composing an entire section in the Red Army archives. Specialists returning to the Soviet Union after combat in Spain were interrogated exhaustively on the effectiveness of the equipment supplied.

[13] Jonathan House, "Toward Combined-Arms Warfare: A Survey of 20th Century Tactics, Doctrine and Organization," Fort Leavenworth, KS: U.S. Army Command and General Staff College, 1984.

[14] A report by Soviet GEN Kirill Meretskov to Marshal Boris Shaposnikov, Chief of the General Staff, Aug. 5, 1937. Cited in Habeck.

[15] Steven Zaloga, ***Spanish Civil War Tanks, the Proving Ground for Blitzkrieg***, Oxford, United Kingdom: Osprey Publishing, 2010.

[16] MID reports at the U.S. National Archives and Records Administration, also cited by Zaloga.

[17] COL Antonio J. Candil, "Soviet Armor in Spain: Aid Mission to Republicans," ***ARMOR***, March-April 1999.

[18] George F. Hofmann, ***Camp Colt to Desert Storm, the History of U.S. Armored Forces***, Lexington, KY: The University Press of Kentucky, 1999.

[19] MG Adna R. Chaffee Jr. was nicknamed the "Father of the Armored Force" for his role in developing the U.S. Army's tank forces. He predicted in 1927 that mechanized armies would dominate the next war and assisted in the first program for developing a U.S. Army armored force. In 1938, he assumed command of the reorganized 7th Cavalry Brigade, the Army's only armored force. Chaffee battled continuously during the prewar years for suitable equipment and for the creation of armored divisions. With the collapse of France in June 1940, Chaffee's 1927 predictions of the importance of armored forces in modern warfare were confirmed.

Acronym Quick-Scan

ADA – air-defense artillery
AP – armor-piercing
MID – Military Intelligence Division
RRS – *Raggruppamento Reparti Specializzati*

LEGENDS OF ARMOR

GENERAL FREDERICK M. FRANKS JR.
Desert Shield - Desert Storm
August 1990 - March 1991

Figure 1. 82nd Airborne paratroopers integrate Armor vehicles to support combined-arms training. Infantry brigade combat teams (BCTs) soon will have organic light-armor mobile protected firepower (MPF) companies to provide them with more firepower to counter near-peer threats. *(Photo by SSG Jason Hull)*

Mobility, Shock and Firepower for Light Armor-Infantry Operations: Past, Present and Future

by CPT S. Scott Diddams

"Armor in the future must fly, just as all other means of war must fly. Possessing good cross-country mobility, and gunned to destroy any earthbound vehicle, the tank will play the decisive role in the coming battles of the airheads." -MG James M. Gavin[1]

The U.S. Army has begun a major shift in training to focus on countering near-peer, well-equipped and well-funded adversaries fighting with an assortment of mechanized-infantry and armored platforms far more capable than the typical insurgency. This means a transition from attempting to win a low-tempo "hearts-and-minds" game to winning a high-tempo, large-scale, combined-arms fight against a smarter, modern enemy.

This transition to better engage a differing mix of enemies reflects the nature of war itself. Tactics, techniques and procedures (TTPs) are constantly evolving as the enemy encounters our weapons' effects, just as we upgrade our weapons and training to counter his advantages. This is especially true in our infantry brigade combat teams (IBCTs), which have limited resources to counter bunkers, tanks and other protected adversarial assets. In response to this deficiency, 82nd Airborne Division has begun experimenting with a mobile protected firepower (MPF) company to augment its light battalions.

The MPF platform promises to be a 30-ton tracked vehicle equipped with a 105mm direct-fire precision-weapon system. Currently, the role has been filled with U.S. Marine Corps' light armored vehicles (LAV-25), equipped with the appropriate laser engagement system (Multiple Integrated Laser Engagement System [MILES]) to simulate MPF. The Army has chosen two prototypes to evaluate within 82nd

Airborne in 2021. The product of this and other evaluations will determine the platform of the proposed MPF units to be activated within the IBCTs in 2025.

The concept of augmenting expeditionary, light-infantry organizations with armor isn't new. Examples include general headquarters (GHQ) tank battalions that were tasked to support light infantry in World War II and Korea, or 73rd Armor Regiment, which air-dropped Sheridan tanks into Panama. These and many more historical, doctrinal evolutions produced a plethora of lessons-learned on the subject of light tank-infantry integration. However, in 82nd Airborne Division, which has been without an armored component since 1996, many of these lessons have been lost or discarded. It is valuable, therefore, to examine history as the Infantry Branch develops plans for the future.

This article will examine several relevant historical vignettes and then discuss lessons-learned and how they apply to the development of future light-armor doctrine, which should be of interest to Armor Branch leaders and Soldiers.

Operation Torch and development of tank-infantry tactics

The Army published doctrine prior to the invasion of Africa that would be tested and developed throughout the duration of Operation Torch. Field Manual (FM) 7-5, ***Organization and Tactics of Infantry – The Rifle Battalion***, governed infantry tactics, where infantry leaders were instructed that, when their attacks were supported by tanks, to advance their units as close behind the tanks using the same maneuvers they would if not supported by tanks.[2] The manual instructed infantry leaders to assume that the tank units would conduct battle the same as they would without infantry as well.

FM 17-10, ***Tank Platoon***, which governed tank tactics, allotted GHQ tank battalions to be attached to higher echelons and distributed among infantry organizations as needed. The FM still assumed that infantry would follow behind, as dictated by FM 7-5, except when they encountered anti-tank weapons. Infantry units would be expected to destroy anti-tank weapons using "stalking and infiltration tactics."[3]

While there was consistency in doctrine for both tank and infantry leaders, it would take a number of failures before commanders could effectively employ the tanks with the infantry. The armored units employed in Africa were not GHQ battalions and were therefore not trained to work with the infantry. The mass attacks tank commanders had expected to conduct were not possible in the rugged terrain of North Africa.[4] Tanks were forced to be dispersed as infantry support in much smaller numbers than what was originally planned.

Infantry commanders did not know what to do with the tanks when they received them. Initially, infantry units, attempting to locate and fix their enemies while leaving their tanks behind, would be pinned down and destroyed with indirect fire. In other cases, when tanks were moved to the front, they would move too fast for the infantry to keep up, running themselves into anti-tank fire. When the infantry did keep close, they would often absorb fire meant for the tanks.[5]

The tanks were being moved around so often they were typically unable to develop cohesion with their infantry counterparts as a combined-arms unit and to develop effective TTPs. They also had trouble accessing spare parts and crew replacements.

The chief of the Armored Force, LTG Jacob L. Devers, wrote the following to GEN George Marshall in 1942: "Economy-of-force and unity of command go together. You get little of either if you get a lot of attached units at the last moment. Team play comes only with practice."[6]

Devers' note to Marshall reflected what Americans had been learning while fighting. In Africa, organizations in which tanks and infantry were attached together for extended periods ultimately became highly capable in battle.[7]

Figure 2. Soldiers from 740th Tank Battalion and 82nd Airborne Division push through the snow near Herresbach, Belgium, Jan. 28, 1945. *(U.S. Army photo)*

504th and 740th advance on Siegfried Line

Company C, 740th Tank Battalion (GHQ), was attached to 504th Parachute Infantry Regiment (PIR), 82nd Airborne Division, for the advance on the Siegfried Line Jan. 28, 1945. They were equipped with M4 Sherman tanks, each with a 76mm cannon, two 30-caliber coaxial and bow machineguns, and a 50-caliber pintle-mounted machinegun on top of the turret.

One tank platoon from Company C was attached to each of 504th's three battalions. Their objective was the town of Herresbach, Belgium, and they would be the right flank of First Army.

The 3rd Platoon from Company C of the 740th and 3rd Battalion of the 504th would lead the attack. Snow and fog covered the advance down a single narrow trail. Single tanks led paratroopers marching in columns of two spaced at platoon interval.[8]

For the first 7,000 yards of the advance, the column encountered only minimal resistance, consisting of machinegun and small-arms fire. At that point the column was notified of a German counterattack to its north. Four tanks assembled at the front of the formation, and infantry climbed on to maneuver toward the suspected enemy.

The German and American columns stumbled upon each other, and without hesitation American paratroopers and tanks jumped into action, seizing the initiative. The lead tank opened with its full complement of machineguns as well as its main cannon, while paratroopers on the ground charged forward, firing from the hip. The violent combined-arms action was over in 10 minutes, with the 504th reporting more than 100 Germans killed and about 180 captured. Not a single American casualty was reported.[9] The town of Herresbach was seized within an hour.

Interspacing tanks among infantry platoons along the canalizing trail to Herresbach allowed for optimal security and firepower spread throughout the formation. Upon notification of contact, the ability of riflemen to ride toward the enemy on top of a platoon of tanks no doubt increased the concentration and tempo of the movement-to-contact. The ability of the tank-infantry team to react to such a large enemy force so decisively in so little time was a result of mobility, shock and firepower that would have been lacking without armor support.

Infantry-armor task force in Korea

As the war in Korea progressed into 1951, especially in the west where terrain was more forgiving, American and United Nations forces were regularly conducting combat operations in infantry-armor battalion task forces.

Typically an infantry regiment consisting of three battalions had a tank battalion of four companies in support, and each battalion would have one or two tank companies attached in addition to other enablers such as engineers, artillery and reconnaissance companies. These infantry-armor task forces were successful in limited-objective attacks such as the attack on Osan-Suwon Jan. 15, 1951.

The 27th Regimental Combat Team (RCT) was organized into three task forces of 27th Infantry Regiment, supported by 89th Tank Battalion. Task Force Baker – consisting of Soldiers from 2nd Battalion, 27th Infantry Regiment, and Company C, 89th Tank Battalion – spearheaded the attack on Suwon. Their rapid advance, coupled with the shock effect and firepower of their armor enablers, caught the defending enemy off guard, inflicting 200 casualties.

The RCT continued toward and into Suwon Jan. 16-17 with additional air support. With shock and surprise, the RCT engaged enemy forces on top of and inside buildings, flushing them out onto the street kill zones with air and ground fire. By the end of the operation, an estimated 1,150 enemy were killed at the cost of a single American casualty.[10]

Similar infantry-armor task-force concepts were put to use successfully in several more operations of this time period. Notable is Operation Punch in February 1951, in which 25th Infantry Division attacked to seize two hilltops outside the town of Suwon. Two separate task forces were assembled from 64th and 89th Tank Battalions and 1st and 2nd Battalions of 27th Infantry Regiment. The plan consisted of the tank battalions launching penetrating attacks to the flanks and rear of the hilltops, while infantry attacked up the hills themselves.

The armor teams were not meant to seize or secure any terrain, only to disorganize and disrupt the enemy to inflict maximum casualties and then withdraw. In the flanking maneuver, each tank company was teamed with an infantry company, and both commanders remained together physically for the rest of the operation. Typically the infantry commander would ride on the back deck of the armor commander's tank. The operation ended with a reported 4,251 enemy killed at the cost of 100 allied casualties.[11]

3-73 Armor and Operation Just Cause

In the early morning of Dec. 20, 1989, Company C, 3rd Battalion, 73rd Armor Regiment, air-dropped 10 M551A1 Sheridan tanks to the east of the Tocuman-Torrijos Airport in Panama as part of Operation Just Cause. The light tanks of this unique division-organic tank battalion were equipped with a 152mm main gun, 7.62mm coax and the commander's .50-caliber pintle-mounted machinegun.

Of the 10 vehicles dropped into Panama, eight were made operational and organized in sections belonging to each of the three PIRs, with one section establishing a blocking position at the airport's entrance.[12] Soldiers from 1st Battalion, 504th Infantry Regiment made direct contact with the Panamanian Defense Force (PDF) when they were ambushed by a machinegun position while clearing an obstacle not far from the drop zone. The lead tank commander immediately opened fire with his .50-caliber machinegun, and his wingman, upon acquiring the enemy location, fired a single 152mm high-explosive (HE) round, causing the side of the building occupied by the enemy to collapse. Enemy fire ceased, and the infantry battalion reduced the obstacle and continued.

Later on the same route, Sheridans

Figure 3. An M551 Sheridan sits outside the Apostolic Nunciature, the Vatican's embassy, during negotiations for Manuel Noriega's surrender in Operation Just Cause. *(U.S. Army Center of Military History photo)*

and infantry encountered another obstacle consisting of an apparent vehicle-born improvised-explosive device. The obstacle was reduced by firing a single 152mm HE round. When the smoke cleared, the tanks pushed the wrecked vehicles aside, and the route was open.[13]

Elsewhere, Sheridans were being put to work on the offensive against the PDF's Commandancia complex and airborne and ranger training base. In the former, Sheridans used their main cannon to knock down walls and open areas for dismounted maneuver. They fired HE rounds into buildings as preparatory fires prior to the infantry entering and clearing. The HE rounds killed occupants and drove the enemy into a state of confusion and discord before being swept away by the precise urban maneuver of the paratroopers.

In the latter, the company commander of the armor-infantry team took his position at the deck of one of his attached Sheridans and manned the dismount telephone to coordinate direct fires, putting tanks to use preventing fratricide.[14]

In contrast to prior infantry-armor operations, the paratroop commanders knew the capabilities of their permanent armor enablers, and likewise the Sheridan crewmen knew how their infantry counterparts fought. Together they produced a lethal and highly successful team. Tanks were available to assist their infantry counterparts in the joint forcible entry almost immediately after hitting the ground and provided much-needed mobility, shock and firepower to keep paratroopers moving from the airhead to their objectives while minimizing casualties. Company C accomplished its mission and returned home from Panama with only one crewmember wounded

Company A, 4th Battalion, 68th Armor, at JRTC

In June 2019 at Joint Readiness Training Center (JRTC), Fort Polk, LA, 82nd Airborne Division's MPF Company brought three platoons of Marine Corps LAVs equipped with MILES simulating a 105mm auto-loading cannon and 30 tons of armor. The company supported 1st Brigade Combat Team in the airborne joint forcible entry, followed by defensive and finally offensive operations against a near-peer mechanized enemy.

The initial plan was to task each of the three platoons to a habitual parent infantry battalion, with one platoon being air-dropped and the other two arriving by air-land. Immediately upon air drop, a platoon of MPF vehicles were made available to the brigade commander to support the infantry battalions as they expanded their control over the airhead.

After encountering minimal resistance, the platoon was attached to 2nd Battalion, 501st PIR, and assisted in repelling multiple mechanized-infantry counterattacks over three days until it was finally destroyed by enemy armor.

The morning after, a two-vehicle section that was initially attached to 1st Battalion, 504th PIR, was rerouted to 2nd Battalion, 501st PIR, to supplement that battalion's defense. The receiving company commander provided clear and brief guidance to provide a defensive battle position (BP) facing down a narrow road with platoons of infantry occupying BPs at the flank. Around midnight an enemy armored-battalion column approached the company engagement area. As planned, infantry attempted to engage enemy armor first with their dismounted anti-tank systems with limited success. The MPF section then began engaging enemy armor with immediate effects.

Initially, the enemy focused on the dismounted infantry arrayed in the tree line at their flank. A few *boyevaya mashina pekhotys* (BMPs) identified and fired back at the engaging MPF section, but their 30mm cannons had no effect on the MPF platform's frontal armor. The section expended all of its ammunition in the space of 20 minutes, destroying a company-sized element of T-80s and BMPs.

Continuing to receive only 30mm fire, the section arranged its vehicles to form an effective roadblock, and the enemy armored column was completely halted. It was the first time in recent history that a light brigade had been able to effectively stop the advance of the armored counterattack at JRTC.

Following the defense, the MPF company was reconstituted and divided up into three armor-infantry teams, two of which were tasked with breaching enemy defenses around the stronghold town of Sangari and passing dismounted paratroopers onto the objective. These teams were augmented with M1A2 72-ton main battle tanks in addition to the MPF platforms. On the approach, the teams took little

Figure 4. A Sheridan tank supporting the 82nd Airborne rotation at JRTC patrols the forward landing strip in Cortina. *(Photo by Raymond Barnard)*

contact until a section of both MPF vehicles and M1A2s were mistaken for enemy armor and destroyed by friendly dismounted anti-tank systems. After absorbing this significant loss, the teams continued to the objective, meeting and destroying enemy armor and successfully opening the breach for infantry to follow through.

Lessons for the future

The bottom line is that success of the light armor-infantry team, as with any enabler, is predicated first on the combined understanding of each other's capabilities and limitations by both armor and infantry leaders, leading to harmonious coordination between crew members and dismounts. This is best achieved through repeated MPF-infantry maneuver training at battalion and below level with organic or habitually attached MPF crews. In a mission-command environment, the efficacy of armor enablers in training and the development of strong TTPs is limited to a well-informed commander's creativity and willingness to take prudent risk. Once this habitual training relationship is achieved and strong TTPs are established among leaders, success on the battlefield will follow.

While this formula for success may seem trivial to commanders who have spent their careers in armored and mechanized organizations, IBCTs typically lack personnel with mechanized experience or understanding of armor doctrine. This general lack of understanding of armored capabilities and doctrine among leaders in IBCTs is also dangerous in that it has created a prevalent attitude of rejection toward the armored force. Light-infantry commanders and staff typically believe they can accomplish their mission without armor because they have been doing so for decades. History has shown, however, that permanent light armor augmentation is an incredible force multiplier, which will allow the IBCT to accomplish much more.

Whether light-infantry commanders want it or not, the MPF company will become a part of IBCTs in the near future. For those commanders who find themselves with armor enablers for the first time in their formations and don't know how to employ them, I offer that there is no right answer, but experience and history has taught us to adhere to these key principles:

- **The MPF requires local security provided in the form of dismounts or a wingman vehicle.** Successful combined-arms teams can be formed between two or more MPF platforms, an MPF and a machinegun-equipped humvee, or preferably an MPF and a squad of riflemen. Dismounts are ideal because it is critical to cover the deadspace around the vehicle and prevent infiltration.
- **Avoid deliberately maneuvering the MPF platform off-road through low ground or loose sand and soil.** A thorough terrain analysis should be conducted at a minimum via a map reconnaissance to determine severely restricted terrain. You don't want your vehicles to get stuck.
- **Make use of engineer assets to provide hull defilade fighting positions.** The MPF platform benefits from the smallest silhouette possible while still being able to traverse its turret.
- **Give the MPF clear lines of sight and maximum standoff.** The MPF is equipped with precision, high-velocity, direct-fire, laser-ranged weapon systems firing both kinetic and chemical ordinance. These weapons systems can affect every perceivable land target accurately and easily at least 3,000 meters away.
- **Plan to make Class III resupply available to the MPF daily and plan to make Class V resupply available during offensive or defensive action against armor or armored targets.** The MPF in contact with armor will run out of main-gun ammunition quickly. Ensure that the MPF platoon sergeant and battalion S-4 have made contact during logistical planning.
- **The infantry planner should have constant access to the MPF platoon leader prior to execution.** During execution, the combat commander should prioritize his control of the MPF. The MPF will most likely be the combat commander's most casualty-producing weapon system and best enemy-detection system. Employing it at the center of mass of the operation is critical and enabled by keeping the MPF leader physically with the tactical planner prior to (and decision maker during) combat operations.

Adherence to these principles and the lessons history teaches us, coupled

with the application of common sense, will set your operation up for success. When the platform arrives, its technical specifications will no doubt affect its maneuverability and combat capabilities. The key is to train together, take risks and make mistakes, then train again, and again, and again.

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Acronym Quick-Scan

BMP – *boyevaya mashina pekhoty* (Russian fighting vehicle)
BP – battle position
FM – field manual
GHQ – general headquarters
HE – high explosive
IBCT – infantry brigade combat team
JRTC – Joint Readiness Training Center
LAV – Light Armored Vehicle (U.S. Marine Corps)
MILES – Multiple Integrated Laser Engagement System
MPF – mobile protected firepower
PDF – Panamanian Defense Force
PIR – parachute infantry regiment
RCT – regimental combat team
TTP – tactics, techniques and procedures

Section Gunnery and Armored Brigade Combat Team Lethality

by CPT Zachary J. Matson

The U.S. Army continues to prepare for large-scale combat operations (LSCO) through tough, realistic training against a near-peer threat.[1] The bulk of America's conventional striking power – its armored brigade combat teams (ABCTs) – may struggle to maintain qualified and lethal sections due to both high personnel changeover and the deliberate neglect of section gunnery. While Human Resources Command and Department of the Army control the former, brigade commanders have control over the latter. Choosing to neglect section gunnery generates three distinct problems:

- Section leaders never receive feedback and development on a live-fire exercise (LFX) that bears more importance than any other like exercise;
- Battalion commanders reluctantly separate platoons into sections which reduces flexibility in planning; and
- Company commanders and platoon leaders do not have any validation or confidence in their sections' operational autonomy before separating them for survivability on a dispersed 21st Century battlefield.

While brigade and battalion commanders might see platoon Table VI as an opportunity to train both platoons and sections, the truth is this approach does not accomplish the best training or preparation for LSCO.[2]

Infantry NCOs in Armor formations

What matters to Infantry Branch noncommissioned officers (NCOs) for promotion to sergeant first class is rated time as a rifle-squad leader, not as a section leader.[3] Infantry NCOs assigned to an ABCT must rotate through the rifle squads to accumulate rated time. Understandably, this priority of rated time creates a desire in NCOs to serve in the rifle-squad-leader role that is mandatory for promotion.

In addition to this discrepancy in rated time between a section and a squad, the rifle-squad leader is sure to get multiple repetitions in a squad LFX, while a section leader will not be

Figure 1. A Bradley Fighting Vehicle assigned to Company A, 3rd Battalion, 15th Infantry Regiment, 2nd Armored Brigade Combat Team, 3rd Infantry Division, advances to the first berm during a crew gunnery at Fort Stewart, GA, Sept. 25, 2019. *(Photo by SPC Jordyn Worshek)*

rated as objectively during platoon LFX because this is the platoon's evaluation with the platoon leader and platoon sergeant responsible for the results. More often than not, platoon leaders and sergeants maneuver their sections, with the section leader relegated to the role of track commander during platoon Table VI.

Comparatively, a squad LFX gives a squad leader the chance to formulate a plan, brief it, execute it and receive feedback for development, all while incorporating enablers under stress and with live rounds – truly an important exercise for leader development. Section leaders do not get the same opportunity because they are not offered the ownership of a section LFX.

Section gunnery and leader development

Section gunnery and NCO development go hand in hand. Field-grade leaders who fail to schedule this event deny a portion of their formation invaluable training. Unfortunately, many ABCTs choose this route.[4]

Leader development is even more vital as formations on the battlefield of the future are expected to perform while geographically dispersed. GEN Mark Milley, who served as 39th Chief of Staff of the Army (CSA), described the future battlefield as requiring never-before-seen levels of unit dispersion. "Soldiers … must split into small units and stay either on the move or under cover," warned the former CSA.[5] Mechanized rifle platoons will break up into sections to increase survivability on a modern battlefield; however, sections never train or operate independently in current unit training plans. Occasionally, a commander detaches a section from its platoon during combat-training-center rotations, but without the deliberate planning and use of live rounds, section leaders do not benefit from this simulated training, as valuable as it is.

The Army knows it will fight dispersed, so it is a commander's responsibility to train those echelons and leaders with live rounds and incorporate that into our peacetime training calendars. Section Table VI qualification allows the battalion commander the flexibility to operate as either sections or platoons.[6] Sections will be the smallest unit we see in a mechanized formation on the future battlefield, and preparation begins now to dominate in close combat.

Section gunnery, often missing in ABCT training calendars, provides an important mechanism to make these formations lethal. By planning, resourcing and executing section gunnery, commanders provide their formations with more seasoned and capable NCOs who take their evaluation and performance more seriously. Successful completion of section Table VI provides battalion commanders with qualified sections that can both operate independently and survive on the future battlefield. Training at this echelon makes ABCTs more lethal and fulfills the promise of leader development that we as an Army focus on. It requires more time and effort, but the increased lethality and leader competence ensures mechanized formations – at any echelon – can fight and win tomorrow's wars.

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Acronym Quick-Scan

ABCT – armored brigade combat team
CSA – Chief of Staff of the Army
LFX – live-fire exercise
LSCO – large-scale combat operations
NCO – noncommissioned officer

BOOK REVIEWS

Soviet Cavalry Operations During the Second World War and the Genesis of the Operational Manoeuvre Group by John S. Harrel; Yorkshire, UK: Pen & Sword Military; 2019; $23 hardcover.

The Soviet-German front in World War II was characterized by massive operations and immense violence. It is often thought of as a conflict between armored forces. German panzers dueled Soviet T-34s, with the infantry doomed to suffer in the cold and in the cities. The conception of cavalry units of significant size and impact has largely been omitted from the war's historiography.

John S. Harrel's latest work serves as a reminder that the era of horse-mounted warfare had not passed and, indeed, continued until the war's conclusion. ***Soviet Cavalry Operations During the Second World War and The Genesis of the Operational Manoeuvre Group*** is an expansive analysis of the technical, tactical and operational employment of Soviet cavalry against the Germans and their Axis allies. For practitioners who want to understand the history and development, the book is a goldmine of overlooked campaigns and actions. As during World War II, while new technologies promise to shift combat operations, the study of the seemingly archaic cavalry serves as a reminder that old platforms continue to be effective long after becoming outdated.

While initially solely horse-mounted, the Soviet cavalry, like much of the Red Army, was increasingly motorized and mechanized as the war progressed. The Soviet cavalry maintained an essential mobility advantage over their German opponents in areas lacking a significant road network, regardless of their mounts. As Harrel elucidates, the cavalry was the only reliably mobile Soviet force during the first years of the war. Despite their mobility, horse-mounted cavalry, like the rest of the Red Army, often paid a heavy price for minimal gains.

The first operational-level raid was launched in early 1942, as 1st Guards Cavalry Corps penetrated the German 4th Army's lines in an effort to strike at 4th Panzer Army's rear near Vyazma. Their efforts, combined with paratroopers dropped behind German lines, led German GEN Franz Halder, chief of the German General Staff, to cite supply difficulties in the area and requirements to shift German forces from the front lines to counter the threat to the rear.

While deployed to cut vulnerable supply lines and disrupt rear-area operations, cavalry forces often faced significant logistical problems as the Red Army was unable to reliably supply them with ammunition, replacements or medical support. The cavalry troops were frequently required to live off the land and, due to mounting losses, to consolidate their forces into ever-shrinking formations as the Germans pursued them. Nevertheless, as Harrel recounts, their impact on German rear areas was significant and they tied down large numbers of troops.

The book is organized into 25 chapters with an introduction, glossary, notes and a bibliography, all supplemented with 63 maps and 48 illustrations. The first 15 chapters cover the origins of the Soviet cavalry as an operational force, as well as its equipment and organization before World War II. From there, operations are told chronologically, often covering multiple operations across multiple fronts in the span of a few pages. Some actions are extensively covered, while others are relatively sparse on details. For students of the Eastern Front, this is unsurprising and does not detract from the work's overall value. The inclusion of so many maps is valuable. This said, the keys on the maps are often lacking scale and other normal information, reducing some of the maps' value.

By the end of World War II, while the Red Army was largely motorized, cavalry units continued to play significant roles in the final strategic offensives. The cavalry units, with tables of organization now containing increasingly armored and motorized formations, continued to penetrate Axis lines, conducting reconnaissance and threatening lines of communications. They kept Axis defenders off-balance and helped spearhead the Soviet's concluding operations in Europe and against Japan. Along with the rest of the Red Army, the Soviet cavalry grew in terms of operational prowess and skill as the war progressed, and Harrel's work brings to light the operational impact that seemingly obsolete tactics and formations had on a modern battlefield. The book's dense and detailed presentation makes it valuable to operational planners and those interested in the Soviet-German war.

MAJ TIMOTHY HECK
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Covering Operations in the Loudon Valley, June 17-23, 1863: A Brief Assessment

by MAJ Christian Garner

The U.S. cavalry has maintained a history of executing reconnaissance and security (R&S) operations in support of higher-echelon formations. While this historical role remains unchanged, the U.S. Army's current transition to large-scale ground combat places increased emphasis on the reconnaissance function of cavalry to seek out enemy formations. Regardless of vehicle composition or echelon, cavalry formations are still required to perform collective missions that include zone, route, area and forceful reconnaissance or screen, guard and cover assignments.[1] Given these tasks to not only find the enemy but also protect friendly forces, the security function of cavalry formations remains and must not be forgotten.

Within the Army, and specifically the Armor Branch, there is much current debate on the future composition of cavalry units and the capabilities they would bring to the fight. While task-organizing existing cavalry squadrons is seen as a current measure to achieve successful R&S operations, there is likely value in creating permanent, standing organizations to reinforce training, establish habitual relationships and simplify the chain of command. However, regardless of structure or echelon, U.S. cavalry functions best in both its R&S roles when it is given direct command and control of enablers to assist the organic cavalry elements. By maximizing the rapid mobility of mounted formations with the unique capabilities brought to the battlefield by enablers, U.S. cavalry units have historically been able to successfully execute the variety of missions assigned to them.

While the history of American cavalry forces provides bountiful examples of successful reconnaissance operations, security operations are somewhat less well known, if not more elusive. During the Battle of Gettysburg, much attention continues to be given to BG John Buford's defense along the ridgelines west of town during the morning of July 1, 1863. Immortalized in Michael Shaara's ***The Killer Angels*** and the actor Sam Elliot's role as Buford in the movie ***Gettysburg***, the current version of Field Manual (FM) 3-98 uses Buford's defense as a textbook example of the dual R&S roles cavalry provides.[2]

While a worthy example, a lesser-known security operation occurred just a few weeks prior to Buford's action on the western approaches around McPherson's Ridge and the Chambersburg Pike.

The absence of MG J.E.B. Stuart's Confederate cavalry until the third day from the Battle of Gettysburg is often a point of contention that is brought up in any analysis of the campaign and subsequent battle. Out conducting a raid deep into Pennsylvania and Maryland, Stuart's absence leading up to July 1, 1863, led to a climactic meeting engagement which arguably changed the course of the Civil War. Absent during most of the Battle of Gettysburg itself, the contributions of the Confederate cavalry were nonetheless important, as they allowed the Army of Northern Virginia to disengage from a numerically superior force and move undetected into enemy territory. Although failing in its reconnaissance role, Stuart's cavalry performed admirably in its exemplary execution of its covering operation as GEN Robert E. Lee moved his army north into Maryland and Pennsylvania.

Lee moves north

Following his defeat of the Union Army of the Potomac at the Battle of Chancellorsville in May 1863, Lee consolidated and resupplied his forces in preparation for an invasion north. Starting June 3, 1863, he began to shift his forces from their positions outside Fredericksburg, VA, to the west to begin the planned invasion. To mask his movement north, the operational plan called for the Army of Northern Virginia to follow the Shenandoah Valley north into enemy territory. By using the Shenandoah, Lee intended to

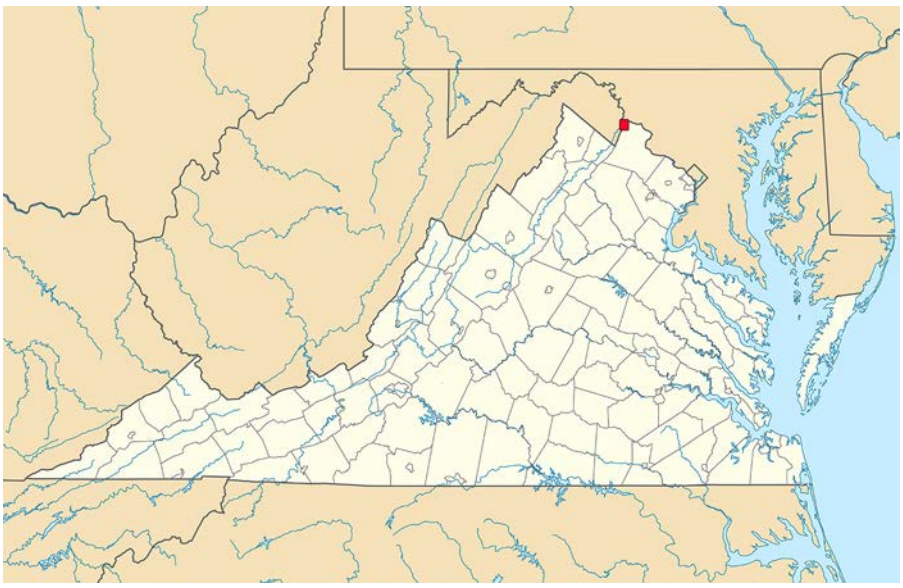

Figure 1. The red area marks the Loudon Valley's location.

Figure 2. Looking east across the Loudoun Valley, as seen from the foot of the Blue Ridge Mountains near Bluemont, VA.

exploit the neighboring Bull Run and Blue Ridge Mountains to form a natural screen line to help conceal his army's movements from detection. Between the two mountain ranges lay an area known as the Loudoun Valley, which contained a series of mountain passes that allowed passage in and out of the mountain ranges. This land became contested terrain June 17-23, 1863, as each side conducted R&S operations in the fight to find or protect Confederate forces.[3]

By June 5, 1863, Union MG Joseph Hooker – commander of the Army of the Potomac – realized that Lee had abandoned his position in Fredericksburg, and he tasked his cavalry force under the command of BG Alfred Pleasonton to ascertain the enemy's intent as Hooker prepared the Union army for movement. To achieve this mission, Pleasonton ordered his two divisions under the commands of Buford and BG David Gregg to mass their brigades and force the passes in the Loudon Valley to determine the Confederate dispositions. Countering Pleasonton's reconnaissance efforts, Stuart placed his six brigades of Confederate cavalry directly west of the gaps that pass through the Bull Run Mountains to cover the Confederate main body as it moved north into Maryland.

In addition to the six brigades of cavalry under Stuart's direction, he also commanded a formation of horse artillery, consisting of six batteries, and a task force commanded by BG John Imboden, containing two regiments of cavalry, a company of partisan rangers and one battery of artillery.[4] With six brigades of mounted cavalry and six batteries of artillery, Stuart had the ability to dedicate a battery to each brigade. By doing so, he created habitual relationships between the brigade and regimental commanders with their respective battery of artillery and its leadership. Stuart would put this command relationship to good use in the coming days in the multiple engagements fought across the Loudon Valley in the middle of June 1863.

Although almost numerically the same size as the Union force, Stuart found himself at a disadvantage. While the defense is generally considered the stronger form of warfare, the Confederate cavalry found themselves defending the many gaps bisecting the Loudon Valley and neighboring mountain ranges. Conversely, Pleasonton had the advantage by being able to mass his cavalry forces at the division level, thus achieving local numerical superiority at a time and place of his choosing. To counter this threat, Stuart relied on his enablers, specifically his field-artillery formations, to help his organic cavalry formations conduct their covering operation for the main body of the Army of Northern Virginia.

Forcing the gaps

On June 16, Hooker ordered Pleasonton's two divisions of Union cavalry to the town of Aldie, an important crossroads town, to find Lee's army. Defended by part of a dismounted brigade of Confederate cavalry under the command of COL Thomas Munford, June 17 found the lead Union cavalry brigade under the command BG Judson Kilpatrick of Gregg's Division slamming into the Confederate positions astride the two turnpikes leading west to Ashby's Gap and northwest to Snickers Gap. Blunting the initial Union assault, Munford's dismounted troopers were aided by enablers in the form of CPT James Breathed's battery of four three-inch rifled cannon from 1st Virginia Horse Artillery.

Checking Kilpatrick's continued charges, the Confederate cavalrymen and artillerymen continued to hold the important crossroads throughout the day. Frustrated by the delay, Gregg committed a second brigade of Union cavalry to Aldie in an attempt to force the task-organized Confederates to cede the important terrain. Although eventually forced to retire due to growing Union strength, Munford successfully delayed the initial Union reconnaissance effort and prevented the enemy from gaining knowledge of Lee's movements.[5]

After hearing of the action at Aldie and recognizing Stuart's covering operation, Hooker ordered Pleasonton to "find out what was behind [the Confederate cavalry]," which resulted in increased Union cavalry commitment June 18.[6] Though hard-pressed by a numerically superior force, Stuart considered it his "duty to mask the movements of Lee's infantry" by "checking the enemy's reconnaissance" efforts as far away from the main force as possible.[7]

Not to be denied, Pleasonton continued his aggressive reconnaissance efforts June 19 in the vicinity of Middleburg, five miles to the west of Aldie.

Again leading with a Union cavalry brigade, this time under the command of COL J. Irvin Gregg from Gregg's Division, Pleasonton attempted to achieve local numerical superiority against the two dismounted partial Confederate cavalry brigades under the command of BG Beverly Robertson and COL John Chambliss. Still needing to cover the main body of Lee's advance northward, Stuart ordered Robertson and Chambliss to conduct a delaying action by trading space for time.

With the initial Confederate skirmish line driven in, Stuart established a position around Mount Defiance, a neighboring ridgeline, to the west of Middleburg. In addition to the troopers of Robertson's and Chambliss' commands, Stuart supplemented the defenses with two batteries of attached artillery, the Lynchburg Rifles under CPT Marcellus Moorman and 2nd Virginia Horse Artillery commanded by CPT William McGregor. Combined, these two batteries provided three Napoleon smoothbore cannons and five three-inch rifled cannons to support the embattled Confederate troopers.

With the initial advance of his cousin COL J. Irvin Gregg stopped, Union BG David Gregg once again brought his second brigade up in an attempt to force the Confederate position. Also, a brigade from Buford's division moved south in an effort to flank the defensive position. Realizing the tenuous nature of the Mount Defiance position, Stuart withdrew his forces behind the Kirk's Branch Creek farther west. Although forced away from Middleburg, Stuart's combined cavalry and artillery force once again successfully stopped the Union reconnaissance efforts and protected Lee's main body from detection.[8] In his official report to Hooker, Pleasonton reported, "We cannot force the gaps of the Blue Ridge in the presence of a superior force."[9]

In a final effort to dislodge Stuart's covering force, Pleasonton asked Hooker for a division of infantry as reinforcements to once and for all "cripple [the Confederate cavalry] up."[10] Leaving two infantry brigades to secure his lines of communication and baggage, on June 21 Pleasonton committed his two divisions of cavalry and an infantry brigade under the command of COL Strong Vincent – including 20th Maine, later to gain fame for its defense of Little Round Top during the Battle of Gettysburg – to engage Stuart and his cavalry around the small settlement of Upperville further west in the Loudon Valley. Using its infantry attachments, the Union force initially pushed back the dismounted Confederate cavalrymen of BG Wade Hampton and the supporting battery of CPT James Hart's Washington Horse Artillery.

Although initially forced to retreat, Stuart reformed his defensive line to the west of Goose Creek in an effort to halt the numerically superior force. Calling for reinforcements, Stuart ordered the cavalry brigades of BG William "Grumble" Jones and Chambliss to converge west of Upperville to establish a secondary defensive position and protect his flank from Buford's enveloping brigades. Supporting this secondary defensive position, the Ashby Horse Artillery under the command of CPT Roger Preston Chew unlimbered and deployed its one three-inch rifle and one howitzer.

By pouring enfilading fire into the flank of 8th Illinois Cavalry, the battery helped check the Union cavalry from reaching the Confederate supply wagons attempting to escape through Ashby's Gap. Able to re-establish his defensive lines, Stuart's troopers continued to fight a delaying action the rest of the day, though eventually ceding the town to enemy control.[11]

Battle analysis

Although being forced to cede control of the Bull Run Mountains and the Loudon Valley to Union cavalry, Stuart and his force retrograded to the west and continued covering the passes of the Blue Ridge Mountains for the next three days. After several days of intense combined-arms actions, Pleasonton confirmed that Lee and the Army of Northern Virginia were not in the Loudon Valley, but the Union cavalry still could not actually determine the location of the Confederate main body. The Confederate cavalry and artillery under Stuart's command had succeeded in their mission to provide security for the movement of the Army of Northern Virginia in its invasion north.

Although often a footnote or afterthought to Gettysburg, the sharp series of battles still took a deadly toll on its participants. In total, from June 17-23, the Union forces lost 883 men and Stuart's cavalry had 510 casualties, reflecting the nature and importance of the R&S operations as both sides fought to gain or protect information.[12] To highlight the importance of Stuart's covering effort, on June 22 – the day after the Battle of Upperville – MG Robert Rodes' division of LTG Richard Ewell's corps crossed into Pennsylvania, the first Confederate force to reach the state.

The organization of the Confederate force to conduct its covering operation in the Loudon Valley serves as a textbook example of enablers supporting cavalry formations. With six batteries of organic artillery already at his disposal, Stuart made the wise decision to attach a battery to each of his brigades. Tasked with covering a series of gaps and passes connecting the Loudon and Shenandoah Valleys, the Confederate cavalry could not mass its forces; instead, it had to fight in disparate brigade-sized elements. The enabler support provided by its artillery batteries proved their utility in helping the Confederate troopers fight off numerically superior forces.

While the technology of the 21st Century makes the battlefield of today look little like those of the American Civil War, the principles of R&S operations have not changed. Enabler support has and will continue to provide cavalry formations unique capabilities in support of these missions.

Stuart's controversial departure June 25, 1863, to begin his raid deep into Union territory continues to dominate the narrative of the usage of Confederate cavalry during the Gettysburg campaign. Though Stuart's operation from June 25 to July 2 can be called into question, his covering operation beginning June 17 against a numerically superior force is a textbook example of the use of cavalry and enablers to protect the disposition and intent of the main force.

Hooker, the Union commander, gave the most telling assessment of Stuart's operation and the efforts of his troopers. Writing President Abraham Lincoln

to keep him abreast of current operations, Hooker wrote that the Confederate horsemen and artillery had "hitherto prevented me from obtaining satisfactory information as to the whereabouts of the enemy. They have masked all of their movements."[13] For the opposing commander to candidly admit such frustration, there can be little doubt to the effectiveness of the Confederate covering operations in the Loudon Valley in the summer of 1863.

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Notes

[1] Headquarters Department of the Army, FM 3-98, ***Reconnaissance and Security Operations***, Washington, DC; Government Printing Office, June 2015.

[2] Ibid.

[3] Edwin B. Coddington, ***The Gettysburg Campaign: A Study in Command***, New York: Simon and Schuster, 1968.

[4] Stephen W. Sears, ***Gettysburg***, New York: Houghton Mifflin Harcourt, 2003.

[5] Ibid; Philip Laino, ***Gettysburg Campaign Atlas***, Gettysburg, PA: Gettysburg Publishing, 2009.

[6] MG Joseph Hooker to MG Henry Halleck, June 18, 1863, in ***The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies***, Washington, DC: Government Printing Office, 1880-1901, Ser. I, 27 (1) [book on-line]. Cited as OR [on-line]), available from http://collections.library.cornell. edu/moa_new/waro.html. Accessed April 16, 2020.

[7] Coddington; MG JEB Stuart to GEN Robert E. Lee, Aug. 20, 1863, OR [online], Ser. 1 27 (2).

[8] Laino.

[9] BG Alfred Pleasonton to BG Seth Williams, June 20, 1863, OR [online], Ser. 1 27 (3).

[10] Coddington; BG Alfred Pleasonton to MG Joseph Hooker, June 20, 1863, OR [online], Ser. 1 27 (1).

[11] Sears; Laino.

[12] Sears.

[13] Harry W. Pfanz, ***Gettysburg: The First Day***, Chapel Hill: The University of North Carolina Press, 2001; MG Joseph Hooker to President Abraham Lincoln, June 21, 1863, OR [online], Ser. 1 27 (1).

Acronym Quick-Scan

BCT – brigade combat team
FM – field manual
R&S – reconnaissance and security
USMA – U.S. Military Academy

TRADOC G-2 newsletter

U.S. Army Training and Doctrine Command's G-2 has begun a monthly newsletter, unclassified and approved for public release. Its inaugural edition highlights many of G-2's most recent products. The newsletter "seeks to arm leaders and Soldiers with resources to understand the operational environment [OE] and succeed when operating in it."

"One of the challenges associated with the changing character of warfare comes not just from the emergence of disruptive technologies and our adversaries' embrace of them, but also from the ways in which they adopt hybrid strategies that challenge traditional symmetric advantages and conventional ways of war," writes LTG Theodore D. Martin, TRADOC deputy commanding general and TRADOC's chief of staff – and former commandant of the U.S. Army Armor School. "It is crucial to understand what the OE looks and feels like to warfighters to shape our application of combat power and how we train our formations to meet these challenges. [A] deep look at the future allows us to examine our assumptions about warfare, force structuring and capabilities requirements. This assessment is vitally important to every member of the Army team, from the brand-new Soldier, to general officers, to career Army civilians. Shared understanding of the environment is essential to preparing our people, setting the context for readiness, informing our modernization efforts and guiding us in reforming our processes to meet new challenges."

Specific country products:

- Iran products: https://community.apan.org/wg/gckn/p/irandproducts
- China products: https://community.apan.org/wg/gckn/p/chinaproducts
- Russia products: https://community.apan.org/wg/gckn/p/russiaproducts
- North Korea products: https://community.apan.org/wg/gckn/p/northkorealibrary

TRADOC G-2's Operational Environment Center Website: https://oe.tradoc.army.mil/OEC/default.aspx

See also TRADOC Pamphlet 525-92-1, ***The Changing Character of Warfare: the Urban OE***, https://adminpubs.tradoc.army.mil/pamphlets/TP525-92-1.pdf.

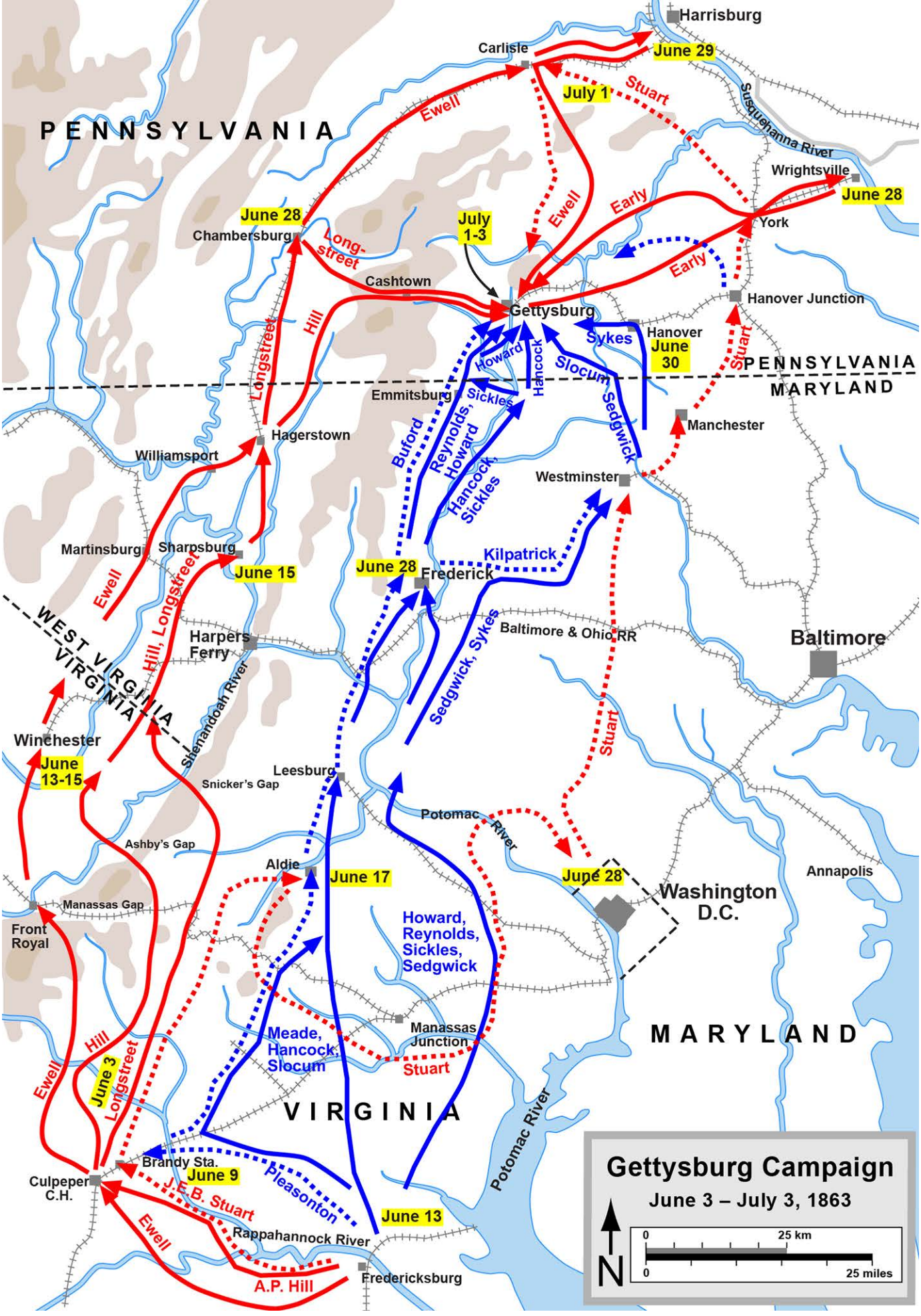

Figure 3. Stuart's ride (shown with a red dotted line) during the Gettysburg Campaign, June 3-July 3, 1863. *(Map by Hal Jespersen)*

COVID-19 and Virtual Wargaming in the Reserve Officer Training Corps:

Deadly Virus Resurrects Aged Tactical-Training Method

by LTC Andrew P. Betson, 2LT Tristan Boomer, 2LT Justin DiCarlo, 2LT Marshall Green and 2LT Adam Messer

The Coronavirus Disease 2019 (COVID-19) pandemic stopped the world in its tracks early in 2020. As unfamiliar terminology such as "social distancing" and "reducing the curve" proliferated everyday life, military leaders faced familiar (and unceasing) training requirements despite the unexpected challenges that arise from a pandemic.

At St. Louis's Army Reserve Officer Training Corps (ROTC) Gateway Battalion, the story was the same. Universities across the city closed in March, and students were sent home, prompting the need for a new solution to fulfill training requirements. Our ROTC program's third-year cadets were expected to be trained (or, at least practiced "P+") in leader and collective tasks for platoon-level tactical operations and in warrior tasks and drills. With unprecedented levels of technology and communication at our fingertips, the cadre and the fourth-year cadet leadership of Gateway Battalion looked to the Prussians of the early 1800s and U.S. Army Reserve units of the 1980s for help. The result succeeded beyond expectations when it came to training our cadets.

Appearing in the early 19th Century, *kriegsspiel* (translated from German as "wargame") served as a tool to test tactical-decision-making for Prussian officers for generations. American officers of the time took note of the game's usefulness after observers reported on actions from the Franco-Prussian War in the 1870s.[1] Iterations of the wargame tool continued in the U.S. Army for another century, usually executed in command-post exercises in the 1970s and '80s using turn-based wargames like the Pegasus free-play manual wargame well known to Cold-Warrior-era Armor officers.[2] Such platforms were considered elemental for battalion training before attending more advanced training at the National Training Center, Fort Irwin, CA.[3]

These models of the past served as a framework for designing a new method to not only test our cadets' ability to plan but also to train them how to handle the fog and friction of the engagement.

The Gateway Battalion's senior class and cadre developed a three-day virtual field-training exercise (VFTX) involving a day of individual-skills refresher training and two days of a series of curated tactical-decision games (TDGs) designed to test our third-year cadets' (junior class) ability to conduct platoon-level operations. This effort demanded much in the planning and preparation phases. We had to create an infrastructure to teach and evaluate the cadets. In other words, we had to design the game. From there, to provide context and tie a common thread between the weekend's events, we designed a convincing and in-depth scenario and enemy situation.

Our plan, called Operation Gateway Archangel, commenced April 16. Until its completion on the afternoon of April 19, we orchestrated the training of almost 100 cadets from all reaches of the United States and adapted to unforeseen difficulties throughout the operation's execution. For both cadre and fourth-year cadets, only months from receiving their commissions, the planning and execution of Gateway Archangel was an important lesson in the utility of agile and adaptive leadership when faced with unprecedented challenges.

Kriegsspiel 4.0

When we first received the news in mid-March 2020 that we could no longer hold our annual FTX training in person at Fort Leonard Wood, MO, we resolved that the junior class and the other classes of cadets deserved a top-notch culminating training event that integrated all the components of military science. Therefore we adopted work already done and leveraged available systems to create the appropriate training/learning environment.

Training Circular (TC) 7-101, ***Exercise Design***, provided a valuable guide. We used it to return to the initial planning phase and switched our live training to virtual/gaming.

The COVID crisis and university constraints largely dictated what combination of live, virtual, constructive and gaming training enablers we could achieve. Our best course of action, we predicted, would be to combine and leverage virtual and gaming components for maximum effect.[4] After toying with maximizing virtual training,[5] we found we could adapt the simplest concepts of *kriegsspiel* and its sequels to form our virtual TDG to prepare cadets for summer training.

With an established concept for our virtual game, we faced a few upfront challenges. For one, the entire VFTX and the game needed to run on a familiar digital platform to minimize confusion. We needed a platform for players, trainers and observers/coaches/trainers (O/C/Ts) to communicate with each other communally and privately, and it had to be relatively user friendly. Zoom fit the bill. Cadets knew Zoom, as they had largely used it for on-line classes, particularly as the Gateway ROTC program taught almost exclusively on the platform at the outset of the COVID-19 crisis.

Gateway Battalion decided on the platform early enough to test certain features in the weekly "leadership labs" leading up to the VFTX. We tested a multitude of features, including screen-sharing and breakout rooms, both of which we knew would benefit the game's final product.

Finally, we needed a "common operational picture" for everyone to "see the battlefield." We chose Google Slides on Google Drive because cadets consistently worked with it both inside and outside of ROTC classes. Google Slides provided a means for multiple viewers, either through sharing a screen on Zoom or by watching the slide itself on the Google Drive.

In addition, multiple cadets could manipulate the slides in real time,

allowing "pieces" to be moved on imagery of the battlefield. Simultaneously, the O/C/Ts could reveal opposing forces (OPFOR) as appropriate.

Setting exciting stage

Once the game was established and the platform chosen, we identified another significant challenge. With our program's cadets spread across the country, surrounded by distractions within their homes and linked only by a sometimes-tenuous WiFi connection to a Zoom meeting, how could we provide context sufficient to keep our cadets engaged? Answering this question proved to be a great training tool for the senior cadets/soon-to-be lieutenants.

The seniors were recently exposed in their curriculum to the truth that war does not occur in a vacuum and that one should think about war as a tool of statecraft. This education point led us to tackle the challenge in an entertaining way by leveraging the program's YouTube account to set the stage. We spent extra effort to develop a coherent narrative for the battles and their respective OPFOR.

In the final days preceding the VFTX, the senior cadets produced a "Road to War" video that explained why the cadets found themselves in "Atropia." It explained the political context of the war, which could be used by O/C/Ts to explain the proficiency of enemy forces. The senior cadets played the video, which incorporated music and maps, to the training audience during the VFTX's first night – our reception, staging, onward movement and integration phase.[6] This sparked an appropriate level of interest at the outset.

For the purposes of developing the exercise within the context laid out in the video, Fort Leonard Wood's Range Control helped by providing maps and imagery of all their training areas, including a 1:50,000 map of the installation modified to reflect the cities, roads, etc., of Atropia.

The planning phase of Gateway Archangel proved an exercise in teamwork and training in exercise design, involving task/countertask development and orders production for the program's senior cadets.[7] The result was a sequence of four engagements that increased in difficulty and complexity during the course of the VFTX. (See Figure 1.)

We developed the enemy's composition and capabilities using the ***Worldwide Equipment Guide***, which provides organizational charts and equipage for the irregular (South Ariana People's Army, or SAPA) and regular (Arianan army) forces in our exercise.[8] This informed the OPFOR portion of the "white-cell information" document (discussed later) for each engagement. Since there were no human beings available for cadets to see in an observation post (OP) or on an objective, we developed the information beforehand.

For the raid, for instance, the O/C/Ts knew that "[t]he OP is located at MB 713 784 (draw) to the northeast of the objective overlooking creekbed. Two enemy, dressed in SAPA uniforms, both have AK-47s, one has a handheld radio. They chatter and smoke in their position, so if the platoon does an SLLS [stop, look, listen and smell] halt within 200 meters, they will smell and hear them."

After establishing our operational area and the enemy, we linked the missions to a wider narrative related to the "war" and sought ways to make things harder. The friendly Blue Forces (BLUFOR) virtually conducted an ambush on an enemy patrol, followed by a raid on a SAPA weapons cache. Keen cadets recognized that the SAPA elements had among them differently uniformed "advisers," which matched the commander's critical-information requirements in the company's order.

Following completion of the first two missions, Arianan forces invaded Atropia from the west and made a bold thrust into central Atropia. In response, the BLUFOR maneuvered southward into the northern flank of the Arianan front. There, platoons conducted a deliberate attack against an Arianan cavalry troop to seize key positions along a main supply route. As the Arianan attack began to crumble, BLUFOR conducted a movement-to-contact against disintegrated OPFOR in an engagement that culminated in a call-for-fire mission on Arianan armor – securing victory for the American forces.

The believable nature and actions of the enemy, combined with a comprehendible political situation, kept the cadets engaged and thinking critically

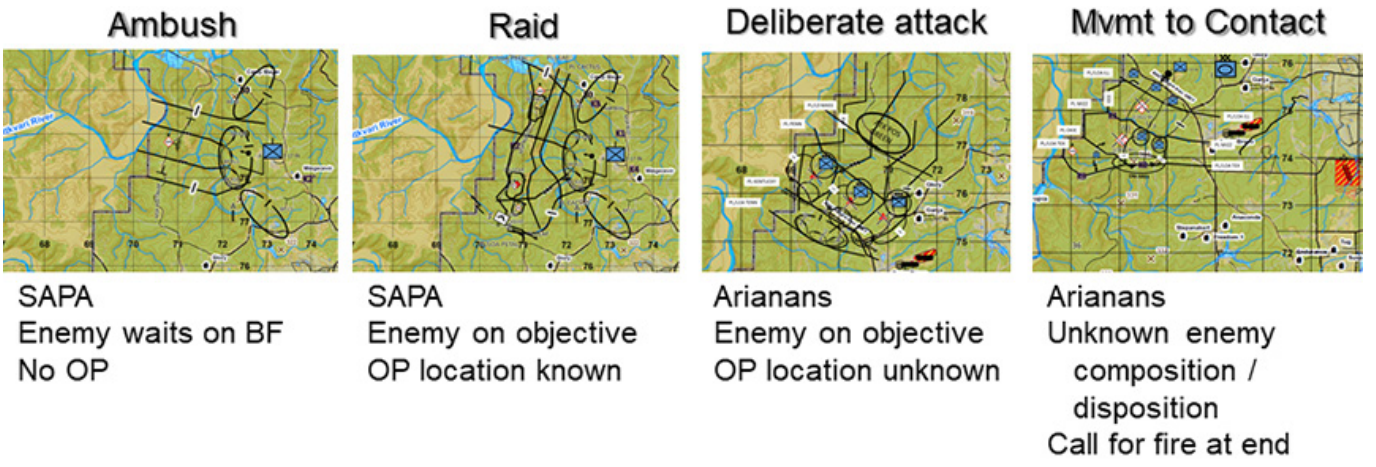

Figure 1. The concept for Gateway Archangel's increasingly difficult regimen. The regimen was linked in logic to the scenario, implementing irregular and regular forces. *(Graphic by LTC Andrew P. Betson)*

throughout the VFTX.

Creating virtual gameroom

With the stage set and enemy capabilities, actions and reactions set, the cadre and senior cadets created each battle's four critical components: the company-level operations order (OPORD), operation graphics and intelligence, white-cell information and the battle's "game board." The first two were for the junior-year trainees, while the white-cell document went to the O/C/Ts. The senior cadets hung the game boards in folders named for each junior-cadet pair on the battalion's Google Drive.

The cadre took pains to ensure that the company OPORD presented the juniors with a doctrinally and tactically sound plan to develop their platoon operation in context. Each was designed, with increasing difficulty, to challenge even the best junior cadet as they integrated the components of military science learned over the course of their previous semesters. However, each company order was done on a "Gateway Standard" four-page tactical OPORD template. This encouraged the junior cadets to understand that any platoon-level plan that cannot be laid out on their four-page laminated template is probably too complicated.

The second component, operational graphics and intelligence, were done in Microsoft PowerPoint and used two resources provided by Fort Leonard Wood's Range Control. The company's operational graphics were overlaid on the Atropia map, while the intelligence documents used Fort Leonard Wood's contour-line-laden maneuver-area imagery. The graphics emphasized the importance of understanding our tactical "language" of control measures and tactical-mission-task symbols, while the imagery revealed expertise (or challenges) in terrain analysis.

Our third component, alluded to in preceding paragraphs, was the white-cell information given to each of the O/C/T teams. Apart from the provided Red picture, it also provided BLUFOR developments. For instance, in our platoon attack, when the junior cadets initiated actions on their objective, the O/C/Ts knew to tell them, "One Arianan fires a grenade that immediately kills two members of your second M240B gun team and wounds badly the third Soldier. The weapon appears to be undamaged." Each BLUFOR situation was designed to test the junior cadets' mastery of the components of military science and their de-

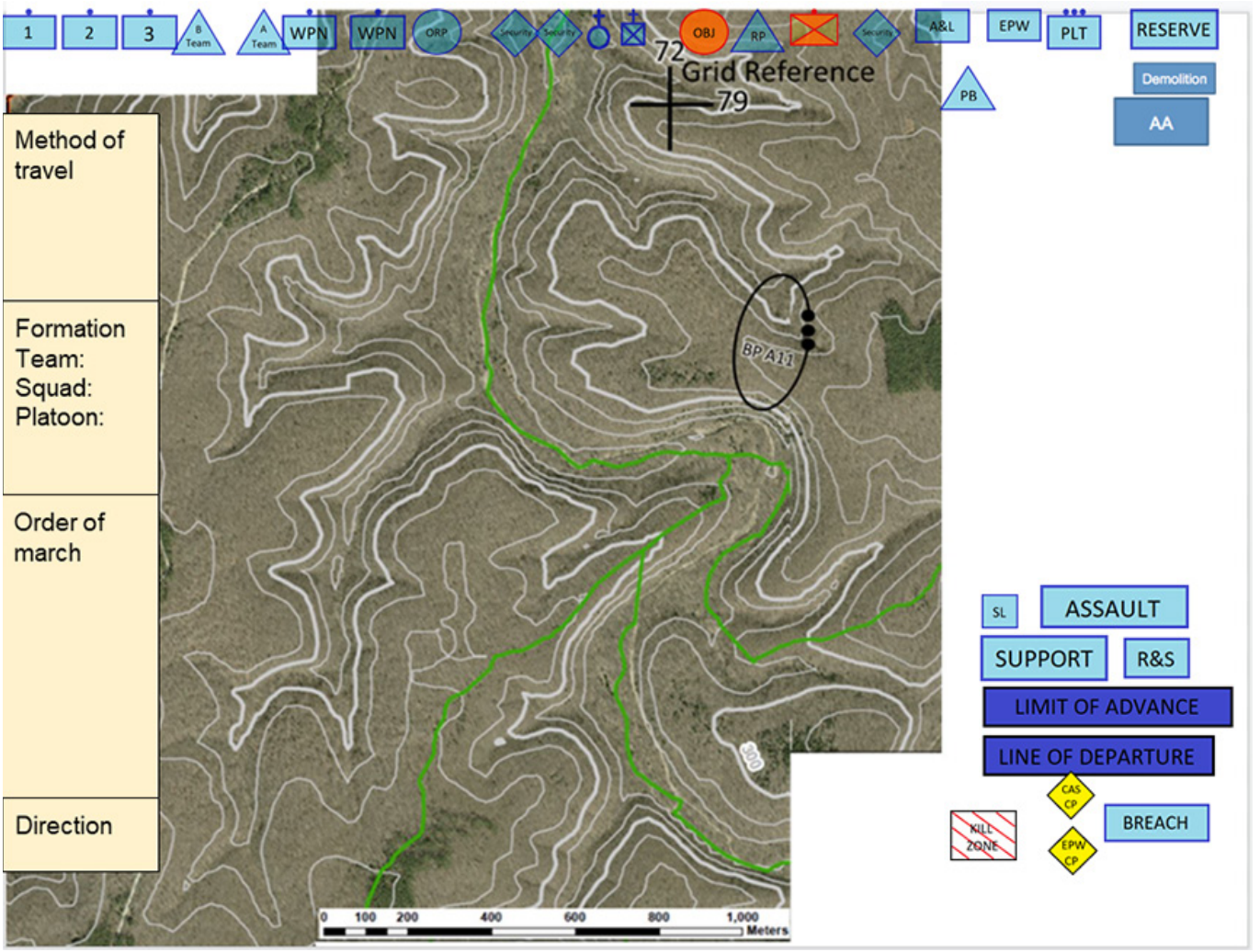

Figure 2. Google Slides and Fort Leonard Wood maps serve as a means for an interactive, virtual battlefield. *(Graphic by LTC Andrew P. Betson)*

cision-making in the face of friction.

The final required element for each battle was the game board for the TDG. This PowerPoint file included the same imagery mentioned from the Fort Leonard Wood Range Control imagery of their maneuver areas with contour lines (Figure 2). One slide had the entire platoon area of operation, while another zoomed in on the objective area. Both had text boxes on the side where the trainee could type in the movement techniques and formations of their units at echelon.

Finally, it also included icons to identify squads, machineguns, the platoon leader, platoon sergeant, casualty-collection points, support-by-fire lines and more that the trainees could click and drag onto the terrain (Figure 2). Prior to kicking off the battles, our seniors created a game board for each pair of trainees for each battle.

Each of these components differed little from any other training exercise, but the virtual nature of ours required a deliberate architecture of Zoom rooms for each battle. A key cadet leader hosted the Zoom meeting for each battle, which served as a kind of tactical-operations center (TOC). Once the trainees and trainers arrived in the TOC, the host transferred each into their assigned breakout room. At any time that O/C/Ts needed to discuss the result of a battlefield action, or arbitrate, they could "press pause" on the battle and send the trainees back to the TOC until they were finished and called them back. It should be clear that this required multiple rehearsals, a robust Annex H and cadets who were savvy with the system.

Each breakout room had an O/C/T team made up of at least one cadre member, one senior cadet, the junior-year cadets serving as platoon leaders and platoon sergeants, and all freshmen and sophomore cadets to serve as squad leaders, team leaders and members of squads. The battalion's leadership or distinguished visitors could drop into any of breakout rooms to observe an OPORD briefing or the battle itself.

The rhythm

One hour before their report time, the platoon leadership received the company OPORD, graphics and intelligence (Components I and II). They spent an hour consuming their tasks, planning their own missions and building a terrain board model wherever they were in the country. Meanwhile, the O/C/Ts accessed and studied their white-cell information and conferred about enemy locations and scenarios that might challenge the trainees. Upon being placed in their Zoom breakout room, the platoon leadership briefed their platoon OPORD to both the O/C/Ts and squad leaders using their terrain model kit. When it was time for the battle to begin, the senior cadet in the room shared to all the participants in a chat window the link to the Google Drive folder that contained the game board.

The platoon leader began the game by placing the relevant icons on the map depicting their starting location. They then described everything to be done in the first phase of the battle, including their movement techniques, formation, order-of-march and direction. When appropriate, they spoke as if on the radio to the O/C/Ts as the higher headquarters and to their squad leaders to give instructions.

While the platoon symbols moved along the board, the O/C/Ts continuously analyzed the probability that the BLUFOR or OPFOR would identify the other. We were not literally "rolling dice," though a more developed form of the game could include such probability inclusion. If the BLUFOR encountered the OPFOR, the O/C/Ts referred to the "white cell" information for guidance on casualty information for both sides, or to describe what exactly the BLUFOR saw. Any time the O/C/Ts required further deliberation, the training audience was sent to the TOC.

The trainers and trainees repeated this process through the subsequent phases of the operation, reacting to contact when made and to other scenarios as the O/C/Ts imposed them. Once the platoon approached the objective area, everyone shifted to seeing the objective-area imagery slide, which allowed more detailed discussion of movement and placement of the platoon elements. Actions on the objective were guided by the white-cell information and tested the trainees' knowledge of special-teams activities, knowledge of intelligence requirements and medical-evacuation steps.

Once the O/C/Ts determined the training and learning objectives were met, the battle stopped, and they began a deliberate after-action review (AAR) process. The underclass cadets went to the TOC while the O/C/Ts and senior-cadet observers quickly gathered comments. The AAR allowed cadets to explain rationale in decision-making, thereby letting the O/C/Ts determine whether mistakes represented fundamental misunderstandings of the components of military science or misunderstandings due to the novel nature of the virtual training environment.

Finally, the senior-cadet observers provided comments on each of the leaders, and the cadre members generated "Blue Cards" to help evaluate the trainees' attributes and competencies.

Before the battle

To best prepare the trainees for the TDG on Day Two, we devoted Day One to training and testing individual skills. We wanted to provide a refresher as well as a means of testing for land navigation, tactical combat-casualty care (TCCC), call-for-fire and the size, activity, location, uniform, time, equipment (SALUTE) report. Each of the "round robin" training stations was held in a different Zoom classroom hosted by a primary senior-cadet instructor. The Zoom conference codes and passwords were distributed through Annex H. In each case, after an instruction phase, we integrated different platforms to test the underclass cadets.

Land navigation

After the PowerPoint-based refresher on land navigation, the junior cadets moved to a breakout room, where they received instructions to take a Blackboard-based exam. It was a 60-question exam that included all basic elements of land navigation (for example, identifying terrain features, colors of the map, reading a legend) and progressed into more complicated questions (for instance, intersection, resection, curved road distance).

Due to the COVID-19 quarantine and the situation preceding the VFTX, few cadets had hard copy maps with them. Instead, we adapted the Atropia map. The maps were printer-friendly (maintaining their scale), allowing cadets to print all 17 pages at home and tape them together.

TCCC

The TCCC refresher included a combination of premade videos of caring for casualties and live demonstration. The senior-cadet instructor demonstrated evaluation and treatment of casualties on his roommate, another senior-year cadet from the battalion. Following the demonstration, the instructor reviewed the nine-line medical-evacuation report. The cadets learned when this would be used, how to fill one out, how to call it in to higher headquarters and platoon members' roles.

Each junior-year cadet received an individual evaluation by the senior-cadet instructor presenting a situation using "Army men" toys. The trainee walked the senior-cadet trainer through what they would do in a situation that demanded all the components of TCCC (Figure 3).

SALUTE reports

After a PowerPoint refresher on radio etiquette and the components of SALUTE, the cadets transitioned into a practical exercise. The senior-cadet instructor prepared a slide deck full of photos of military activity with various vehicles, enemies and equipment.

Junior-year trainees received a grid location for their OPs and a distance and azimuth for the photo. This reinforced the importance of map-reading skills by forcing the ability to determine a point on a map. Each cadet wrote their SALUTE reports and were called on to submit them using proper radio etiquette.

Call for fire

The call-for-fire task incorporated the most variety of platforms. The refresher course included a video from the battalion's YouTube account shared by the senior-cadet instructor. The junior cadets then received instructions and a map image from U.S. Army Training and Doctrine Command's Operational Environment Training Support Center's digital Observed-Fire Trainer (OFT), which was available to all cadets through U.S. Army Cadet Command's Blackboard site.

After generating their radio transmission, junior cadets shared their screens with the senior-cadet instructor, which showed the images from the OFT. Cadets being evaluated submitted his/her information for the initial request for fire and watched the simulator for rounds to impact. They then adjusted the fire until they appropriately ended the fire mission. This task would be the last task of the final battle in the wargame, signifying victory for the BLUFOR.

Conclusion

Leadership, like warfare, exists in the realm of uncertainty and is extremely susceptible to fog and friction. The Gateway Battalion's VFTX demonstrated not only the necessity for agile and adaptive leaders in the U.S. Army, but it also emphasized the importance of training regardless of circumstance – thereby sometimes we must fight to train. In our adapted training, as budding new second lieutenants, we learned much about Army leadership. The VFTX, especially the tactical-decision game, revealed the importance of the components of military science – leaders must understand terrain analysis, military symbology, troop-leading procedures, staff functions and relative combat power.

There was never a question that it would have been preferable to train in the mud and woods of Fort Leonard Wood. We learned, however, that meaningful, effective training can be conducted even when standard methods fail.

Cavalry and Armor leaders should consider the TDGs of the past, augmented by technological advancements, as a versatile means to develop tactical skill and improve judgment. They could follow the Gateway Battalion's three efforts resulting from this experience. The cadre and cadets in St. Louis are first, seeking ways to integrate analog TDGs into their labs in future years.

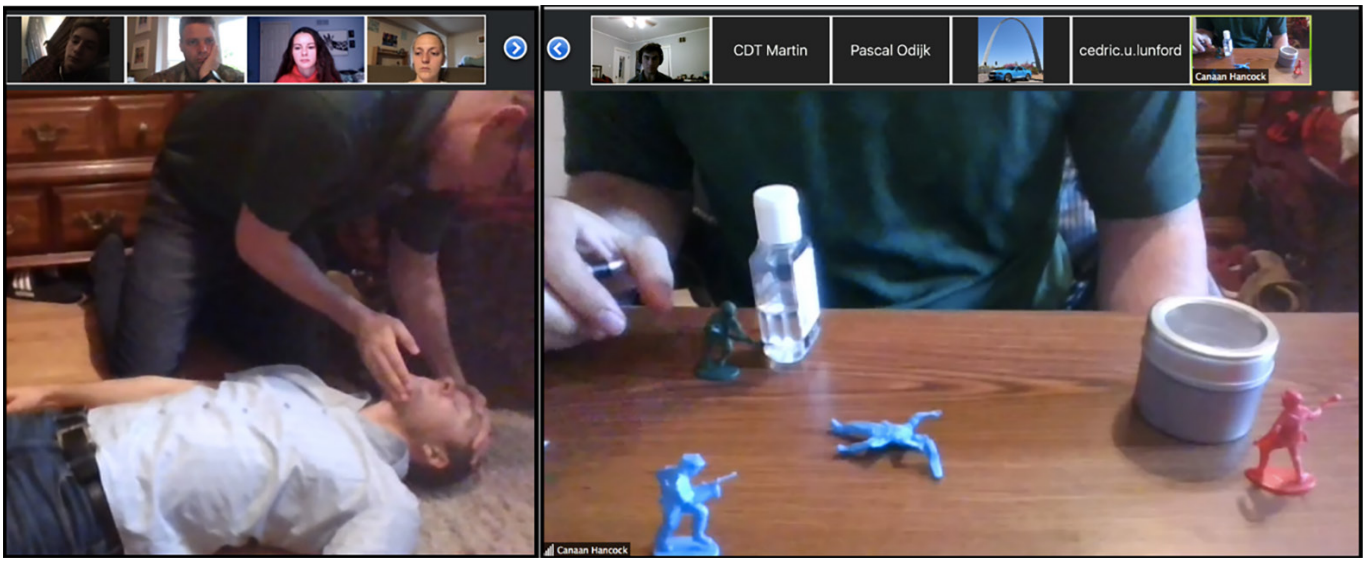

Figure 3. Zoom images of TCCC demonstrations and evaluation "game" with BLUFOR and OPFOR. *(Graphic by LTC Andrew P. Betson)*

Second, they will pilot a program using the U.S. Army's Virtual Battlefield Simulator 3 (VBS3) to improve our new officers' awareness of virtual-training platforms at the tactical level.

Finally, the Gateway team will use what it learned to retain "*Kriegsspiel* 4.0" as a contingency to face whatever frictions may lay ahead.

LTC Andrew Betson is professor of military science at Washington University in St. Louis, MO. His previous assignments include aide de camp to the III Corps commanding general, Fort Hood, TX; executive officer and operations officer, 4th Squadron, 3rd Cavalry Regiment, at Fort Hood and Mosul, Iraq; future-operations chief, 1st Cavalry Division, Fort Hood and Bagram, Afghanistan; and commander, Company A, 4th Battalion, 64th Armor Regiment, Fort Stewart, GA, and Bagdad, Iraq. LTC Betson's military schools include Basic Army Parachutist Course, Armor Basic Officer Leader's Course, Sapper Leader's Course, Maneuver Captain's Career Course and Command and General Staff College (CGSC). He has a bachelor's of science degree in military history from the U.S. Military Academy, West Point, NY; a master's of arts degree in diplomacy and international commerce from the University of Kentucky; and a master's of military art and science degree (as an art-of-war scholar) from CGSC. LTC Betson's awards and honors include the Bronze Order of St. George.

2LT Tristan Boomer is attending the Cyber Basic Officer Leader's Course, Fort Gordon, GA. His military schools include ROTC, Washington University, St. Louis, MO. 2LT Boomer has a bachelor's of science degree in systems science and engineering from Washington University.

2LT Justin DiCarlo is assistant S-1, 5th Battalion, 98th Regiment, 102nd Training Division (this battalion teaches the basic and advanced leader courses for civil affairs and psychological operations) at MG William Weigel U.S. Army Reserve Center, Edison, NJ. His military schooling includes ROTC, Washington University, St. Louis. 2LT DiCarlo has a bachelor's of arts degree in international relations from Washington University.

2LT Marshall Green is attending the Infantry Basic Officer Leader's Course, Fort Benning, GA. His military schools include ROTC, Washington University, St. Louis. 2LT Green has a bachelor's of arts degree in international relations and a bachelor's of arts degree in economics, both from Lindenwood University.

2LT Adam Messer is attending the Cyber Basic Officer Leader's Course, Fort Gordon. His military schools include ROTC, Washington University, St. Louis, and Air-Assault School. 2LT Messer has a bachelor's of science degree in systems science and engineering from Washington University, St. Louis.

Notes

[1] William Roscoe Livermore, ***The American Kriegsspiel: A Game for Practicing the Art of War upon a Topographical Map***, Houghton, Mifflin, 1879. Accessed through Google Books, June 2, 2020.

[2] U.S. Marine Corps MAJ Dominic Nicolosi Jr., "A framework for an interactive, computer-supported, battalion-level wargame," master's thesis, June 1979. Accessed at https://core.ac.uk/download/pdf/36711970.pdf, June 1, 2020.

[3] MAJ Charles R. Steiner Jr. "Thunder in the desert," ***ARMOR***, May-June 1982.

[4] Headquarters Department of the Army, TC 7-101, ***Exercise Design***, November 2010.

[5] The professor of military science explored the possibility of having all the cadets in the target training audience download a version of the Army's program of record for virtual training, "Virtual Battlefield Simulator." As of this writing, we are on VBS3. However, the proponent could not provide a version of the game that did not require a computer without gaming-quality graphics capability. Due to this lesson, the Gateway Program seeks to pilot a program of instruction that exposes cadets to the system of record as part of the military science curriculum to serve as a potential contingency to such situations in the future.

[6] Gateway Battalion's "Road to War" video can be found at https://www.youtube.com/watch?v=OcvjHzcIaQM&t=15s.

[7] TC 7-101.

[8] ***Worldwide Equipment Guide***, accessed at https://odin.tradoc.army.mil/WEG, June 3, 2020.

Acronym Quick-Scan

AAR – after-action review
BF – Blue Forces (Figure 1)
BLUFOR – Blue Forces (friendly forces)
CGSC – Command and General Staff College
COVID-19 – Coronavirus Disease 2019
FTX – field-training exercise
O/C/T – observer/coach/trainer
OFT – Observed-Fire Trainer
OP – observation post
OPFOR – opposing forces
OPORD – operations order
ROTC – Reserve Officer Training Corps
SALUTE – size, activity, location, uniform, time, equipment
SAPA – South Ariana People's Army
TC – training circular
TCCC – tactical combat-casualty care
TDG – tactical-decision game
TOC – tactical-operations center
VBS3 – Virtual Battlefield Simulator 3
VFTX – virtual field-training exercise

A Case for Covered Motorpool Parking

by CPT(P) David Blanton

The U.S. Army invested more than $20 billion in new ground-combat systems (GCS) acquisition in Fiscal Year 2020.[1] Notably absent from the investment was an analysis of preventive measures to increase the service life of these systems – for example, overhead covered parking shelters designed to protect high-cost GCS from the environment. The shelters are similar to open-air aircraft hangers already used by other military services.

Issue and background

The Army directs considerable resources toward analyzing maintenance processes while striving for cost savings and efficiencies.[2] Absent, however, is assessment of physical structures to increase efficiency and service life. In contrast to Army motorpools, some local government sectors report anticipated 50-year cost savings in excess of $20 million for fleets of only 60 vehicles by incorporating overhead parking shelters.[3] Notably, these local government fleets are far less expensive than most Army GCS. A similar initiative by the Army could represent huge preventative maintenance cost savings during a GCS lifecycle.

Critics might argue that high-cost Army GCS are designed for operation in any environment, making overhead shelters an unnecessary investment. Assuredly, the Army has resilient equipment capable of operating in all environments. However, alternatives may exist that could make even the initial investment cost-neutral. For example, solar-energy investment and solar parking shelters are already common across many military installations. Instead of covering post-exchange and public-parking areas with solar shelters, future solar shelters could be built in motorpools.[4]

In addition to GCS lifecycle cost savings, covered parking structures will increase operator safety and increase preventative-maintenance productivity. Protection from the elements is a prudent investment to enabling Soldiers to properly care for equipment. This issue warrants further consideration and analysis for cost savings and implementation.

Figure 1. Soldiers conduct preventive-maintenance checks on newly acquired M1A2 Abrams main battle tanks at Fort Bliss, TX, Aug. 22, 2019. *(U.S. Army photo by SSG Kris Bonet)*

Stakeholders

Any policy implementation must account for the following key stakeholders:

- **Army** – may stand to gain significant maintenance readiness goals and cost savings by conducting this study;
- **American taxpayers** – if maintenance costs can be decreased and lifecycles extended for high-cost Army GCS, it would be responsible management of resources; and
- **Soldiers** – reduced non-productive labor hours due to storms or high temperatures and covered shelters may also increase overall safety and productivity when conducting preventative maintenance and training.

Policy alternatives

- **Do nothing** (status quo). The Army and Department of Defense can choose to do nothing and not commission a study. While there may be marginal cost savings respective to the study itself, an intentional analysis that truly informs policymakers would not be conducted. Therefore high-cost Army GCS will remain uncovered in large outdoor parking pads.
- **Conduct an internal Army assessment**. The Army commissions a study related to system lifecycle and maintenance cost savings associated with covered parking shelters. The study should also account for factors like safety and productivity increases. An internal Army study would likely be cheaper, but it would take longer to complete.
- Contract an external assessment. The Army authorizes an outside agency, or contractor, to conduct a cost-benefit and feasibility study using the same criteria as listed in Alternative 2. An external assessment would likely be the costliest overall, but this method is faster, and the cost would be a fraction of the project's anticipated positive impact.

Recommendations and implementation

Of the three alternatives cited, the external-assessment option would be the most effective. Once compiled, the assessment should be forwarded for consideration and resource-sourcing

Figure 2. The U.S. Army needs covered storage in its motorpools, similar to that shown over this Royal Australian Air Force jet and its crew at Luke Air Force Base, AZ. *(U.S. Air Force photo by A1C Leala Marquez)*

solutions. Even if adoption is not recommended for every GCS in the force, recommendations should still be made for partial adoption based on end-item acquisition cost, geographic location, environmental factors, equipment size and the stage of GCS lifecycle. Integrating these variables may direct specific and maximized cost expenditures commensurate with capital construction investment.

To maximize future cost savings, it is critical that the Army act now to further investigate a service-life cost-benefit study analyzing future construction of overhead covered parking shelters. This initiative can save the Army critical money for reinvestment in other programs. The study is fiscally responsible and in the best interests of American taxpayers. Most importantly, it is also prudent for Soldiers to maximize maintenance efficiency, safety and overall readiness.

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Notes

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Acronym Quick-Scan

GCS – ground-combat systems

Weights	Study cost 1	Schedule 1	Anticipated overall performance 3	**Total score**
Option 1: Do nothing (status quo)	3 (3)	3 (3)	1 (3)	7 (9)
Option 2: Internal Army assessment	2 (2)	1 (1)	2 (6)	5 (9)
Option 3: External contracted assessment	1 (1)	2 (2)	3 (9)	6 (12) ☑

Table 1. Policy option comparison: Army parking shelter cost-benefit study.

Correlating Proficiency and Lethality in the Stryker Brigade Combat Team

by SFC Zack D. Eckert

Soldiers who have spent time in a Stryker brigade combat team (SBCT) after previously serving in an armored brigade combat team (ABCT) will often find themselves in a strange environment when the topic of gunnery and live-fire comes up. For instance, the drastic distinction between the definitions of "crew" is a prime example.

Tank crewmembers are often situated on a given tank for extended periods of time. The tank commander, once a young sergeant, now commands the tank using the same driver and loader, both of whom have also been promoted in rank and position. The lieutenant, leading the tank platoon, is the person most likely to transition out of the platoon.

Conversely, the SBCT often relies on one Soldier to serve as both the vehicle commander and the gunner. The proficiency of the crew is sufficient only to qualify once and then serve as the supporting asset for tactical operations. Since this crewmember is slated against dismounted positions, it is vital for career progression for him/her to be rotated from the gunner position to gain critical leadership time on the ground as a team or squad leader.

This turnover often has a significant impact on the SBCT. Specifically speaking, platform proficiency remains at the lowest level of requirements inside the infantry battalions due to the lack of visibility, quality assurance and emphasis on platform lethality. This discussion intends to help remedy this problem by informing SBCT leaders about recommended methods to develop quality gunners for their formations.

Variables

The following analysis comes from the information gleaned by scouring evaluation packages for live-fire events conducted from 2017 to 2019.[1] While not an empirical study, the information provides enough anecdotal evidence to support the thrust of this article. All variables listed here are pertinent factors in a crewmember's ability to effectively engage targets from the firing platform.

The inclusive list is an essential part of determining the maximum engagement limit of each platform and each echelon when aggregate data is applied.

Probability of hit

Probability of hit (Ph) is a key factor in crew gunnery. Ph is factored by the number of rounds fired against a target in relation to the number of rounds striking the given target.[2] For this assessment, two factors take precedence: range-to-target and firing-vehicle posture.

As the range to a target increases, the muzzle velocity drops and dispersion

Figure 1. A Stryker Mobile Gun System engages an armored target. *(U.S. Army photo by SFC Ben Johnson)*

increases, thereby reducing the likelihood for a round to fly true. Determining the appropriate range-to-target is an essential factor for target acquisition, especially for non-stabilized weapon systems. Also, firing on the move decreases a weapon's accuracy.

Given these factors, the most effective shot would be a short-range static engagement from a defensive position. Also, effective target acquisition and ammunition selection positively influence a gunner's effectiveness. To increase effective target acquisition, gunners should follow three basic rules:

- **End gunner lay in elevation.** Once the left and right limits have been established, releasing the handles either manually or electronically will cause the bore to settle at the last second. To reduce this possibility, a gunner ends with an upward adjustment to ensure the reticle and bore stay on the intended mark.
- **Aim center visible mass.** To guarantee a target is hit based on exposure, avoid guesswork. What is presented and visible is the target to aim for.
- **Remember sight picture and trigger squeeze.** A weapon is only as effective as the operator, so setting this final condition ensures that when the weapon cycles through and functions, all potential loss of accuracy has been mitigated.

Finally, improper ammunition selection can dramatically affect the ballistic firing solution for an intended target, causing the round to hit wildly off-target. For example, on a dual-feed weapon such as the M242 25mm Bushmaster, the last round on the face of the bolt is projected to follow the current ballistic solution and cannot be discarded easily. This creates a requirement during Bradley gunnery to allow the firing of a "dump round" when transitioning from anti-phosphorus to high-explosive (HE) munitions. For the tank, incorrectly indexing the round results in sabots going extremely high of the target, whereas an HE anti-tank fired with sabot indexed results in the round falling well short of the target.

In either case, "switchology" is a fundamental task for gunners and important in effective crew communication during a firing engagement.

Probability of detection

With the advancement of sensor technology, the likelihood of detecting active targets has become increasingly more lucrative. Target detection remains a significant factor in the engagement process, as it reduces the exposure of the firing vehicle prior to issuing a fire command and engaging. Common detection systems include the Forward-Looking Infrared, PAS-13 thermal sight and the Long-Range Advanced Scout Surveillance System. These systems are designed to detect thermal signatures with a common performance measure rating out to no less than 2,500 meters.

That being said, utilization rates and practice indicate that sensors are not being implemented into training programs to increase the outcome of detection. Commanders should ensure that gunners understand appropriate scanning techniques using the associated detection sensor and that they can rapidly distinguish battlefield debris from targets in addition to recognizing the presence of camouflage, concealment and decoys (CCD). Environmental hazards such as rain, snow, dust and smoke further complicate target detection. Gunners must be exposed to these elements during training to increase their comfort in challenging target-detection environments, with the goal being to maximize their proficiency.

Common training methods for this include acquisition drills and counter-CCD. Acquisition drills ensure that for each engagement and for each position, the gunner has determined his ability to "see" targets, traversing from the left range limit and transitioning from wide field of view (WFOV) to narrow field of view. If equipped with a laser range finder (LRF), the gunner should be able to lase a target and obtain an accurate return. Once complete, the gunner returns to WFOV, rapidly traversing the sector to the right range limit and repeating the procedure.

Counter-CCD is an element that can be taught in a classroom environment and given practical experience in a simulator. Gunners should be aware of how to determine which irregularities in their field of view may act as indicators of a target attempting deception and camouflage.

Finally, the detection system should be maintained regularly to ensure it meets the expected technical specifications by performing drift null, boresight or alignment. However, since each of these systems will still be subject to shock, gravity and static build-up over time, firers should be prepared to conduct a sensor reset as frequently as the tactical situation permits.

Reliability of targeting system

Fire-control systems (FCSs) vary by platform, but all follow an inherent series of principles in which to compute ballistic solutions and increase the probability of a first-round hit. Some sensor systems determine whether or not the gun trunnion is perfectly level with the horizon (cant), thereby removing one source of gunner error. The vehicle's ability to compute movement through the use of an inertial navigation unit will update ballistic solutions to add or remove drift.

Vehicles with a height-management system can make adjustments to provide a greater field of view or reduce exposure. With the implementation of an integrated LRF, the vehicle then uses the computer inside the FCS to factor the following: vehicle status, range to target and weapon/ammunition inputs. It computes these factors to make corrections to the reticle and bore, applying adjustments as necessary to conduct the engagement.

While the platform and weapons may vary, these three factors remain the same. Training conducted to enhance targeting effectiveness relies on the use of training aids, devices, simulators and simulations (TADSS) to gain a technical appreciation for the related systems. Crewmembers familiar with the targeting process are more likely to avoid incorrect inputs.

Also, while systems are designed to communicate with each other, not all circumstances will grant the ability to

use a fully functional FCS. In those events, crewmembers must be trained and proficient in degraded operations. For example, a targeting system with an ineffective LRF can still be used with the manual input of an accurate range to target, but only if the crewmember has been trained to determine range accurately.

Reliability of weapon

Not all weapon systems are created equal. Also, not all platforms are equally functional. Therefore it is important for commanders to conduct an analysis of the equipment provided to determine whether the gunner or the equipment is the problem.

For example, two brand-new M2A1 .50-caliber machineguns are assigned to a section with unstabilized MK-93 mounts. Both mounts have a traverse and elevation mechanism assigned, and both gunners have engaged the same target from identical platforms. Gunner 1 has placed 75 percent of his rounds within a 12-inch circle at 500 meters. Gunner 2 has only placed 30 percent in the same area.

What caused such a dramatic drop in performance? While the fastest answer is usually that Gunner 2 is simply not as good as Gunner 1, it was determined that his mount had been in circulation for 10 years, while Gunner 1 was using a brand-new gun mount.

Two key elements play into the dependability of the mount and weapon system: circular error probable (CEP) and dispersion radius. When determining CEP, a control should be established with assigned equipment to determine the level of accuracy, regardless of the gunner. CEP is a measure of the weapon system's precision, so determining these results does require the use of controlled execution. As a crewmember assigned to a specific platform and associated equipment, each gunner implements the same conditions and records the results.

Fifty percent of the rounds falling within the expected tolerance for the weapon system for a given range (in this scenario, 500 meters) create the mean point of impact.[3] For 100 rounds, the remaining 50 rounds become the average impact point.

Determining the effectiveness of the weapon system – the weapon paired with the mount and platform – relies on the individual platform in comparison to the rest of the commander's fleet.

Secondly, dispersion determines the ability to consistently place rounds in the same place, shot after shot. When planning this control, the first step is to determine an appropriate target. For the baseline experiment, a target placed at 500 meters from the gun target line will produce the desired result. For stabilized firing platforms, the expected dispersion is two degrees left or right of the mean point of impact, or center of the target, based on single-shot or automatic modes of fire.

For unstabilized platforms, the intended dispersion angle is five degrees. Using the same control principles as before, each platform uses its organic equipment to validate the information and records it for consolidation. Since the dispersion area accounts for multiple variables – human error, gun or cannon tube wear, propellant temperature and type of munition fired – the emphasis lies on replicating the exact conditions for all tests.

Finally, the reliability of a platform with an FCS requires the implementation of a muzzle reference system update that accounts for excessive firing and gun tube droop. While a smaller-caliber weapon may not be subject to gravity, it will require a change of barrel or reticle reset to retain accuracy.

Probability of a kill given a hit

To determine a platform's true lethality, synthesize the previously mentioned factors through the application

BMP No.	Weapon system	Gunnery Table VI score (Ph)	Detection average (Pd)	Rws target system operational (Rsys)	Reliability of weapon (Rw)	Pk
B11	M2A1	825 (.83)	.87	.85	1	61%
B12	M2A1	850 (.85)	.9	.85	1	65%
B13	MK19	765 (.77)	.7	.85	.65	30%
B14	MK19	798 (.80)	.7	.85	.85	40%
B15	M2A1	925 (.93)	.9	.85	.9	64%
B16	M2A1	816 (.82)	.8	.85	.9	50%
A SEC AVG		820 (.82)	.76	.85	.88	47%
B SEC AVG		830 (.83)	.6	.85	.88	37%
PLT AVG		825 (.83)	.68	.85	.88	42%

Table 1.

of a formula that amalgamates all probabilities into a singular result. For this, determine that the ammunition selected is appropriate to meet a kill standard for a given threat. Then convert the data from percentage to decimal, then back to percentage for the result.

The probability a of kill (Pk) equals probability of hit (Ph) times probability of detection (Pd) times reliability of targeting system (Rsys) times reliability of weapon (Rw), or Pk = Ph x Pd x Rsys x Rw. For example, if a missile operates properly 90 percent of the time (assuming a good shot), the targeting system operates properly 85 percent of the time and enemy targets are detected at 50 percent, then our Pk estimation is Pk = 0.9 x 0.5 x 0.85 x 0.90 = 0.344 = 34 percent Pk.

Application

Commanders tend to assume each firing platform is equal. While this prediction satisfies the engagement criteria for a templated, untrained adversary, the results from execution lean toward the inability of the crews to operate at the expected threshold, thereby affecting the results. When an analysis of all factors are applied, units can better determine the strengths and weaknesses of platform firers at echelon and cross-organize their assets to achieve realistic effects. If the unit performs better under ideal weather and time conditions, give the crews a more offensive-oriented threat package to elevate training. If crews cannot qualify the minimum standard, they should be allocated with a supporting platform (wingman) to ensure the objectives have been met on the battlefield.

Table 1 gives an example of the information.[4]

The scenario depicted includes the execution of three degraded tasks of the 10 steps conducted during Table VI. More information can be collected from the evaluation and consolidation of the qualification packets: Pk for offensive or defensive engagements only, Pk for day or night engagements only and average Pk based on range to target and target posture.

Training development, management

Key elements play a part in the ability to gauge proficiency on this level. Commander involvement is a must to ensure the controlled tests are conducted to a standard that collects appropriate data prior to the execution of gunnery. If issues can be addressed, the information collected at qualification Table VI will prove an accurate assessment of proficiency.

Also, the implementation of quality-assurance practices enhance the program's feasibility and maximizes resources, both TADSS and live-fire ammunition. The team used for this should be qualified to operate as both vehicle-crew evaluators and range safety officer for events, increasing the exposure and ensuring that expectations are met.

Moving beyond the Tier 3 crew strategy, more evaluators should be integrated into the process for data collection and integration. The battalion-level staff should seek the guidance of the master gunner to facilitate the preparation of live-fire events as well as using their knowledge to inform crew members of the requirements. Crew members assigned to a firing platform should be stabilized to validate their performance on the platform, providing commanders a baseline for increasing proficiency through repetition. Finally, sergeants' time training conducted at the company level should be aligned with weapons proficiency for the crew members to reinforce the practical application of gunnery skills.

Conclusion

When the SBCT brings its guns to the fight, crew members should remain actively employed to support the operation from their platform. If commanders can reinforce the need for direct-fire support, the result is more lethal support-by-fire elements from positions of relative advantage. Crew members who have been trained to deploy, fight and win from their firing platform bring the ability to retain the initiative against a near-peer threat and maintain the support needs of the dismounted infantry. What the SBCT lacks in firepower, it compensates for in manpower, and as the Army continues to develop new platforms to increase the effectiveness of these platforms, crew mentality needs to develop into a culture of "fighting from the hatch" to preserve the freedom to maneuver against an ever-evolving threat.

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Notes

[1] III Corps lethality report on the state of the ABCT direct-fire weapon systems (M1 Abrams and M2 Bradley family of vehicles), Sept. 20, 2019.

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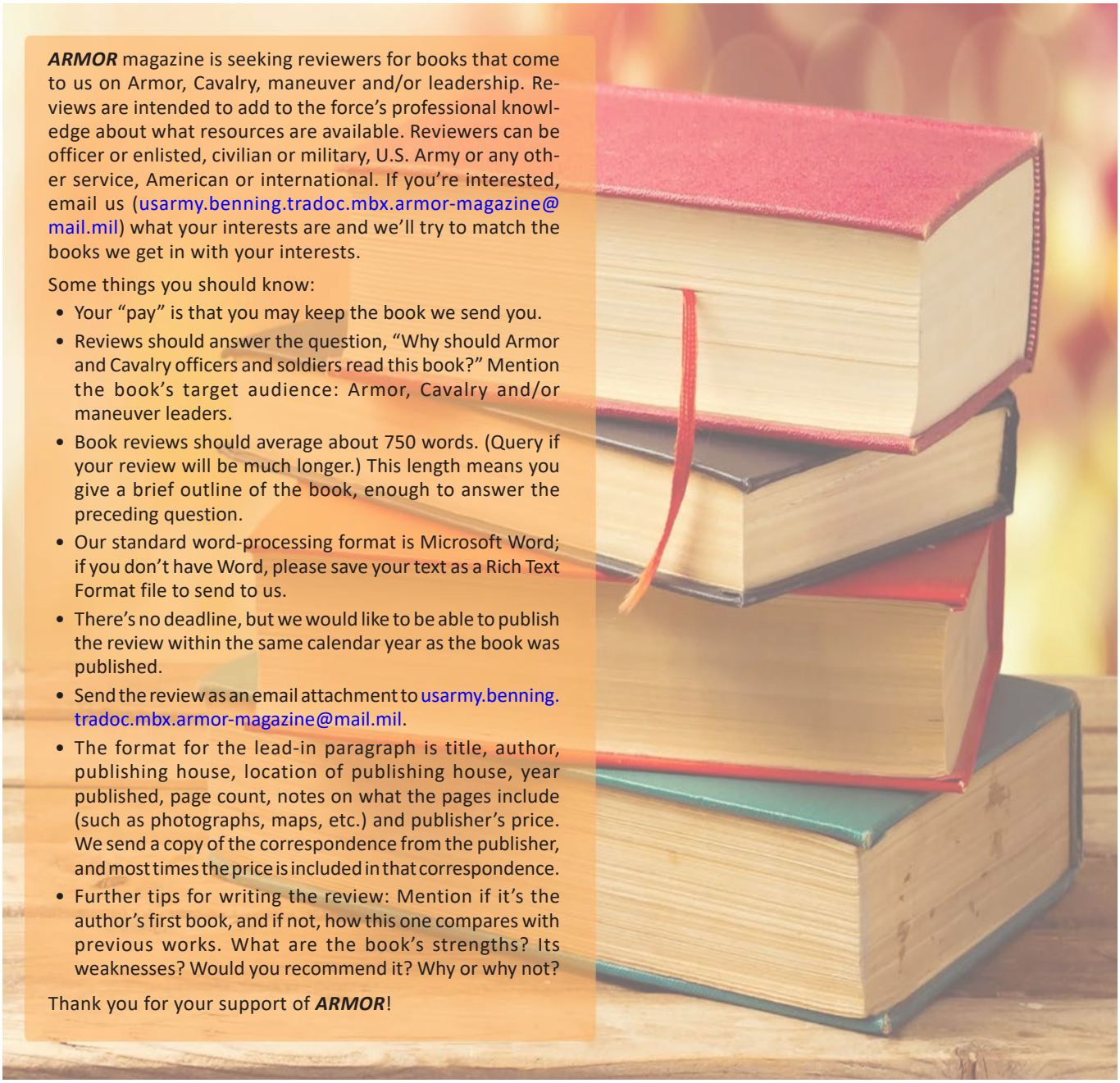
Acronym Quick-Scan

ABCT – armored brigade combat team
CCD – camouflage, concealment and decoys
CEP – circular error probable
FCS – fire-control system
HE – high explosive
LRF – laser range finder
Pd – probability of detection
Ph – probability of hit
Pk – probability a of kill
Pkh – Probability of a kill given a hit
Rsys – reliability of targeting system
Rw – reliability of weapon
SBCT – Stryker brigade combat team
TADSS – training aids, devices, simulators and simulations
TVI – crew Table VI, qualification
WFOV – wide field-of-view



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- The format for the lead-in paragraph is title, author, publishing house, location of publishing house, year published, page count, notes on what the pages include (such as photographs, maps, etc.) and publisher's price. We send a copy of the correspondence from the publisher, and most times the price is included in that correspondence.
- Further tips for writing the review: Mention if it's the author's first book, and if not, how this one compares with previous works. What are the book's strengths? Its weaknesses? Would you recommend it? Why or why not?

Thank you for your support of ***ARMOR***!

#GoArmor! The Annual Recruiting and Assessment of Officer Talent

by Alex Turkatte

The U.S. Army Armor School is tasked annually to support branch-specific education for cadets of the U.S. Military Academy (USMA) and Reserve Officer Training Corps (ROTC). This tasking includes annual evaluations of nearly 7,000 cadets for their potential to branch into Armor. This annual program is referred to as #GoArmor!

Branching background

In 2012, the Office of Economics and Manpower Analysis (OEMA) at West Point, NY, began an officer-talent-based accessions program based on the May 2010 Officer Corps Strategy Series[1] publication known as ***The Green Pages***. This new talent-management accessions initiative started with USMA cadets who would commission in Summer 2013, replacing the previous order-of-merit-list branching process.

Armor talent priorities[2]

As part of the talent-management initiative, 20 talent priorities were developed by OEMA for the evaluation of cadet potential for each branch. Of the available talent-category options, the Chief of Armor selected the following six talent priorities as key indicators for which a cadet would be best suited for Armor:

- **Mentally tough** – Stress-tolerant and emotionally mature. Performs well even under extreme psychological duress.
- **Physically fit** – Physically tough, gritty and tenacious. Performs well even under extreme physiological duress.
- **Technologically adept** – Understands and comfortably uses the latest technologies.
- **Problem-solver** – Able to choose between best practices and unorthodox approaches to reach a solution. Accomplishes the task.
- **Innovative** – Creative, inquisitive and insightful. Easily identifies new solutions and catalyzes change.
- **Communicator** – Precise, efficient and compelling in both written and spoken word.

Armor cadre with USMA and ROTC are encouraged to recommend cadets seek to improve their scores in these six Armor talent priorities. High talent scores in these six talent traits will help influence branch board panels, who review cadet records to determine the cadets' level of potential to branch into Armor.

USMA and ROTC outreach

For more than 10 years, the Armor School has supported branch briefings during annual USMA Branch Week and the ROTC summer events, currently named ROTC cadet summer training. In support of these efforts, an M1A2 SEP V2 Abrams, M1127 Stryker Reconnaissance Vehicle and a Bradley Fighting Vehicle (BFV) are transported annually to both events. (Note that the Infantry Branch has been required to use the BFV for its branch display for the past two years, instead of just highlighting its light dismounted branch focus.)

Figure 1. Soldiers from 1-16 Cavalry load a C-17 from the New York Air National Guard for airlift to USMA as part of the annual Branch Week event in August 2020.

Figure 2. CPT Gabriella Katz discusses the Armor Branch with cadets at USMA during the annual Branch Week event in August 2020.

During 2020 and the coronavirus pandemic, virtual branch briefings were established for ROTC and USMA cadets using Blackboard and Microsoft Teams applications. More video briefings and Armor officer testimonials were developed for posting on social media and the Armor School Website to help educate cadets on Armor. This effort was highly successful through the assistance of brigade combat teams submitting their videos for inclusion in these Armor Branch products, which are uploaded to the Armor School Webpage as well as to the Defense Visual Information Distribution Service.

Cadet evaluations

Conducted simultaneously with summer branch-education efforts, the Office of the Chief of Armor (OCOA) conducts in-depth analysis and evaluations of more than 1,000 USMA and 6,000 ROTC cadets. Through individual cadet data provided by OEMA, all cadets are scored for their potential to branch Armor using the following information:

- Cadet talent priority scores (as discussed previously);
- Cadet branch choice for Armor;
- Cadet personal statements;
- Cadre evaluation statements;
- Interview conducted with HireVue application and questionnaire form;
- Military, academic and physical grade-point average; and
- Army Physical Fitness Test or Army Combat Fitness Test.

These seven items are used to create an initial Armor preference score of the cadet's potential. A score of 3 is "most preferred" for Armor; 2 is "preferred"; and 1 is "least preferred." Once this initial score is created, a panel of Armor leaders reviews all information and votes to retain or change the preference score for each cadet. The panel is also charged to ensure Armor Branch accessions are in line with Army diversity goals in accordance with Army Regulation 600-20 and Army guidance.[3] Although the cadet's final branch choice is a significant factor during branching, the Armor preference score provides the Army G-1 with critical information to finalize all branch determinations.

#GoArmor!

There are several benefits to the officer branching process to ensure the best talent is selected to join Armor. Although the Officer Candidate School (OCS) on Fort Benning, GA, is not yet a part of this education and talent assessment process, OEMA is in direct coordination with OCS leadership for future developments.

In closing, through the help of leaders sharing the Armor story, the Army can continue to educate and assess cadets for the continued success of our Armor Branch.

Alex Turkatte is a military human-resources specialist with OCOA at Fort Benning, GA. His previous assignments include 420A human-resources technician (as chief warrant officer 3), U.S. Army Training and Doctrine Command G-1/Adjutant General, Fort Monroe, VA; Headquarters U.S. Army Europe, Heidelberg, Germany; secretary general staff, Headquarters V Corps/Combined Joint Task Force-7, Baghdad, Iraq; 1st Special Forces Operational Detachment-Delta Human Resources Troop, Fort Bragg, NC; and S-1, 3-12 Infantry (Mechanized), Baumholder, Germany. His military schooling includes Defense Civilian Emerging Leader Program, Warrant Officer Candidate School, Adjutant General Warrant Officer Basic Course, Airborne School and Jumpmaster Course.

Notes

[1] Officer Corps Strategy Series, May 2010, Wardynski, Lyle, Colarusso.

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Acronym Quick-Scan

BFV – Bradley Fighting Vehicle
OCOA – Office of the Chief of Armor
OCS – Officer Candidate School
OEMA – Office of Economics and Manpower Analysis
ROTC – Reserve Officer Training Corps
USMA – United States Military Academy

Junior Officers Community

Armor and Cavalry junior officers looking for a professional space to connect with like-minded leaders about improving themselves and making their units more effective may wish to check out Junior Officer (JO) (http://cjo.army.mil).

JO is an on-iine space dedicated to the professional development of Army junior officers and the organizations they lead. In JO, junior officers can find an array of leader development resources, including:

- **Blog: Original articles on topics relevant to junior officers. New content from junior officers is welcome.**
- **Document database: A repository of professional documents written by other junior officers and shared to help others.**
- **CCLPDs: Mobile-friendly leader professional development modules with short videos, articles and discussion questions.**
- **(Coming soon) On-line leader challenge: Put yourself in the shoes of a junior officer facing a tough dilemma with no clear right answer.**
- **On-line forums: A members-only space where junior officers can share ideas and insights.**

For organizations looking to professionally develop their junior officers in person, the Center for Junior Officers (U.S. Military Academy, West Point, NY) will provide a custom training package. Options include:

- **Leader challenge: Video-based leader development program with discussion.**
- **Great-teams exercise: Share and learn from others' experience on a great team.**
- **Dogtag exercise: Build a visual plot of professional experience to reveal new aspects and talents of your team members.**
- **Third-generation leadership talk: A concept that focuses on impacting leaders who have yet to come into service.**
- **Company-level leader Interviews: Share your experience with a leadership challenge.**
- **Leader/visual metaphor exercise: Identify current values reflected in the organization and discuss future development.**
- **Leadership psychology talk: Presentation on a wide range of topics related to the psychology of leadership.**

The Center for Junior Officers is an officially sponsored Army unit that supports junior officers across the force. To find out more, email info@jo.army.mil.

91ST CAVALRY REGIMENT

The shield includes yellow, the color of the cavalry, denoting the origin of the organization in that service. The horseshoe also carries out the same idea. The speeding wheel, enhanced by speed lines, creates the impression of the lightning speed of the modern armored force. The motto "Alert" is appropriate and fittingly expresses the sentiments of the unit. The distinctive unit insignia was originally approved for 91st Reconnaissance Squadron Aug. 6, 1942. It was redesignated for 91st Reconnaissance Battalion May 25, 1950. The insignia was redesignated for 91st Armored Cavalry Reconnaissance Battalion Oct. 22, 1953. The insignia was redesignated for 91st Cavalry Regiment, with the description and symbolism updated March 1, 2006.

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