ARMOR

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Maintaining the Army's No. 1 Priority: People to Build Combat Power

ARMOR

The Professional Bulletin of the Armor Branch, Headquarters, Department of the Army, PB 17-21-1

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CHIEF OF ARMOR'S HATCH

BG Kevin D. Admiral
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Leaders Are the Weapon System That Delivers Armored Brigade Combat Team Lethality

"No matter how much technology we develop, Soldiers will always remain the centerpiece of our Army. We equip people, we don't man equipment, and that will never change." -GEN James C. McConville

Armored brigade combat team (ABCT) lethality is achieved by developing confident and competent leaders (commissioned and noncommissioned officers (NCOs)). They drive change and innovation, maintain readiness and develop future leaders. Leader development, through education and training, will ensure ABCTs maintain the lethality necessary to fight and win.

Department of the Army Pamphlet (DA PAM) 600-3 says commissioned officers "must know how the Army runs and demonstrate confidence, integrity, critical judgment and responsibility while operating in an environment of complexity, ambiguity, and rapid change."

Armor officers must be agile, adaptive, technologically savvy and engaged problem-solvers to lead and plan combined-arms maneuver and cavalry missions during large-scale combat operations. Company-grade officer education and training is focused on building military-occupation specialty (MOS) proficiency. They must be able to accomplish all MOS level tasks to standard under adverse conditions to effectively lead at the platoon and company levels.

As they progress in rank, field-grade officers are expected to master the fundamentals of the aforementioned and be adept at fires synchronization and warfighting-function integration. Their education also focuses on oral and written communication to enable them to lead staffs at the battalion, brigade and division levels, or to function as members of joint- or Army-level staffs. Field-grade officers integrate warfighting functions (WfFs) to ensure that the unit's information collection, fires, protection, communication and sustainment plans enable combined-arms maneuver. At the staff level, field-grade officers serve as planners and action officers for joint- or Army-level actions.

As Armor officers become more senior (commanders or senior staff leads), they build a comprehensive and authoritative knowledge of MOS-specific tasks and work to develop junior leaders.
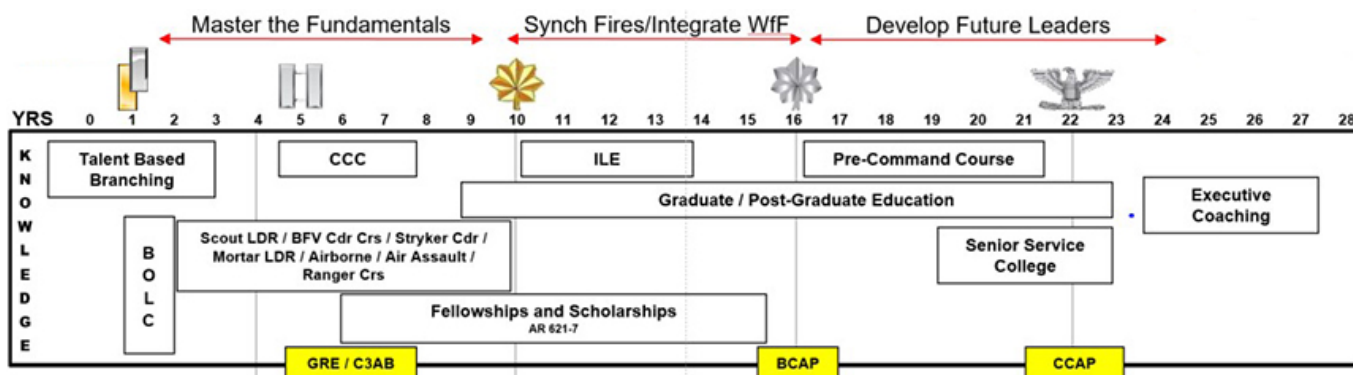

Figure 1. Armor officer professional-development model.

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The professional-development model in Figure 1 depicts the formal education an Armor officer receives throughout his or her career.

The U.S. Army is renowned globally for its NCO corps. In Training Circular 7-22.7, the 16th Sergeant Major of the Army, Michael A. Grinston said, "Throughout the history of the U.S. Army, the NCO has been its backbone. Our NCO corps is admired by our contemporaries around the world and is an integral part of what has made our Army so successful throughout our 244 years of service to the nation. The NCO corps has made revolutionary changes in the past decade and continues to evolve to meet the emerging threats posed by our enemies. Grounded in our oath to the nation and our rich history and heritage, the NCO corps is the vanguard for leading and training Soldiers at the crew, team, squad, section and platoon level. Focusing on the basics with tough, realistic combat training will ensure that in the crucible of ground combat, our Soldiers will be victorious."

NCOs enable ABCTs to function. They enable Soldiers to master the fundamentals of marksmanship, vehicle employment and maintenance, as well as supply and personnel management. Also, they are invaluable assets for planning and training management.

NCO professional military education (PME) is the catalyst for the aforementioned. The NCO Education and Professional-Development System is the foundation to NCO development. Education is included in each of its three lines of effort (development, talent management and stewardship of the profession).

Figure 2 depicts how education is continuous for Armor NCOs as they progress in their careers; education is continuous and ensures NCOs reach MOS proficiency for their current grade.

DA PAM 600-25 details Armor NCO development. Junior NCOs (sergeant/staff sergeant) focus self-development and their mastery of 10-level tasks. This enables them to lead by example and train their younger, less experienced subordinates.

As Armor NCOs become more senior (sergeant first class/master sergeant), they focus on coaching, mentoring and developing lethal platoons. While still important, at this phase in their career, senior NCOs have less focus on individual accomplishments and greater emphasis on building teams and providing value to the organization. Following their key-developmental (KD) assignments, they continue to coach and mentor; they serve as combat-training center observer/coach/trainers and PME or functional-course instructors.

The senior armor NCOs (sergeant major/command sergeant major) have advanced communications and organizational leadership skills. These skills enable them to coach, teach and mentor junior and senior NCOs. They also focus on developing their community and public-relations skills to enable them to represent the command or Army during civic functions.

In addition to PME, ABCTs create confident and competent NCOs by sending them to functional courses. Functional courses make ABCTs more lethal; they create leaders with vehicle,
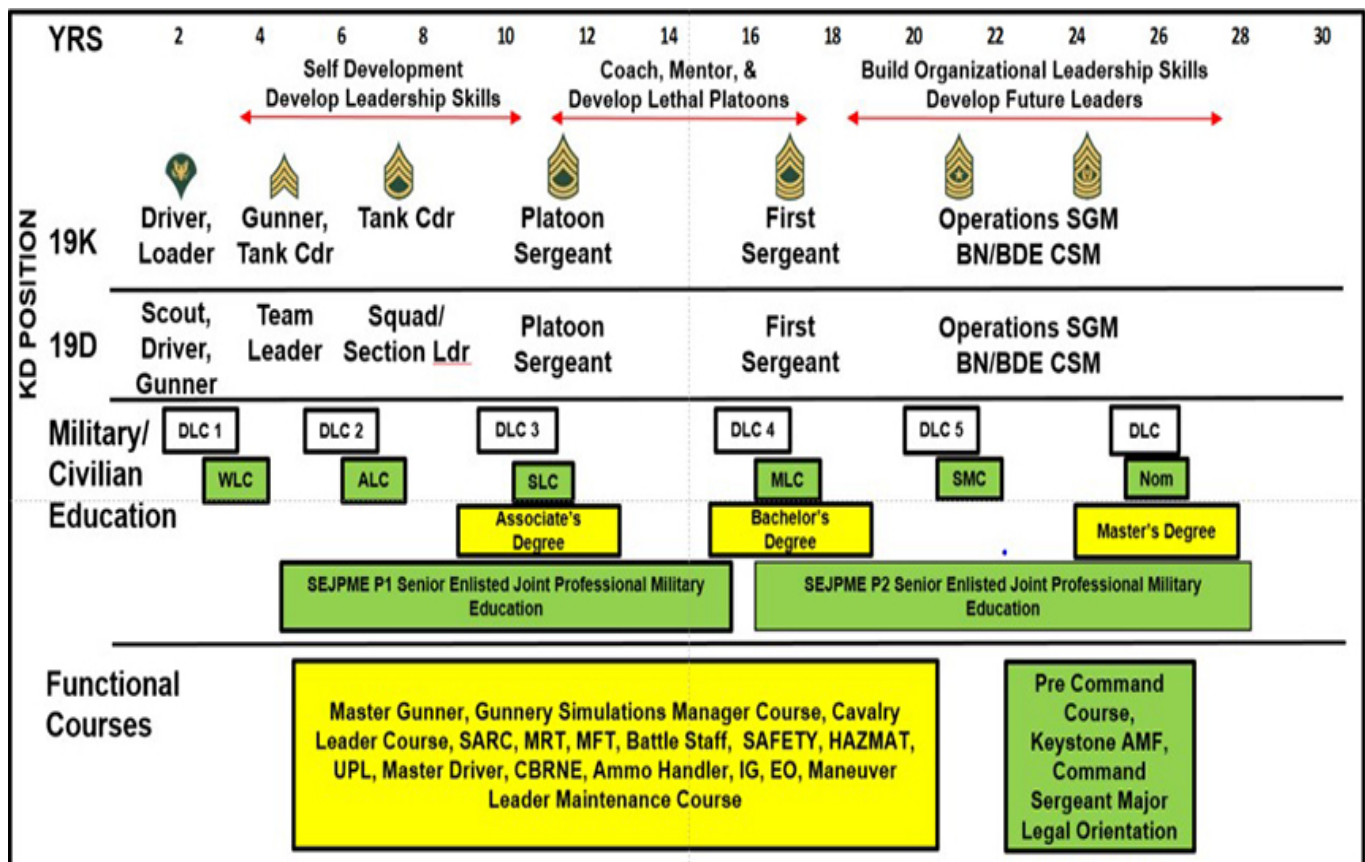

Figure 2. Armor NCO professional-development model.

weapons, maneuver, communications and administrative expertise.

Confident and competent leaders are the most casualty-producing weapon system in the ABCT. They drive change, inspire innovation and develop future leaders. Confident, competent leaders are the lifeblood of the ABCT and are quintessential to lethality.

ACRONYM QUICK-SCAN

ABCT – armored brigade combat team
ALC – Advanced Leader's Course (Figure 2)
AMF – Army Mobilization Forum (Figure 2)
BCAP – Battalion Commander Assessment Program (Figure 1)
BDE – brigade (Figure 2)
BFV – Bradley Fighting Vehicle (Figure 1)
BN – battalion (Figure 1)
BOLC – basic officer leader course (Figure 1)
C3AB – Career Courses' **Cognitive Assessment Battery (Figure 1)**
CBRNE – chemical, biological, radiological, nuclear and (high-yield) explosives (Figure 2)
CCAP – Colonels' Command Assessment Program (Figure 1)
CCC – career captain's course (Figure 1)
Cdr – commander (Figures 1 and 2)
Crs – course (Figure 1)
CSM – command sergeant major (Figure 2)
DA PAM – Department of the Army pamphlet
DLC – Distributed Leader's Course (Figure 2)
EO – equal opportunity (Figure 2)
GRE – Graduate Record Exam (Figure 1)

HAZMAT – hazardous material (Figure 2)
IG – inspector general (Figure 2)
ILE – intermediate-level education (Figure 1)
KD – key developmental
LDR – leader (Figure 1)
MFT – master fitness trainer (Figure 2)
MLC – Mortar Leader's Course (Figure 2)
MOS – military-occupation specialty
MRT – master resilience trainer (course) (Figure 2)
NCO – noncommissioned officer
PME – professional military education
SARC – sexual-assault response coordinator (Figure 2)
SEJPME -- Senior Enlisted Joint Professional Military Education (Figure 2)
SGM – sergeant major (Figure 2)
SLC – Senior Leader's Course (Figure 2)
SMC – Sergeant Major's Course (Figure 2)
UPL – unit prevention leader (Figure 2)
YRS – years (Figures 1 and 2)
WfF – warfighting function
WLC – Warrior Leader's Course (Figure 2)

Honoring our Armor and Cavalry Medal of Honor Heroes

Derived from Center of Military History information provided at https://history.army.mil/html/moh/civwaral.html. Listed alphabetically. Note: Asterisk in the citation indicates the award was given posthumously.

EDGERTON, NATHAN H. LT
Unit: Adjutant, 6th U.S. Colored Troops. Place and date of action: Chapins Farm, VA, Sept. 29, 1864. Entered service: Philadelphia, PA. Date of issue: March 30, 1898. Citation: Took up the flag after three color bearers had been shot down and bore it forward, though himself wounded.

ELLIOTT, ALEXANDER SGT
Unit: Company A, 1st Pennsylvania Cavalry. Place and date of action: Paines Crossroads, VA, April 5, 1865. Entered service: North Sewickley, PA. Date of issue: May 3, 1865. Citation: Capture of flag.

ELLIOTT, RUSSELL C. SGT
Unit: Company B, 3rd Massachusetts Cavalry. Place and date of action: Natchitoches, LA, April 19, 1864. Entered service: Boston, MA. Date of issue: Nov. 20, 1896. Citation: Seeing a Confederate officer in advance of his command, charged on him alone and unaided and captured him.

ELISE, WILLIAM 1SG
Unit: Company K, 3rd Wisconsin Cavalry. Place and date of action: Arkansas, Jan. 14, 1865. Entered service: Little Rock, AR. Date of issue: March 8, 1865. Citation: Remained at his post after receiving three wounds, and only retired, by his commanding officer's orders, after being wounded the fourth time.

GUNNER'S SEAT

CSM Tony T. Towns
Command Sergeant Major
U.S. Army Armor School
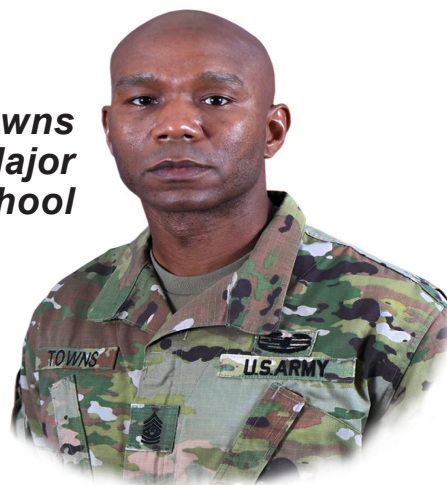
The NCO's Role in Driving Organizational Change

Dating back to 1775 with the birth of the Continental Army to present day, the role of the noncommissioned officer (NCO) has progressed. In 1778 at Valley Forge, Inspector General Friedrich von Steuben, a Prussian-German Army officer, standardized NCO duties and responsibilities for the Continental Army NCO corps. Today those duties and responsibilities have evolved.

There are several factors that demanded that the role of NCO revolutionize: technological advances, operational requirements, policy changes and societal (generational) evolution, just to name a few. Today our NCO role of accomplishing the mission and looking out for the welfare of Soldiers may sound simplistic, but it has become more challenging than ever before.

The welfare of our Soldiers perfectly aligns with the Army's "people" strategy, and there is no endeavor more important. Exceptional organizations are a direct reflection of the people assigned, above all else. Who are those leaders who had the greatest impact in your life? What set them apart from other leaders?

As I reflect upon my career, these leaders pushed me to be better every day, displayed genuine care and compassion for Soldiers and the profession, and, above all, treated Soldiers as family. They ensured each day was purposeful and productive, and they enforced even the simplest of standards.

John Quincy Adams once stated, "If your actions inspire others to dream more, learn more, do more and become more, you are a leader." Without question, these NCOs were leaders and drove organizational change.

Agnostic to rank, what is your role as an NCO to drive needed change within your organization?

From post-Vietnam to present-day, mission requirements have increased here at home and across the globe. More than ever, NCOs are training partner nations, leading combat operations, advising foreign countries and developing the next generation of leaders to face emerging threats using technological advancements and intuition. Also, suicides, sexual assault/harassment, racism and the lack of diversity and inclusion are cancers within our institution that add to the list of challenges our NCOs must face each day.

The NCO's role in the organization has never been more important. From combat post to motorpool operations and everything in between, NCOs are essential to driving organizational change across an array of challenges within our Army. The problems that plague our Army require all leaders to do their part. We must explore more effective ways to connect with our Soldiers and their families. We must devote the precious resource of time to personally coach, counsel and mentor. Finally, we must positively role-model ethics and professional conduct, and care for our Soldiers as though they are our own sons and daughters. Every mission, big or small, will involve Soldiers.

The welfare of our Soldiers and their families is the mission that never ends. Our people truly are the secret recipe for the success of the organization.

We can all recall leaders who significantly impacted our lives and left an indelible mark within an organization. Leaders, specifically NCOs, create hope and possibility for greater opportunities for Soldiers. Our Army is about change, not only to ensure overmatch of our adversaries, but to also improve policy and procedures that impact Soldiers and their families. We as NCOs are the "backbone" of the Army – empowered and trusted by our civilian and military senior leaders to carry out directives.

As stewards of the profession, we must always remember our oath and be an agent that drives the change necessary to improve our Army and the lives of the Soldiers we lead. By ensuring the welfare of our Soldiers, we will accomplish any mission and remain the most revered NCO corps across the globe!

Armor Ready! Forge the Thunderbolt!

ACRONYM QUICK-SCAN

NCO – noncommissioned officer

Figure 1. 19K one-station unit training trainees from Company B, 1st Battalion, 81st Armor Regiment, take a break during a turret training block of instruction. All 19K trainees receive an orientation to the different duty stations (tank commander, gunner and loader) inside the turret of the tank but receive thorough instruction pertaining to the duties of a tank loader. *(U.S. Army photo by 1LT Alexander Muzyka)*

Army's No. 1 Priority – People:
Operationalized by U.S. Army Armor School

By MAJ Demarius Thomas

In his first message as the 40th Chief of Staff of the Army, GEN James C. McConville said, "People are always my [No. 1] priority. Our Army's people are our greatest strength and our most important weapon system. Our people are our Soldiers, family members, Department of the Army civilians and Soldiers for Life (retirees and veterans). We must take care of our people and treat each other with dignity and respect. It is our people who will deliver on our readiness, modernization and reform efforts."

Following this address, the Army released its "People Strategy," which states, "We will build cohesive teams for the Joint Force by maximizing the talents of our people, the Army's greatest strength and most important weapon system." The U.S. Army Armor School (USAARMS) developed a plan of action to enable this vision.

The Armor Branch is the home of the best trained, best led, best equipped and most lethal tankers and scouts in the world. Armor Soldiers and Cavalry troopers thrive in conditions of ambiguity and uncertainty. They seek opportunities to seize, retain and exploit the initiative, and to preserve freedom of action for friendly forces while denying the enemy options. The Armor Branch achieves the aforementioned by, with and through USAARMS' focus on people.

USAARMS is the catalyst that transforms civilians into the world's best Armor and Cavalrymen and -women. USAARMS' primary purpose is to support the operating force by providing training, doctrine and leader development to enable the warfighter to win in any environment. The school developed a campaign plan to create unity of effort by outlining what must be done at the school to enable Army readiness and to prepare Soldiers and leaders for large-scale combat operations.

USAARMS enables the Chief of Staff of the Army's No. 1 priority by developing better Soldiers, better leaders, better mounted capabilities for the future force and branch advocacy to recruit the best and brightest civilians.

Develop better Soldiers

GEN McConville said, "No matter how much technology we develop, Soldiers will always remain the centerpiece of our Army. We equip people; we don't man equipment, and that philosophy will not change."

The transition from civilian to Soldier can be daunting. Therefore USAARMS implemented a 22-week one-station unit training (OSUT) program to aid the process. OSUT is an initial-entry program that transforms civilian volunteers into professional Soldiers;

ARMOR ⚔

Figure 2. PVT Bassam Cozzo drives a tank simulator designed to replicate in real-time the look and feel of driving a tank in a combat. *(U.S. Army photo by Patrick A. Albright, Maneuver Center of Excellence and Fort Benning Public Affairs)*

graduates become disciplined, fit, acculturated and combat-ready.

USAARMS creates better Soldiers by using two OSUT programs of instruction (Armor crewman and Cavalry scout) to specialize graduates. Graduates of both programs know how to be a part of a winning team, and they are ready to contribute to their unit's success on Day 1.

Men and women who graduate the military-occupation specialty (MOS) 19K OSUT have a high degree of knowledge pertaining to operations, gunnery skills and maintenance of the M1A2 main battle tank. They possess individual skills required to effectively acquire and engage targets with the loader's machinegun. They can assist the tank commander and gunner by scanning and identifying targets for engagement, and they can operate communication equipment and ensure it functions properly. They can also tactically maneuver their vehicle and identify covered and concealed positions to enable the crew to engage the enemy.

The MOS 19D OSUT program creates Cavalry scouts who understand the fundamentals of reconnaissance and security. Graduates possess the individual skills required to navigate with stealth through terrain to close with and report on enemy units. They are proficient in the use of indirect fires and with analog and digital reporting systems. The 19D OSUT graduates also learn to serve as drivers for the Stryker and Bradley Fighting Vehicle. All OSUT graduates can accomplish the

Figure 3. SFC Joseph K. Bennett (left) orients ABOLC students to the terrain they will encounter during a platoon situational-training exercise (STX) using the newly installed Augmented Reality Sandtable (ARES) system. ARES combines the tactile nature of a traditional sandtable with digital terrain overlay on sand to promote interactivity and improve terrain visualization in 3-D. *(U.S. Army photo by SSG Scott Peckham)*

aforementioned to standard under adverse conditions.

Develop better leaders

A strategic outcome of the 2020 Army People Strategy is a professional Army. It says, "The Army is a profession, a highly expert, certified and credentialed force resulting from years of increasingly rigorous training and education. Its members are morally centered, retaining the trust and confidence of both the American people and each other. Army professionals are people of character, presence and intellect, committed to reflective practice and continuous learning. They share a powerful and enduring identity as lifelong members of the Army team."

The Armor Basic Officer Leader Course (ABOLC) is a program designed to enable newly commissioned lieutenants to transition into the Army profession. The 19-week training program produces Armor lieutenants who are bold, aggressive, resourceful and adaptive leaders capable of leading tank and scout platoons in any environment.

ABOLC creates better junior leaders because the course ensures graduates can make decisions, direct, lead and assess operations effectively at the platoon level. Graduates are proficient in doctrinal, technical and administrative tasks associated with the tank platoon, and they are knowledgeable in the art and science of Armor and Cavalry formations, employing weapon systems and integrating assets to close with and destroy the enemy. They can also plan operations and analyze tactical situations, disseminate and filter information, and employ the full capabilities of the platoon's equipment. Well versed in enemy organizations, doctrine and equipment, the ABOLC graduate can comprehend mission and commander's intent during decentralized operations to fight and win on the battlefield.

USAARMS also has 13 functional courses designed to build leader (noncommissioned officers and officers) proficiency and develop professionalism. The programs of instruction range from technical proficiency to organizational planning. There are also courses designed to build platform mastery on the Abrams, Bradley and Stryker. Each functional course enhances student intellect and increases the capabilities of the overall force.

Develop better mounted capabilities

"The time has come for transformational change to build the Army we need for the future [because] winning matters," GEN McConville said during the 2020 Association of the U.S. Army annual meeting and exposition. "When the nation calls on the Army, we don't go to participate. We don't go to try hard; we go to win. There is no second place or honorable mention in combat."

USAARMS develops doctrine and works with the Army's Future Command to develop capabilities of the future maneuver force and optimize capabilities (platform and organizational) for the mounted force. USAARMS assesses the use of technology in support of cross-domain maneuver through the expertise of Armor professionals. Technological improvements include ammunition upgrades, vehicle improvements, fielding and modifications to formations as well as total Army, joint and coalition interoperability.

USAARMS works through its Army capabilities manager (ACM) to integrate capabilities across the doctrine, organization, training, materiel, leadership and education, personnel, facilities and policy (DOTMLPF-P) enterprise to enable armor and cavalry formations to win on any battlefield. The ACM collaborates with stakeholders (Headquarters Department of the Army, Army Futures Command, U.S. Army Forces Command, program/product managers and U.S. Army Training and Doctrine Command centers of excellence) to identify, develop, field and assess holistic solutions to maintain capabilities overmatch, conduct cross-domain maneuver and defeat any adversary during large-scale combat.

Branch advocacy recruits best, brightest

Another strategic outcome of the Army's People Strategy is a ready Army. "The Army employs a range of technologies, incentives, programs and policies to identify the talents of its people and the talent demands of its organizations in timely, accurate and granular detail," states the strategy. "This allows the use of data-driven analytical tools in its talent matching and alignment (employment and development) efforts, increasing overall workforce productivity. This granular data also drives a far more dynamic and

Figure 4. ABOLC instructor CPT Meaole Meaole (right, sitting on the stool) grades a student who is briefing his operations order to his classmates during Block 4, which is the final phase of training. During this phase, students develop and brief a tactical operations order and demonstrate their ability to control a platoon-sized element supported by indirect fire during an STX. (U.S. Army photo by SSG Scott Peckham)

accurate long-term workforce planning system, reducing unanticipated talent gaps and increasing overall Army readiness."

USAARMS uses social media, person-to-person interaction and branch publications to attract the best and brightest civilians as well as to enable retention. These connect USAARMS to current Soldiers, college students, high-school students and citizens around the world. Social media enables USAARMS to "tell the Armor story" through videos and short messages on social-media platforms. The Armor story communicates the history of the Army and the Armor Branch, publicizes achievements and informs civilians' decision to join the Army.

Person-to-person engagements on college campuses enable USAARMS to attract high-quality cadets and encourage students to join the Army's Reserve Officer Training Corps, while branch publications communicate news and achievements to the entire Army. Therefore USAARMS' recruitment strategies attract top-performing civilians, retain talented Soldiers and leaders, and enable the success of the total Army.

Conclusion

"No Soldier or unit will ever be sent into combat that's not highly trained, disciplined, fit and ready," GEN McConville directed.

USAARMS enables this directive through its campaign plan. BG Kevin D. Admiral, 52nd Chief of Armor and commandant of USAARMS, said, "[USAARMS] trains, develops, educates and inspires the world's most agile and adaptive Armor and Cavalry leaders, Soldiers and formations to win in complex environments by closing with and destroying our nation's enemies using fire, maneuver and shock effect."

To achieve this goal and operationalize the Army's No. 1 priority, USAARMS focuses on people. It transforms civilian volunteers into disciplined,

competent, confident Soldiers who are physically fit, proficient in the fundamentals and prepared to become valued members of the profession of arms (*develop better Soldiers*). It creates agile, adaptive, technology-savvy Armor/Cavalry leaders of character who are engaged problem-solvers prepared to operate in multiple domains to fight and win (*develop better leaders*). It integrates DOTMLPF-P solutions to enable modernization for the future force (*develop better mounted capabilities*), and it actively uses social media, publications and person-to-person engagements to attract talent to the branch and the Army (*Armor branch advocacy to recruit the best and brightest*).

MAJ Demarius Thomas is chief of the Armor Commandant's Initiatives Group at USAARMS, Fort Benning GA. His previous assignments include brigade S-3, 5th Armored Brigade, Fort Bliss, TX; squadron executive officer, 2nd Squadron, 13th Cavalry Regiment, Fort Bliss; battalion S-3, 1st Battalion, 67th Armored Regiment, Fort Bliss; and chief of operations, 1st Armored Division, Fort Bliss. His military education includes the Command and General Staff Officer College, Maneuver Captain's Career Course, Armor Officer Basic Course and Airborne School. MAJ Thomas holds a bachelor's of science degree in political science from Florida A&M University a master's of business administration degree from Webster University. His awards include two awards of the Bronze Star Medal and four awards of the Meritorious Service Medal.
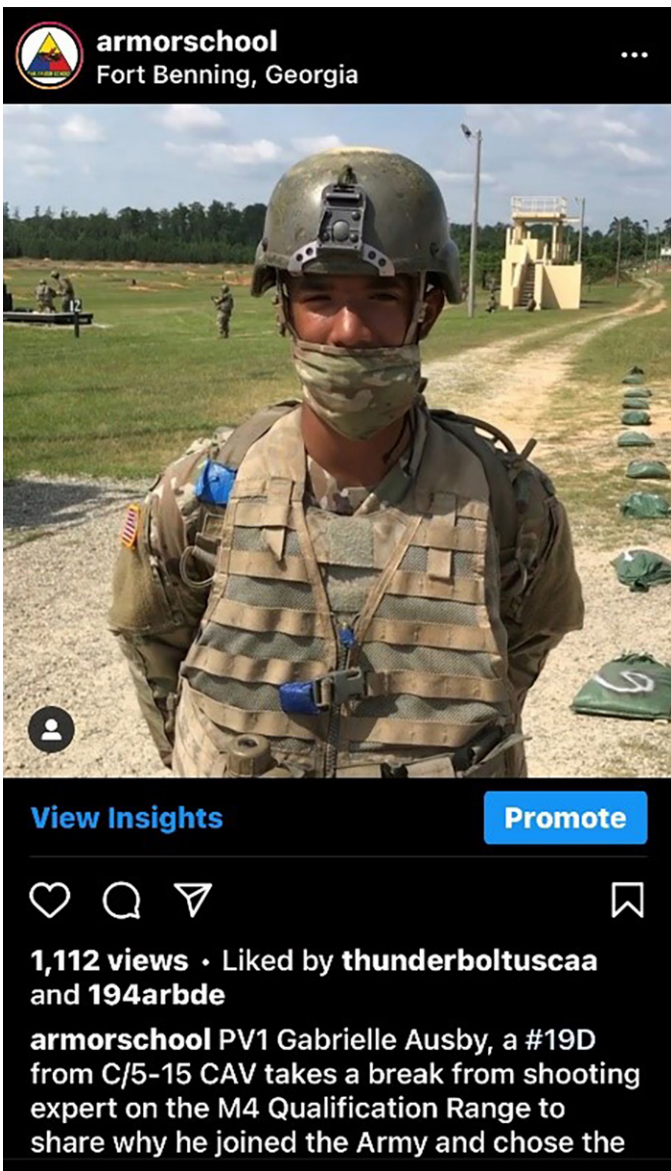

Figure 5. In this social-media post from USAARMS, PV1 Gabrielle Ausby explains why he joined the Army and why he chose to be a scout in the Armor Branch. *(U.S. Army video image)*

Learn from My Mistakes: What I Wish I Knew Before Becoming a Lieutenant

by 1LT Justin Leugers

I believe the Army does not prepare its junior leaders for what they will face when they arrive at their first duty station. This means that most of what you need to learn becomes on-the-job training/learning. With that in mind, there were a lot of things I wish I would have known prior to arriving at my first duty station at Fort Bliss, TX.

I started learning what I still needed to know when I first became a platoon leader. I conducted platoon- and company-level field-training exercises and multiple live-fire exercises where I actually learned how to maneuver a platoon-sized element as part of

company operations in the unforgiving deserts of New Mexico. I also participated in a National Training Center rotation prior to a nine-month rotational deployment to Camp Humphreys, Republic of Korea (RoK). I learned a lot, but I wish I had known more at the beginning.

With that in mind, the point of this article is to recommend some ways new lieutenants can learn from my experience.

Care – it's your only job

As a new lieutenant you are eventually bound to get a platoon. Remember, you only have one job and that is to

care. Soldiers and leaders who truly care about each other develop mutual trust and respect. If you care about your job and everything your job encompasses, you will be successful. Care about the Soldiers in your platoon, care about your vehicles, care about your additional duties and care about all the random taskings you will sooner or later inherit. Caring for your platoon is harder for leaders who lack empathy/sympathy (I am one of those people), so it took me a few months to fully understand my Soldiers and what it truly means to care.

Your platoon sees everything you do and do not do, so sit down with them

Figure 1. Red Platoon conducts platoon-level operations while forward-deployed in the RoK. *(U.S. Army photo by 1LT Justin Leugers)*

and talk to them like people you care about – not a group of subordinates you can tell what to do. Your Soldiers will see that you care and will be more willing to do what you ask of them; your Soldiers will also respect you as a leader.

As the platoon leader you need to care about their families, hobbies, medical appointments and all the metrics your first sergeant will be yelling about. Also, you need to understand that your platoon sergeant will take care of tracking your Soldiers, but you will need to keep readiness in the back of your mind.

When you get to your platoon, within the first month you should sit down and have a one-on-one conversation with each Soldier. This allows you to get to know the Soldiers you could one day lead in combat. You will find out that one or more of them has some higher education, even a bachelor's or master's degree. Ask them why they joined the Army and what their goals are.

Caring for your Soldiers also means maintaining standards and discipline. Your noncommissioned officers (NCOs) will help with that, but ultimately you are the standard, so do not deviate. Mutual trust and respect will help mitigate any doubts that come up in stressful situations. Care about your job and your evaluation will write itself.

Educate yourself

As a new lieutenant you do not yet really understand how the "Big Army" works and how much there is to learn. Therefore, you must learn quickly how to "drink from the firehose." Read regulations, read doctrine, read policy letters, read relevant articles, read professional development and self-development books and, most importantly, read something fun. You should always have a book nearby that you are reading or listening to.

I have been more successful in retaining my reads by listening to audiobooks than actually having a paper copy in my hands. Do what works for you.

I often have a hard time finding periods during the day or evening where I am able to pick up my book and knock out a few chapters. I discovered that my 30-minute commute offers me the longest uninterrupted period of the day, during which I can listen to whatever book I am "reading."

Consuming books offers you knowledge you will not get anywhere else. Television documentaries and impromptu conversations with field-grade officers are great, but getting absorbed in a book and understanding the author and his/her point of view, motives and reasons for writing it in the first place really gives you wider access to other viewpoints, and it allows you to develop a wider perspective.

Read "Funk's Fundamentals." I have it hanging in my office for quick reference. GEN Paul E. Funk II, commander of U.S. Army Training and Doctrine Command, has 40 quick points that I believe are excellent advice. If you are able to apply the fundamentals early in your career, you will be more successful.

Ask, ask, ask and ask questions. Your technical knowledge is so limited at this early stage of your career that you have to ask questions. You will drown in questions if you don't ask them, but be careful who you ask. A brand-new lieutenant should seek out his/her platoon sergeant because he/she is your right hand and the person with whom you will work most closely. Even to this day, I ask my platoon sergeant first.

Then I recommend asking the senior platoon leader in the company or a peer and then the company executive officer or first sergeant. I wouldn't ask the company commander anything unless it was a question I couldn't get answered elsewhere. Your commander has a hundred other things going on and does not need a lieutenant asking him/her five questions a day, especially when the question can be easily answered by asking someone else.

I would find myself asking my specialists and below about certain equipment and how they operate it because they are the Soldiers who work on that piece of equipment each day. Also, it gives you a chance to test your Soldiers' knowledge and show them you care about their jobs.

Never leave a question unanswered; if you think it's a "stupid question," ask your NCOs. They will set you straight.

Don't neglect PT!

Physical training (PT) in the morning is very important. It is usually the only time most of your Soldiers will work out or do anything remotely active all day. Invest in a Bluetooth speaker to play music on lifting days or while you are conducting an Army Physical Fitness Test or Army Combat Fitness Test. It will come in handy more times than you think.

Taking your PT plans seriously will ensure your platoon is healthy and can help build esprit de corps. Be creative in your workouts: create a platoon PT competition once a month, use the pool, conduct an off-post run or coordinate to use the equipment at your local gym. I know commanders will want a concept of the operation and risk assessment, showing what you will do and how you will mitigate risks associated with a different type of PT, but take the extra 15 minutes and knock it out. Put in the legwork so you can keep PT creative and your platoon fit and motivated during the workouts.

Regularly conduct an after-action review to determine what went well and what needs improvement. Most importantly, let your NCOs run PT. This is a great opportunity for them to lead Soldiers, for you to develop them as leaders, to learn from them and develop yourself.

Maintenance will make or break you

My time in a tank company, and in an armored brigade combat team (ABCT) in general, has drilled the importance of maintenance deep into my brain. My battalion commander used to always say that maintenance is training, and the longer he was in the position, the less he empathized with traditional training and the more he cared about maintenance. He knew that traditional training would happen regardless, but good maintenance would only happen if it was a priority.

He was exactly right. As a platoon leader, you might be in charge of four tanks, worth around $6 million each, or a various set of vehicles and

weapons. It is ultimately your job to maintain and sustain them. If your tanks or rifles do not work, you cannot fight. You have to be able to move, shoot and communicate.

You need to be able to read and understand Department of the Army 5988Es, Equipment Status Reports, and all of the codes that correspond on them. These tools help you understand what is "officially broken" and when you can expect replacement parts to arrive. Each unit will have a different 5988E flow, so understand yours and again ask questions if you don't know. I was expected to brief the battalion commander on the status of my vehicles at any moment.

You need to have a relationship with the maintenance chief, the maintenance-control officer and especially your company maintenance team. Those relationships are more important when you become an executive officer, but talking to all these people regularly and showing them you care about their work will express to them you care for maintenance.

This whole process, at least in an ABCT, starts every Monday with thorough preventative maintenance checks and services (PMCS), and it will continues every day of the week. You have to ensure that your platoon is conducting PMCS by the technical manual (TM) with platoon leadership supervising – and preferably maintenance personnel are included as well. I would ensure that the crew had the TM open on the front slope of the tank and knew how to read it.

As a tank-platoon leader, I found out that it should take almost the whole day to PMCS a tank and some of the other larger tracked vehicles. When a crew is done by noon, you know you need to spot-check their 5988E.

Many young Soldiers truly just do not know what right looks like, hence the need for leadership at all levels from the lowest echelon to battalion must be present for maintenance. As a platoon leader or executive officer, you will have so many other tasks and spot-checks that sometimes you cannot get inside your tank during PMCS, but you have to understand the process and what correct looks like. Officers need to have a strong, competent NCO on their vehicle who can ensure tasks are completed to standard in the absence of officer supervision.

NCOs: the backbone

The most important relationship you will have is with your platoon sergeant. Your platoon sergeant will run the daily operations of the platoon, especially when you get called away to attend meetings, leader professional development, operations-order briefs or any other random "officer task." He/she makes sure everyone is where they need to be, whether that is at appointments, on their vehicle for maintenance, or in training.

You and your platoon sergeant must be on the same page. You should have all your disagreements behind closed doors, hash out the problems and return to your platoon confident and with a plan together. With that in mind, you should always run your "great ideas" by your platoon sergeant first because you will soon realize that many of them aren't really that great.

Another best practice is to regularly engage NCOs outside your normal channels (from other platoons or companies). This will allow you to gain awareness across the formation as well as provide a wider base of experience from which to glean information.

By doctrine, the first sergeant is the senior trainer in the company and is typically the most experienced NCO in the company. Make a point to interact with the first sergeant often – he/she can provide sound advice based on personal experience and can give you a better perspective based on his/her unique vantage point observing leadership's interactions at all levels within the battalion.

My initial first sergeant was a dual tank and Stryker Mobile Gun System master gunner. I used his experience and expertise to help develop my own technical knowledge. This in turn allowed me to be a better leader and allowed me to better educate and empower the Soldiers in my platoon.

Do not discount your NCOs; they have much more experience than you and can be a force multiplier.

Property – what a headache

Property is a beast to understand, and once you think you understand it, you will find out something else you did not know.

All documents pertaining to things you are signed for and will sub-hand-receipt to someone should be kept consolidated in a hard-copy property book. There is also the digital

Figure 2. Red Platoon conducts recovery operations since the platoon leader's tank threw a track. *(U.S. Army photo by 1LT Justin Leugers)*

property book that's in Global Combat Support System-Army (GCSS-A). Your property book could range from a few pages and a thousand dollars to tens of pages and upward of $20 million in value. Failure to closely manage your property could result in catastrophic consequences and financial liability.

One thing I learned early is not to sign for something or sub-hand-receipt it to someone else unless you have a complete understanding of what the item is. You need to understand what the components of *end item*, *basic issued items* and *additional authorized items* are, as well as the items on those lists. If you do not understand what an item is, then leverage the resources the Army provides you to gain a better understanding.

Your supply sergeant should be your first touchpoint for all property needs. Supply personnel should understand, at the absolute minimum, the basics

of GCSS-A; property books; ordering shortages; the difference among expendable, durable and nonexpendable shortages; and the lateral-transfer process. If your supply sergeant cannot answer your questions, talk to your S-4 officer in charge and the S-4 NCO in charge, or check in with the property-book officer. These are the available property resources within a brigade and should remedy all but the most catastrophic property situations.

As stated earlier, new lieutenants often don't yet know what they don't know. That's the point of this article – to help them learn from the experience of one who has walked the path they are now on.

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ACRONYM QUICK-SCAN

ABCT – armored brigade combat team
GCSS-A – Global Combat Support System-Army
NCO – noncommissioned officer
PMCS – preventative maintenance checks and services
PT – physical training
TM – technical manual

Armored Fighting Vehicles of the World

BMPT-72 "Terminator" 2

(Initial production BMPT)

Russian tank-support fighting vehicle, unofficially called "Terminator" by the manufacturer. The BMPT-72 is an upgrade of the very similar BMPT Terminator, entering Russian service in 2018. Both are based on existing T-72 chassis, with the BMPT-2 being a T-72 retrofit package. Five-man crew, weight 48 tons. Weapons include two 30mm autocannons, 7.62 mm coaxial main gun, four anti-tank guided missle launchers and two grenade launchers. It has advanced hunter-killer capabilities against ground and aerial targets. In service with Russian ground forces, Algeria and Kazakhstan.

Improving Low Back Health in Soldiers via Leadership-Driven Cultural Change

by CPT Brooke Sorrell

The U.S. Army has come a long way since the days when ibuprofen, water and more running were the solution to all aches and pains. As our technology and medical capabilities progress, the Army continues to evolve to meet the Army Chief of Staff's No. 1 priority of Soldier readiness. This is reflected in two recent changes: the medical health-care system shifting to the Defense Health Agency, whose mission is to increase readiness and provide better health and care, and the implementation of the Army Combat Fitness Test (ACFT).

As the Army works diligently to stay at the forefront of technological and medical advancements, it is imperative that leaders at every level employ this knowledge to identify potential risks associated with training and military-occupation specialty demands. It is every leader's responsibility to exercise due diligence in risk mitigation to preserve Soldiers' health and maximize the longevity of the Army's investment in its most critical asset. Furthermore, it is incumbent on leaders to foster an environment where Soldiers feel comfortable seeking medical care without fear of reprisal or perception of weakness.

Cost of injuries

With Soldier readiness becoming a priority for our Army, musculoskeletal injuries (MSKI) have become a top focus of our military leadership. Non-combat MSKI in the military cause 25 million days of limited duty and more than 2 million clinic visits per year, costing the government more than $3.7 billion annually.[1] Non-combat MSKI account for about 60 percent of limited duty and 65 percent of non-deployable Soldiers.[2]

Low back and knee pain account for a large portion of MSKI, with low back pain (LBP) having higher disability impacts and the most work days missed. The World Health Organization estimates that 80 percent of the population worldwide will experience back pain at some point in their life, and that back pain plagues some 32.8 percent of veterans.[2] Most individuals with LBP have no specific diagnosis and are categorized as having non-specific LBP based on exclusion of specific pathologies.

Although these statistics are staggeringly high, they may not fully capture the severity of the MSKI problem due to underreporting, especially in the U.S. Army Training and Doctrine Command environment. A study completed in 2019 looked at the reporting of MSKI during initial-entry training across Forts Sill, OK; Benning, GA; and

Leonard Wood, MO. (The study was conducted five weeks before the Soldiers' graduation from advanced individual training or one-station unit training.) The study concluded that 64 percent of trainees did not report a training-related MSKI that lasted seven days or more.[3] There were seven main reasons trainees did not seek medical treatment, with the most common reasons being "I wanted to graduate on time" and "I wanted to avoid a profile."

Unit leaders should implement a command climate in which the importance of early detection and care is emphasized at all echelons. This emphasis mitigates the risk of Soldiers developing more severe injuries that may lead to a higher disability or potential of being discharged from the Army. When the commander fights to overcome the stigma that discourages trainees and Soldiers from seeking the care they need, they are prioritizing unit readiness and fulfilling their command responsibility as outlined in Army Regulation 600-20, *Army Command Policy*.

Risk mitigation

Injury prevention through risk mitigation is just as important as encouragement to seek treatment in maintaining Soldier readiness. A centerpiece of an injury-prevention strategy in the Armor community should be to identify risk factors in each vehicle platform and mitigate risk of injury by optimizing physical training, reinforcing good practices and ensuring proper equipment fit for the operator.

Most often when commanders are completing a risk assessment for training, it is easy to think of the potential acute MSKI such as a sprained ankle or twisted knee after landing improperly while jumping off the side of a tank after failing to use the proper dismounting procedures. However, leaders must also address chronic injuries such as non-specific LBP, which slowly develops over time and eventually becomes debilitating. Although chronic conditions can be harder to treat with the passage of time, controlling modifiable risk factors such as work/rest cycles and equipment fitting should be a focus.

Figure 1. 1LT Nichelle Pascoe, a physical-therapy intern from Martin Army Community Hospital at Fort Benning, GA, is instructing 1LT Tyler Smith on proper bracing and form prior to executing the deadlift, one of the six events in the ACFT. Proper bracing is imperative to activate the core and stabilize the spine for injury prevention and performance optimization. *(Photo by CPT Brooke Sorrell, Fitness Training Unit)*

A meta-analysis article written in 2016 concluded that long exposure to vehicle vibrations in simulators led to spinal musculature fatigue of the lower back stabilizers, specifically the lumbar multifidi muscles, in mounted warfighters.[4] These muscles are important for stabilizing the lumbar spine during functional activities to reduce the undue stress on the surrounding structures such as the bones, cartilage and intervertebral discs. Dysfunction of this muscle group has been strongly associated with chronic LBP. However, the warfighter can combat potential fatigue and dysfunction with targeted muscle activation through strength and endurance training. The quadraplex, one of the four for the core exercises, and the deadlift are two specific exercises that target this muscle group.

There is a reason the Army has implemented certain exercises that Soldiers should be consistently performing in physical-readiness training (PRT) programs. However, it is not enough to just perform these exercises during PRT. Soldiers must also make sure they perform them with precision to get the desired effect. This may require tactile and verbal cues to ensure proper execution of the exercises. Leveraging the expertise of athletic trainers, strength and conditioning coaches, master-fitness trainers or physical therapists can help achieve optimal training outcomes.

Recently the terms *Soldier-athlete* and *tactical-athlete* entered our military lexicon. By embracing the sports-medicine model that supports high-level athletic performance, leaders can drive a cultural shift in which Soldiers are viewed as athletes with unique physical demands. In this type of culture, Soldiers are more willing to leverage the assets provided to support their health, rather than conceal injuries out of fear of reprisal.

Predictive risk factors

MG Patrick Scully, deputy surgeon general of the U.S. Army (1998-2002),

said it best: "Injuries are not random events; they are the predictable result of a complex set of risk factors, many of which can and should be controlled." Physical inactivity, along with psychosocial difficulties, smoking, suboptimal body composition, sleep disturbances and poor self-rated health have been suggested to be risk factors for LBP, leading to increased disability.[5] Many of these are modifiable risks that can be addressed through various Army resources and interventions.

It is imperative that leaders are educated and can identify potential risks associated with certain injuries developing within their Soldiers. This ensures we provide Soldiers with the necessary help to optimize their recovery from current injuries and to be proactive in preventing future injuries.

As with any type of evidence, there are always limitations, and a larger data set will provide a better idea of the mechanism of vehicle-related MSKI. In this case, future research is needed to identify if there is a dose-response relationship between military vehicle type (i.e., Stryker, Bradley) and ride time with the development of spine musculature fatigue, as this may provide greater insight into the amount of ride exposure required to elicit spinal musculature fatigue, so that we may implement the appropriate work/rest cycles.

Takeaway

Soldier readiness in the Armor community can be improved through reducing the risk of LBP by creating a positive environment to encourage early reporting and seeking medical care. We can facilitate this cultural change as leaders by supporting injury-prevention programs. It is our duty to be educated leaders who can identify potential risks and provide risk-mitigation measures to protect our nation's young men and women, improve performance optimization and readiness, and further enhance the lethality of our force.

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Baylor University and a bachelor's of science degree in athletic training from Colorado State University-Pueblo. She is a board-certified clinical specialist in orthopedic physical therapy and a certified athletic trainer.

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[5] Ville M. Mattila, Heikki Kyröläinen, Matti Santtila, Harri Pihlajamäki, "Low back pain during military service predicts low back pain later in life," *PLOS One*, March 10, 2017, https://doi.org/10.1371/journal.pone.0173568.

Figure 2. MAJ George Clevenger, a physical therapist from Martin Army Community Hospital at Fort Benning is teaching SSG Stephen Thomas how to properly execute the quadraplex exercise to activate his lumbar multifidi and gluteal muscles prior to exercising. *(Photo by CPT Brooke Sorrell, Fitness Training Unit)*
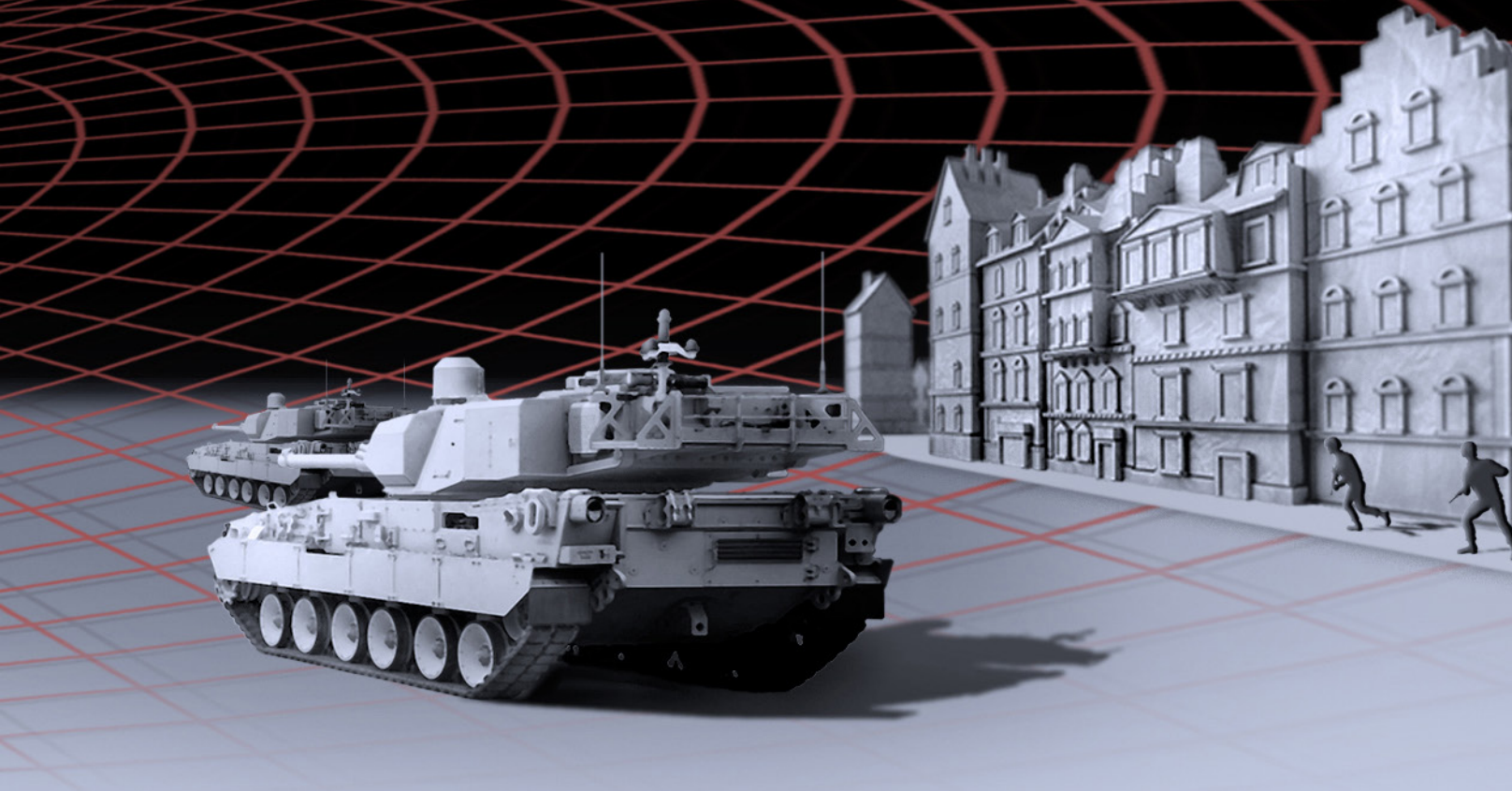
A Balanced Team: The Need for Options in Armored Warfare

by CPT Christopher M. Telle

"It's the best main battle tank in the world – if you can get it there," a 1st Infantry Division battalion commander in Kosovo once pointed out about the Abrams tank.[1]

The role of the tank is to close with and destroy the enemy through maneuver, firepower and shock effect. Its main objective is not the enemy's strength but rather its weakness (see Point A). Armored formations are unique in their ability to project armored mobile firepower through or around an enemy's front lines and into its rear echelons.

This ability continues to be the tank's exclusive domain on the battlefield, but the U.S. Army's dominance of that domain is not a foregone conclusion. Maintaining the strength of our armored formation in the face of multi-domain operations, a spectrum of threats (terrorists, insurgents, near-peers) and a complex battlefield (civilians, criminals, urban) requires innovation, agility and moving beyond a "one-size-fits-all" concept of the main battle tank (MBT). With that in mind, returning the medium tank to the Army's equipment roster is the key to filling a major capability gap and ensuring success on the future battlefield.

This article will highlight the need for that medium tank, especially when it comes to providing offensive firepower in areas that the Abrams, or its logistics tail, would have issues reaching. It defines a medium tank that can provide versatility to the force, highlights potential characteristics of the future battlefield, outlines concerns about the M1A2 Abrams on that battlefield and addresses a "medium tank" proposal that appeared in *ARMOR* last year. I will then describe what would conceptually make a medium tank, and how such a platform might be gainfully employed doctrinally and organizationally, and then conclude with recommendations on how to better assess the need and potential of a medium tank.

While current doctrine addresses the role of the tank platoon – "to close with and destroy the enemy" – it is less forthcoming with a definition of what makes a tank a tank.[2] Armor Branch frequently uses the term *mobile protected firepower*, but this definition falls short, as it can be applied to infantry fighting vehicles (IFVs) such as the Bradley Fighting Vehicle (BFV).

Though there may be some confusion in the eyes of the civilian press, the Bradley is not a tank. In a fight, especially between tanks, the side that engages first has a considerable advantage. That advantage quickly disappears if, like the Bradley, the vehicle that fires first lacks the ability to defeat the enemy's armor with a single shot.

While not authoritative, for the purpose of this article my proposed definition of a tank is "an armored, tracked, turreted combat platform that possesses a main gun capable of killing the enemy's best armored vehicles."

Future battlefield

The future battlefield is currently a hot topic in the professional community and so only a few highlights need to be addressed here. A future conflict may not feature a megacity; it will, however, certainly feature urban terrain. Proliferation of unmanned aerial systems (UASs) paired with indirect fires as in the Russian Reconnaissance Strike Complex will require significant tactical mobility – both to disperse as well as to concentrate for engagements.[3] Enemies may fight as insurgents, hiding among the population; as conventional formations mirroring our own combined-arms tactics; or, most likely, some combination thereof.

The resulting battlefield will be open and sparsely populated with combat platforms compared to previous wars, not just to the lethality of fires paired with reconnaissance, but also simply due to the smaller size of the armies involved. As of 2020, the Russians no longer had seven divisions massed at the mouth of the Fulda Gap. North Atlantic Treaty Organization armies are a fraction of the size they once were. And the vast majority of U.S. combat power remains separated from potential conflicts by the two largest oceans in the world.

The M1 Abrams tank was developed to counter a specific threat (massed Warsaw Pact armor) in a specific environment (Central Europe) in a specific manner (well-prepared defensive operations in depth). It was the result of decades of development by the Army into the concept of an MBT. The MBT approach was based on the merger of heavy and medium tanks types following World War II. The output was a "universal" tank that balanced protection, maneuverability and firepower.

Over time, obsession with increased protection has greatly increased the weight and decreased the maneuverability of the Abrams. The M1A2C

weighs more than 80 tons.[4] While the German Leopard and Israeli Merkava approach the Abrams in mass, other potential-threat MBTs such as the Russian T-14 (55 tons), T-90 (50 tons) and Chinese Type 98 (55 tons) remain considerably lighter.[5]

The fact that the Abrams went on to be successfully employed in Operation Desert Storm and the Global War on Terrorism is more a testament to American crewmembers, leaders and, most importantly, logistics than it is to inherent all-round superiority in the design of the 70-ton, fuel-intensive, defense-oriented Abrams. While its armor, fire control, weapons and optics make it rightly to be feared, lighter, more maneuverable tanks led by capable opponents will likely gain positions of advantage by going where the Abrams is not or where it cannot go. This Abrams avoidance will be aided by UAS systems, Special Operations Forces operations in the American rear and long-range rocket and missile strikes on logistics hubs – all of which will reduce the flow of fuel that all vehicles, but especially the Abrams, rely on.[6]

This brings us to the need for a medium tank to complement (not replace) the Abrams. The recent article making the case for a medium tank in ***ARMOR*** does a good job highlighting some of the limitations of the Abrams but misses the mark when it comes to a true medium tank.[7] The focus on a platform optimized for megacity warfare results in a poorly designed tank for any operations not occurring in an urban area.

For example, the requirements list for a future operating environment specifies a main gun with high-explosive ammunition – it specifically does not address the need to be able to defeat enemy armored vehicles in urban areas or elsewhere. Likewise, the requirement of 360-degree armor protection will leave the vehicle either too heavy to be properly mobile, or armored enough to resist individual-fired anti-tank weapons but not the main-gun rounds of an enemy tank.

The vehicle requirements outlined in MAJ Jeremy Zollin's article[7] ("The Case for a Medium Tank to Be Incorporated

into the Joint Force," ***ARMOR***, Spring-Summer 2019) could best be met by an American equivalent of the Russian *Boyeva Mashina Pekhoty* "Terminator" (BMP-T), an armored, tracked, turreted, infantry-support vehicle with enough mobility, protection and firepower in a platform that lends itself to future remote control or automation (see Point B).

The vehicle requested in Zollin's article is an IFV, not a medium tank. Filling the niche of medium tank with a vehicle optimized almost exclusively for urban combat would not do anything to address the limitations of the Abrams in the offense nor provide flexibility to future commanders on a multi-domain battlefield that will certainly extend beyond urban centers. Let's call this urban-support vehicle "urban mobile protected firepower" (UMPH) (Point C). Labeling the urban-support vehicle as such allows the use of the term "medium tank" where it actually belongs.

Medium tank

A true medium tank would restore to the Army the ability to conduct offensive operations against a near-peer threat in a variety of terrain and with greater logistical freedom in the face of anti-access, area-denial threats and UAS. To fill this niche, the medium tank would need to meet requirements in weight, firepower, fuel consumption and mechanical resiliency.

- **Weight.** To fill the role of medium tank, the proposed platform would obviously require a reduction in weight from the heavy Abrams. Armor would comparatively be reduced, but an active-protection system (Point D), scalable armor additions like explosive-reactive armor and a decreased-size turret (done by implementing an autoloader) would all serve to mitigate the risk to the platform and crew. The weight saved would decrease fuel consumption and allow greater mobility. Further research should identify an upper weight limit based on bridge classifications in areas such as Eastern Europe or Southeast Asia.

- **Firepower.** The medium tank should possess a main gun capable of

defeating enemy armored vehicles with a single shot, thereby ensuring it can conduct offensive operations against a full spectrum of threats. Based on current tank design, that gun needs to be at least 120mm. An anti-tank guided missile (ATGM) capability would further increase the lethality of the medium tank and provide a long-range capability to mitigate the lessened armor compared to an Abrams.

- **Fuel consumption.** For the medium tank to execute offensive operations in an open battlefield where supply lines are heavily restricted, it cannot operate with the fuel thirst of the Abrams tank. Employment of a diesel engine designed with efficiency in mind will ensure offensive tempo with a considerably reduced logistics tail. A consumption rate similar or less than that of the BFV should serve as an aim point.

- **Mechanical resiliency.** Key to this resiliency is an extreme emphasis on redundancy and reliability. We will ask much of these tanks and their crews, and cannot cripple ourselves before we get out of the gate with overcomplicated systems reliant on field-service representative support and digital troubleshooting. As an added benefit, the diesel engine would enable mechanic cross-training, compared to the turbine engine of the Abrams. Less maintenance burden means more time to train greater proficiency in crews and more combat power forward for longer.

Properly using medium tank

"The medium tank units are the primary striking force of an armored division. … The heavy tank of the armored division will normally be the best antitank weapon when the division meets hostile armor, which the medium tanks cannot easily defeat," according to Field Manual (FM) 17-33, **Tank Battalion**, 1949.[8]

While a medium tank can be valuable in all three brigade-combat-team types, the most potential for a medium tank is found in the Stryker brigade combat team (SBCT). In an armored brigade combat team (ABCT), the cavalry squadron or one or more combined-arms battalions (CABs) equipped with medium tanks could provide increased flexibility to the brigade commander. A medium tank and mechanized-infantry task force would be able to operate at longer ranges and with less of a logistics tail than our current CABs while still employing the offensive killing power of tanks. An infantry brigade combat team could benefit from an attached medium-tank battalion – much as infantry formations in World War II and Korea made great use of the independent tank battalions. These medium-tank formations would provide concentrated offensive options against a peer enemy, allowing the mobile protected firepower "light tank" platform to be dispersed in support of infantry companies and battalions.

However, the medium tank's ability to enable an SBCT's offensive maneuver may be its greatest contribution. The Stryker brigades, despite speed and large numbers of infantry dismounts, lack offensive firepower – especially in open or semi-open terrain.[9] By incorporating medium-tank battalions on a one-for-one or one-for-two basis with Stryker-equipped infantry battalions, the formation would significantly increase its agility and combat power. Medium tanks would provide the firepower and armor needed to get the Strykers and their dismounts onto an objective. This increased combat power would not tax the Stryker logistics footprint the way a CAB or multiple companies of M1A2 tanks would, thus maintaining the mobility and speed of the SBCT.

Accepting trade-offs

"We know exactly what we want. We want a fast, highly mobile, fully armored, lightweight vehicle. It must be able to swim, cross any terrain and climb 30-degree hills. It must be air-transportable. It must have a simple but powerful engine, requiring little or no maintenance. The operating range should be several hundred miles. We would also like it to be invisible," GEN Bruce C. Clarke once wrote.[10]

As GEN Clarke humorously highlighted, while we may want a true one-size-fits-all solution, the design and fielding of Army equipment is always a matter of trade-offs. In the case of the medium tank proposed here, the firepower of the Abrams is maintained while accepting some risk in protection. The potential offensive maneuver capability across multiple types of terrain this medium-weight tank brings to the Army should also be added to the scale of trade-offs we are willing to make.

Future tech can wait

This capability, as well as UMPF, does not have to wait for a radical breakthrough in technology.[11] We don't need directed-energy weapons or quantum sensors to field such a necessary component of combined-arms success. Using existing technology, pulling the lessons-learned from our allies on their design and employment of medium armored vehicles, emphasizing reliability and rapid prototyping, we could have units testing the next medium tank at our combat-training centers in relatively short order.

Even before a prototype, opportunities to test medium tanks in action as part of Army formations exist. Japanese tank battalions equipped with the Type 90 Tank (55 tons) are already integrated into National Training Center rotations, while in Europe the Polish PT-91 (50 tons) or T-80s and T-90s provide examples to integrate and research at the Joint Multinational Readiness Center and elsewhere.[12]

While the Abrams will remain a clear symbol of U.S. commitment and continue to excel as a heavyweight on the battlefield, it needs a medium counterpart to restore the offensive capability essential to the combat arm of decision. By restoring this capability, we will enable American armor to exploit the openness of the battlefield to close with and destroy the enemy where they are weakest – in their rear area.

"We have yet to find a situation in which armor, to some degree, could not be profitably employed. The tank has repeatedly exploited the situation in spite of the terrain," summarized COL Thomas D. Gillis, commander, 24th Infantry Regiment (Korean War).[13]

Point A. While a tank should be able

to defeat other tanks, its ideal prey is enemy command-and-control nodes, logistics and support elements.

Point B. Unlike the official mobile protective firepower program, the BMP-T possesses the ATGMs needed to defeat modern armor, something a 105mm gun would struggle with.

Point C. UMPF. Pronounced "oomph" as in "We're pinned down! We need some more oomph over here!"

Point D. An active-protective system built into the design from the beginning, not a heavy and bulky attachment to a legacy system.

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The Overmatch Dilemma: Leveraging Strengths of Stryker Cavalry Troop in Reconnaissance and Security Operations against an Opposing Armored Force

by CPT Andrew Chack

Stryker brigade combat teams (SBCT) preparing for a decisive-action training environment (DATE) rotation at the National Training Center (NTC) have a unique challenge in overcoming innate deficits when competing against a brigade tactical group (BTG).

Stryker brigades are fully aware of the overmatch in protection, mobility and firepower that the adversary vehicle platforms possess. The armor on an M1127 Reconnaissance Variant Stryker is comprised of a half-inch sheet metal lined with Kevlar, and its weapons platform is either an unstabilized Mk-19 40mm automatic grenade launcher or the M2 .50-caliber machinegun. On the other side, the armor on a *Boyeva Mashina Pekhoty* 3 (Russian infantry fighting vehicle)

(BMP-3) is comprised of welded aluminum alloy, and its weapons platform is a stabilized 30mm autocannon. In addition, the tracks on a BMP-3 provide greater off-terrain mobility than the wheels on a top-heavy Stryker. As a killing machine, the Stryker is outgunned in every imaginable way.

Despite the disparity in vehicle capabilities, Stryker units have one significant feature the BTG lacks. This feature is the Stryker's capability to transport and mass a substantial quantity of dismounted Soldiers rapidly over extended distances. This allows Stryker units to secure and defend complex terrain, infiltrate from unexpected avenues of approach and engage enemies undetected. Dismounted Soldiers carrying Javelin missiles and

long-range optics maneuvering in severely restricted terrain can be more dangerous than the main cannon on an M1 Abrams main battle tank.

At the Maneuver Captain's Career Course (MCCC), my instructor, a visiting major from the Australian Army, asked the class if we understood the difference between *mechanized* and *motorized*. The juxtaposition of the employment between tanks and Strykers provided clarity as I was adjusting from my experience serving in a tank company. The Abrams has the individual firepower, armor and mobility to engage other armored targets. Conversely, a Stryker engages targets through the interoperability between its dismounts and the vehicle crew. In other words, a Stryker provides

support to its dismounted personnel through transportation, command and control, and medium-caliber direct fire. The Abrams is *mechanized* while the Stryker is *motorized*.

Proper tactical employment of Stryker capabilities in reconnaissance and security operations is a complicated endeavor. Squad leaders – who are responsible for the Stryker itself, the three-man crew and the dismount team – need to master the unceasing transitions between mounted and dismounted, stealthy and forceful, and expected and unexpected enemy contact. Institutional training for the Stryker frames this as dismounting before, on or after the objective. However, this oversimplifies and misleads junior leaders on the level of detailed preparation necessary for the rapid transitions required for Stryker units to succeed in large-scale combat operations.

During the last decade and a half, a significant cadre of Army leaders has developed expertise in counterinsurgency operations (COIN). These heuristics and habits developed during COIN can prove fatal in the DATE scenario, where enemy capabilities have parity with U.S. forces and cultural engagement with the civilian populace is minimized. Only through deliberate planning and repetitive training can an organization develop new habits and refine tactics that will better serve in the next peer-to-peer war.

Build foundation, develop leaders

Typically, team-, squad- and section-level training are adequately resourced to be sufficiently challenging, realistic and developmental. At the platoon level, when the complexity of operations and the number of personnel required to be on the field increases, resourcing and coordination become increasingly challenging to sync. Therefore the quality of training fluctuates wildly. With that in mind, tactical leaders must understand that the results achieved at the culmination of collective-training events such as an NTC rotation begin at the earliest stages of the training cycle. An organization is built on the strength of its foundation.

Starting with the individual Soldier, conduct all qualifications to standard. Overburdened with last-minute garrison requirements, the prioritization of every task and an infinite amount of warrior tasks and battle drills to train from, conducting everything to standard is more complicated than stated. However, every serious organization needs to give its best effort to achieve this. Conduct rifle qualifications with pop-up targets both day and night. Implement an equipment academy to certify individuals on critical equipment like the Lightweight Laser Designator Rangefinder (LLDR), the Long-Range Advanced Scout Surveillance System (LRAS3), the Simple Key Loader, and how to extend the range of the Single Channel Ground and Airborne Radio System. Design a challenging gunnery-skills test (GST) that will develop subject-matter experts. Execute a land-navigation course. Do weekly ruck marches to condition the feet and shoulders. Certify as many combat lifesavers as possible.

At the crew, team, squad and section echelons, the focus is on improving individual tactical expertise, also known as "field craft," and on leader development. Plan realistic and challenging simulated tactical exercises (STX) and live-fire exercises (LFX) that emphasize critical thinking. Avoid scripted scenarios and allow leaders to take risks and to learn from failure. For example, design a situation where reconnaissance teams dismount from a Stryker, conduct land navigation to establish an observation post (OP), and then deploy the M240L machinegun or Javelin missile to destroy an enemy. Upon reaching the displacement criteria, the team will exfiltrate back to the vehicle and conduct a casualty evacuation. The conduct of pre-combat checks and pre-combat inspections, the route to the OP, choice of movement technique, where to establish an objective rally point, method of engagement and frequency of reporting are just some examples where leaders can take initiative and diverge from a singular, optimal solution.

To have an accurate assessment of a leader's tactical ability relative to his or her peers, the tasks, conditions and standards of the training event should

be identical. However, due to factors such as instructor quality, time constraints and resource limitations, getting every Soldier the same quality of training is not feasible. To mitigate the variations in quality, develop events through a single planner.

For example, although noncommissioned officers are the primary trainers of individual tasks and skills, designate a platoon leader to be responsible for consolidating the expertise to execute the troop-wide equipment academy mentioned earlier. Do the same for GST, team STX and team LFX. Furthermore, have multiple touch-points with your planners to provide coaching while steering the plan toward your vision. Start the platoon leaders early so they have plenty of time for revision and refinement. Rigorously adhere to the Eight-Step Training Model and the quality of training will drastically improve.

Finally, leverage talented individuals with unique experiences to further elevate the level of training provided. I was fortunate to have a Ranger-qualified troop executive officer who happened to be the officer honor graduate for his class. He helped teach, mentor and assess our dismounts and dismounted-team leaders according to the Ranger standard. My first sergeant had been an instructor at the Army Reconnaissance Course and provided quality scout training in lieu of sending every scout to the school.

Dismounted and mounted maneuver

As a motorized force, Stryker units are most effective with dismounts maneuvering along restricted terrain and vehicles providing support with the LRAS3 and crew-served weapon. Vehicle commanders must minimize the Stryker's silhouette while bounding to cover and concealment. The greatest tragedy is when a Stryker is lost with all dismounts still present in the vehicle. If the squad leader is mounted, he or she needs to be in constant communication with the dismount team, the wingman and the platoon leadership.

Furthermore, while simultaneously controlling movement, the squad leader needs to monitor all the various forms of communications according to

the primary, alternate, contingency, emergency plan. If the squad leader is dismounted, a radiotelephone operator needs to be trained, and the senior Soldier on the vehicle needs to be capable of serving as the Stryker's commander.

Maneuvering a Stryker greatly stresses the ability to command and control for any individual. Standard operating procedures (SOPs) for simultaneous mounted and dismounted maneuver must be trained, drilled and rehearsed.

Fire your mortars

Mortars are the cavalry troop's most versatile weapon system. The range of the mortars and the scout's desire to stay hidden from the enemy naturally results in employing mortars as the weapon of choice. However, training for the mortar section can be forgotten on the wayside if there is no deliberate effort to develop them.

Stay engaged with the mortar-platoon sergeant to ensure that the gunner's exam, fire-direction center exam and the Mortar Training and Evaluation Program is executed to standard. Incorporate mortars with your scouts' training as much as possible and reinforce with virtual training. The sensor-shooter-sensor routing of fire missions must be repeatedly rehearsed. The ability to destroy targets by way of scouts calling for fire while mortars are engaging and conducting survivability drills will be tested for the first time at NTC. Units that excel at employing indirect fires have a target-location error of less than 100 meters. Set a goal for the first rounds to have effects on the enemy.

Furthermore, mortars tend to be more responsive to the needs of a cavalry commander. Unless priority targets are allocated for field artillery, flash-to-splash tends to lag behind target decay.

Surveillance vs. reconnaissance

Achieving tactical proficiency for scouts is incomplete without validating the ability to collect priority information requirements (PIR). While maneuvering, cavalry leaders need to receive data quickly, process it, filter out

the signal from the noise and then accurately report to higher headquarters. This is achieved through the mastery of reconnaissance techniques, methods and management.

Training must incorporate this aspect at all echelons. For example, while certifying section leaders on the tactical task of "conduct area reconnaissance," I noticed that usually only one OP was established and oriented toward the named area of interest (NAI). The OP would then remain stationary until a scripted indicator came into view. Unsurprisingly, when the OP was established in a location where the indicator was hidden, the section, after a period of time, would report "no contact" before picking up and moving on. They misunderstood that reporting the lack of an indicator was just as important as reporting the presence of one.

I revised the tactical problem to coach the section and platoon leaders on the difference between *surveillance* and *reconnaissance*. Eventually, the leaders recognized that the OP had to observe from different locations to develop a full picture of the NAI. By keeping the OP stationary, the section leader was conducting *surveillance*. Bounding the OP to different locations or assigning a second OP to observe into dead space, they were now conducting *reconnaissance*. When cavalry leaders consciously employ reconnaissance push-pull using both mounted and dismounted methods and managed through the harmony of mixing, cueing and redundancy, reconnaissance nirvana is achieved.

Layer forms of contact

The eight forms of contact are direct fire, indirect fire, non-lethal, obstacle, chemical / biological / radiological / nuclear (CBRN), air, visual and electronic/cyber. A cavalry troop has the organic capability to apply three of the eight: direct fire, indirect fire and visual.

Direct fire is achieved through one of the many direct-fire weapon systems, including the .50-caliber machinegun, Mk-19 grenade launcher, M240 machinegun, Javelin missile and M4 carbine. Indirect fire is achieved through the 120mm mortars or the M320

grenade launcher. The cavalry troop also has optics such as the LRAS and LLDR that provide long-range visual contact.

With more planning and preparation, obstacle and air contact can also be achieved. Obstacle effects can be achieved by employing concertina wire. Air can be achieved by employing the Raven. Although the Raven is an organic capability, the level of planning and the number of approvals necessary to set up a restricted operating zone (ROZ) to fly the actual Raven render this incredibly difficult to deploy relative to everything else. The term "Hasty ROZ" is misleading because the approval process can take more than six hours, and the resulting ROZ received might not even achieve the effect you wanted.

Also, be aware that mortars are unable to fire through the ROZ.

Using all available capabilities, the cavalry troop can acquire, identify and destroy enemy targets with remarkable efficiency. First, either a mounted or dismounted platform using the LRAS3 or LLDR acquires a target. Next, a secondary platform is cued to provide visual redundancy and to assist in identification. This secondary platform can be another Stryker, a dismounted OP or a Raven. With the target identified as hostile, the mortar section relocates to engage with indirect fire. Simultaneously, a dismounted Javelin team maneuvers to engage with its weapon system as well. By continually observing the target and reporting any significant change in posture, the observers allow both the mortars and the Javelin team to maneuver within the engagement range. Once set, mortars engage with indirect fire while the Javelin team engages with direct fire.

In the preceding example, three forms of contact were applied to facilitate the destruction of the enemy: visual, indirect and direct. With added attachments, it is within the realm of possibility for the cavalry troop to apply additional forms of contact and to truly bewilder the enemy.

Delegate special capabilities to maneuvering unit

Cavalry troops receive various attachments throughout the rotation. Maneuver attachments such as tanks, Mobile Gun System (MGS) and battalion scouts directly increase combat power. Other attachments as snipers, Joint Terminal Attack Controllers, low-level voice-intercept teams, Q-50 radars and CBRN reconnaissance provide unique capabilities that can expand the breadth of the mission.

Understand that attachments are only assigned after deliberate planning and wargaming. Through the military decision-making process, a battle staff has determined that the chance of mission success is materially higher when the attachment is allocated. There may be a specific PIR that can only be collected through a specific capability.

However, the physical transfer of attachments throughout the battlefield is often fluid and chaotic. A troop commander can easily be overwhelmed and lose accountability of a unit that recently arrived. To mitigate this:

- First, establish SOP for receiving attachments. Have a checklist to ensure the integration is thorough. At a minimum, the checklist should contain call sign, frequency, number of personnel, battle rosters, equipment and sustainment concerns.
- Second, the troop command post, along with the first sergeant and troop executive officer, needs to integrate the attachments using the SOP. This has an added benefit of ensuring that Red and Yellow reports are accurate.
- Finally, delegate the maneuver and sustainment of the attachments to the platoon that will likely employ them. However, I recommend that the troop commander directs any maneuver attachments as an additional combat platoon.

Employ hunter-killer teams

Conducting zone reconnaissance against an opposing armored force without mobile anti-armor capabilities such as a tank or MGS will drastically slow the tempo of reconnaissance. Strykers by themselves do not have the firepower and protection to rapidly deploy, engage and destroy enemy armor. Making contact with enemy armor will require dismounting three kilometers away and waiting for dismounts to maneuver within direct-fire range of a camouflaged, hull-defilade enemy.

When the cavalry troop is assigned a tank or MGS platoon, the hunter-killer team is unlocked. Reconnaissance variants, or the hunters, have superior optics and low-target-signature dismount teams that allow for target acquisition at extended range. The hunters conduct target hand-off by sharing this information with the killers or the tanks. The killers are then able to initiate contact and facilitate the destruction of the enemy from a position of relative advantage. Afterward, hunters bound forward and rapidly continue forward movement.

This cycle of target acquisition, target destruction and forward progress occurs rapidly and can completely dislodge the enemy plans if a high enough tempo is achieved. Furthermore, with further repetition, the lethalness of this partnership will increase through the rotation.

Update enemy situational template

The military is shifting to fight another global power. From Day 1, build your team to fight a near-peer enemy. Use regionally aligned near-peer threats when conducting vehicle identification. Use near-peer capabilities when conducting intelligence preparation of the battlefield.

The enemy can currently engage at greater distances than we can, so determine the probable line of deployment and probable line of contact based on this knowledge. Ruthlessly enforce 500 meters of vehicle dispersion and dismount scouts to clear complex terrain.

Make contact with the smallest echelon possible. The enemy we are preparing to fight will capitalize on any tactical misstep with potentially catastrophic results.

Shaping fight

The brigade commander shapes the deep fight with four primary weapons: intelligence, surveillance and reconnaissance platforms; the cavalry squadron; the field-artillery battalion; and attack aviation. These weapons allow the infantry battalions to seize objectives.

However, they must be applied judiciously and with purpose. Every time the cannons fire, there's a possibility of receiving counterfire.

The loss of even one attack-aviation aircraft exponentially diminishes the effectiveness of airpower. This risk/reward calculation translates into the designation of high-payoff/high-value targets and the accompanying attack guidance. In other words, anything outside of the high-payoff target list will require organic capabilities to destroy.

Carry your sustainment

Two fuel cans and two water cans are the basic issue items for the Stryker. This underlying issue will sustain a full day of maneuver before going completely black. As large-scale combat operations do not support cavalry operations from a combat outpost, the cavalry troop needs to prepare to operate independently for an extended period of time. At a minimum, each Stryker should carry eight fuel cans and four water cans. The two bustle racks on the side can each hold five cans while the rear racks can hold four.

This setup allows for a minimum of three days of supply of Class III. With the cavalry troop operating at the margins of the forward-line-of-troops, unsecured and elongated supply lines are created. In addition, the enemy will continuously attempt to disrupt rear supply nodes and, when successful, the effects ripple throughout the battlefield. A daily resupply is simply not guaranteed.

Get first sergeant a vehicle

The troop first sergeant is not authorized a vehicle under the current SBCT cavalry troop modified table of organization and equipment (MTOE). If rigidly abiding by MTOE, there are two options where the first sergeant either

rides in the supply Light Medium Tactical Vehicle or the medical-evacuation vehicle (MEV) when attached from the squadron's medical platoon.

Both of these choices are less than ideal. Handcuffing the first sergeant to the supply sergeant or the medics in the MEV denies the first sergeant the flexibility to conduct battlefield circulation, logistics operations or risk mitigation. Allowing the troop's most experienced Soldier to operate independently will pay off tremendously. At NTC, draw a truck from prepositioned stock for the first sergeant.

Assign personal responsibility for equipment

Every piece of fighting equipment in the troop needs to be assigned to an individual. Avoid assigning equipment to the crew or squad. The diffusion of responsibility for the equipment will almost certainly occur.

Having a good command supply discipline program with the proper sub-hand receipt holders will help with some of this. Platoon leaders sign for platoon equipment and then sign the equipment down to the user. Weapons, CBRN equipment and sensitive communications equipment may be signed by the unit armorer, CBRN specialist and communications specialist, respectively. Individual responsibility is then assigned to the user through the master authorization list (MAL). The MAL needs to be vigorously enforced to ensure compliance and to develop a culture of ownership.

Maintenance is executed by the user, or the Soldier who is assigned the equipment based on the MAL, who performs operator-level preventative maintenance checks and services (PMCS) on the equipment. The unit armorer, CBRN specialist and the communications specialist then validate the faults discovered by the user, similar to mechanics validating vehicle faults identified by the operator. They do not conduct operator-level PMCS for equipment not assigned to them.

Developing an organizational culture where Soldiers have personal responsibility for equipment is critical in maintaining the functionality of key systems.

Conclusion

A rotation at NTC is the crucible for many organizations. Months of planning, training and execution can either validate or invalidate a commander's theories on developing a lethal, resilient and cohesive organization.

With time as a finite resource, a company or troop must focus on improving keystone habits that will eventually extend into other areas within the organization. The difficulty will always be navigating the competing priorities and planning appropriately to maximize all resources when made available.

Hopefully these lessons I've shared will help your organization focus on what's truly important in achieving tactical success at NTC.

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The Live-Fire Accuracy Screening Test: Why Close Enough Isn't Good Enough

by SFC Christopher Coughlin and WO2 Ewan Jack

The U.S. Armored Force employs the Live-Fire Accuracy Screening Test (LFAST) as a means to confirm by fire that the ballistic solution, computer-correction factors (CCF) and the gun/sight relationship established during boresighting are correct and accurate for the type of ammunition being fired for its Abrams main battle tanks. This method of confirming that the tank is firing accurately (able to strike the intended point of aim) was established in 1982 and is referred to as the fleet-calibration method.

For the Armored Force to fight and win the first battle of the next war, we must redefine the current definition of tank accuracy. Our next adversary will undoubtedly require we prove our adage of "one shot, one kill." The Reduced Range Live-Fire Accuracy Screening Test (RRLFAST) will do that.

Determining fleet CCF

Close tolerances in the design and manufacture of the fire-control system and its hardware allow most tanks to use the same ballistic information. This equates to a high probability of hitting the intended strike point when firing several different natures of ammunition.

This ballistic information was gathered by having several tanks fire seven to 10 rounds per gun tube for each nature of ammunition in service. Various other factors were also involved, including range and meteorological data, which the fire-control system considers when calculating a ballistic solution.

The average strike of the rounds is calculated in milliradians, which provides an accurate means of measuring the difference between the intended strike of the rounds and the actual impacts. These standard offsets are then input into the fire-control system as our fleet CCF.

Defining accuracy (Army)

LFAST allows master gunners, experienced tank commanders and gunners to gauge the accuracy of the fleet CCF for each nature of ammunition being fired. This information allows the ballistic computer to apply an offset to the gun to hit close to the intended aiming point.

For instance, an M1A1 Abrams firing M865 target-practice, cone-stabilized, discarding sabot-tracer ammunition at the ST-5 panel (1,500 meters) would miss the intended aiming point (circle in the center of the target) if the azimuth and elevation offsets in the CCF were not applied to the ballistic solution. This circle is 175 centimeters (1.2 mils) in diameter, painted on a large panel at 1,500 meters away from the firing tank.

The tank is considered screened when one of the first two rounds for each nature of ammunition being fired lands anywhere in the circle. If the ammunition fails this test, measurements are taken of the actual impacts and new offsets are entered and applied to the fire-control system. This is known as a discreet CCF. Once the CCF is entered, the projectile should theoretically impact near the center of the target.

Defining accuracy (Marine Corps)

The U.S. Marine Corps (USMC) incorporates a much more deliberate approach to confirming its tanks' accuracy by way of zeroing. Using the fleet CCF, they reduce the range of the target to 500 meters. (This is the same range used by the Leopard 2 main battle tank from Germany and Canada, which uses the same M256 smoothbore cannon.) Secondly, the USMC incorporates a scaled-down circle of an ST-5 panel at 1,500 meters (still 1.2 mils in diameter but reduced from 175 centimeters to 58.4 centimeters).

In addition to this, the USMC uses a smaller inner circle by which to measure and confirm accuracy. This .5-mil (24.7 centimeters) inner circle ensures that confirmatory projectiles impacting within this circle can impact a smaller target at greater ranges with a
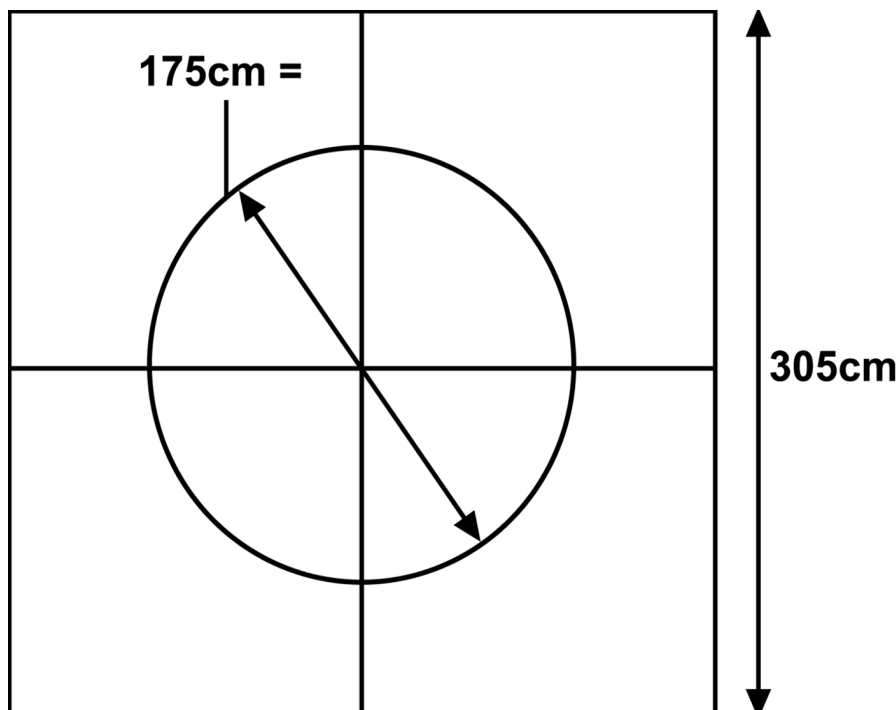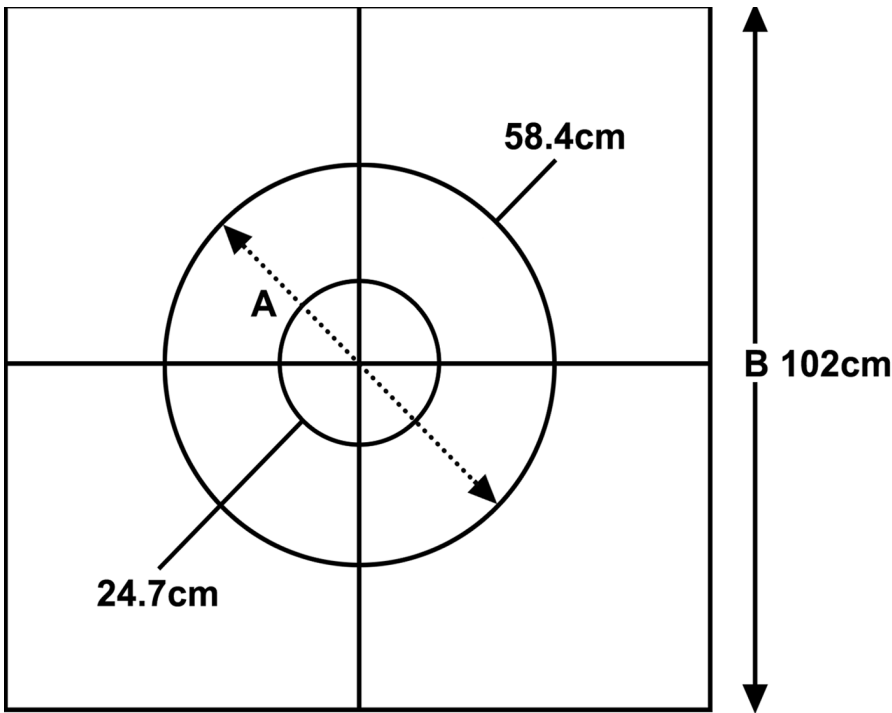

Figure 1. Current U.S. Army LFAST ST-5 panel at 1,500 meters.

175cm =

305cm

Figure 2. USMC zero panel at 500 meters.

influences prevent this from occurring. The .3-mil round-to-round dispersion tolerance would make it significantly harder for crews to impact consistently within the .5-mil inner circle when you add the possibility of a .25-mil gunner lay error. Adding the two together, a .55-mil (82 centimeters) error would hamper a crew's efforts to consistently impact within the inner circle at 1,500 meters.

In addition to this, the USMC zero allows crews to clearly define their own mean point of impact (the average point at which their projectiles are impacting in relation to the aiming point). This is significantly harder to observe at 1,500 meters, especially when the backdrop to the target is dark and there is heat shimmer obscuring the crew's ability to observe the projectile impacts.

So why don't we just adopt the USMC method and be done with it? The USMC gunnery manual states that if they are using M829A3 armor-piercing, fin-stabilized, discarding sabot-tracer (APFSDS-T) on operations that they will increase the range of their USMC zero out to 1,000 meters. This is to account for the projectile not being fully stabilized. Ammunition studies suggest that initial yaw is not fully

higher degree of accuracy.

Finally, the USMC doesn't place a restriction on ammunition usage during the zeroing process, opting for higher levels of individual tank accuracy over a one-size-fits-all solution.

Arguably, the USMC has a smaller tank fleet so this extra usage of ammunition will have significantly less cost implications to the overall budget.

Method comparison

If both the USMC zero and U.S Army LFAST were to be conducted at 1,500 meters, the outer circle size would remain the same (175 centimeters diameter). Incorporating the .5-mil inner circle of the USMC zero would create an inner circle of 75 centimeters' diameter. To put those measurements into perspective, a projectile impacting within the inner circle at 1,500 meters would allow that tank to engage a T-72 tank turret of .9 meters in height out to 1,800 meters with an exceptionally high probability of hitting the target.

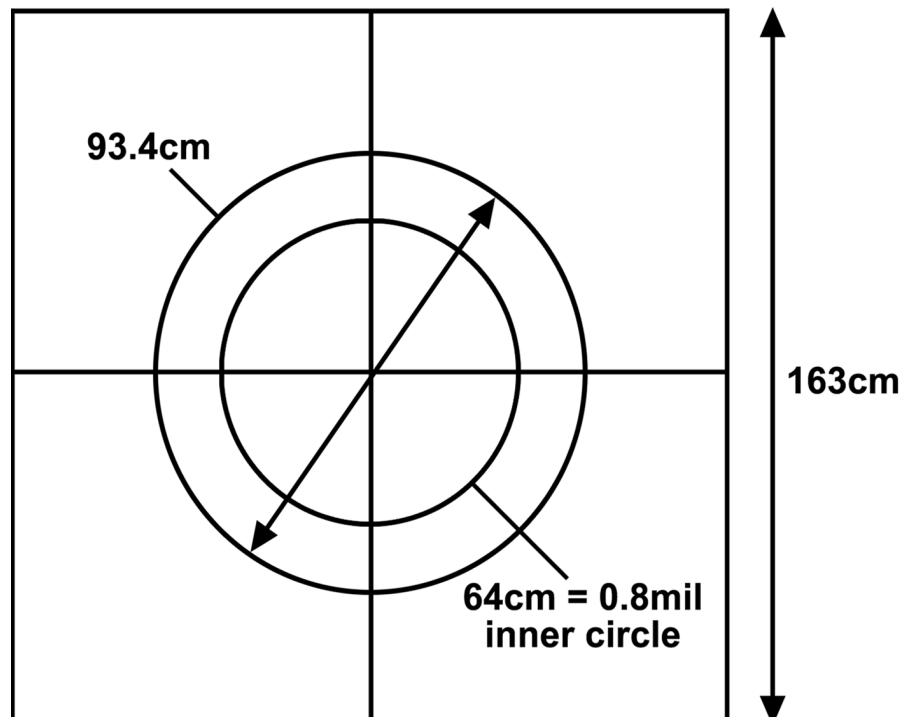So why don't we just incorporate an inner circle during the current LFAST process?

Currently, ammunition-lot acceptance has an allowable round-to-round dispersion tolerance of .3 mils. In an

ideal world, we would impact subsequent projectiles one on top of the other, replicating Robin Hood's splitting of the arrow several times over. Unfortunately, in the real world, that is not the case. Platform manufacturing irregularities, variations in manufacturing of ammunition, meteorological changes and several other

Figure 3. ST-5 panel at 800 meters.

dampened on fin-stabilized projectiles such as the M829A2 APFSDS-T until after 800 meters.

This brings us to a possible solution: the RRLFAST. The RRLFAST incorporates the strengths of the various procedures and mitigates the respective weaknesses.

Redefining accuracy

First, reducing the range of the ST-5 panel to 800 meters enhances the tank commander's and gunner's ability to identify shot impact in relation to aim point. In addition, this reduced range effectively halves the deflection that crosswind could have on the projectile in flight.

Identifying that crosswind can have a significant effect on the projectile is crucial, but also that crosswind is only calculated at the vehicle's position strengthens the reason to reduce the range. Crosswind is unaccounted for from the end of the blast envelope (three meters past the muzzle) to the target, so the further the distance a projectile must travel, the further crosswind can move it off the intended strike point.

Another weakness of the current LFAST procedure observed frequently during LFAST is the flinching of new, inexperienced gunners when firing the main gun. Arguably the most important time for accuracy is the most nerve-racking time for new gunners. To mitigate this issue, the use of manual controls has proven positive. To those who argue "you are not testing the full capability of the fire-control system," what is the purpose of armament accuracy checks? The practical application of this method during testing at Fort Stewart, GA, proved that this method was as accurate as using the powered control handles, and it significantly increased consistency for subsequent rounds fired.

Also, the Army should consider adding an .8-mil inner circle to the current ST-5 panel. The .8-mil inner circle equates to a 1.2-meter high target at 1,500 meters. This coincidentally equates to the same height as the 1.2-meter H1T armor-defilade target listed in Training Circular 25-8, *Training Ranges*. Further, projectiles

impacting within an .8-mil inner circle would replicate the ability to strike an H1T armor-defilade target at 1,500 meters with a considerably higher probability of hitting any fully exposed armor targets at greater ranges.

Figure 4. H1T armor-defilade target dimensions.

Furthermore, the use of a significantly larger inner circle (.8 mils/64 centimeters) in comparison to the Marine Corps' zero .5-mil inner circle would reduce the dispensing of discreet CCFs. This would enable company and battalion master gunners to remain within their ammunition allocation for LFAST and reduce the tendency to zero their tanks. It would also lead to ammunition cost-savings due to first-round hit increases and negate the requirement to re-engage missed targets.

Let us take a second to restate what RRLFAST is not. It is **not** a zeroing of the main gun. The requirement to pass RRLFAST will be one of the first two rounds striking within the inner circle of the ST-5 panel. The outer circle will remain on the ST-5 panel for aiming purposes to assist the gunner. Should the tank strike within the inner circle of the ST-5 panel, that nature of ammunition will be considered screened and the tank crew will continue to screen other natures of ammunition or test-fire small-arms ammunition. The 120mm ammunition harvested from first-round screening passes will then be cross-leveled to other tanks within the formation that require more screening ammunition.

Case study

Two companies from 2nd Brigade Combat Team, 3rd Infantry Division, from Fort Stewart conducted information-gathering to provide supporting evidence as to why the U.S. Armored Force should modernize and indoctrinate RRLFAST. Results from the two companies showed a significant disparity in relation to accuracy. The company that participated in RRLFAST had an average of 86 percent (71/84)
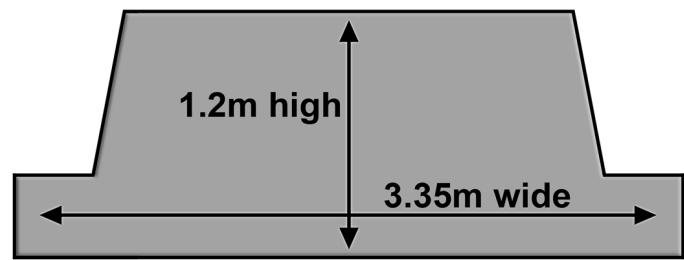
hits on the armor-defilade targets engaged during their Tables IV/V. The company that conducted the standard LFAST had a significantly lower 36 percent (33/91) hits on armor-defilade targets.

It must be noted that both companies' crews were offered a chance to engage targets once re-presented outside of timing restrictions due to acquisition issues.

The brigade master gunner noted that between the two companies, the company that completed RRLFAST had significantly more impacts central to the target, with some targets having the centers shot out. This would be directly reflected in the probability of hits and kills against fully exposed targets at greater ranges and would allow tank crews the ability to fully exploit the capabilities of the fire-control system. Alternatively, the standard LFAST company had impacts in multiple locations, with some likely to have ricocheted off the enemy's turret armor or resulting in only a mobility kill. On the modern battlefield, with such advancements in fire-control systems and ammunition capabilities, the opportunity to re-service a missed or damaged target may not be so easily afforded.

Why does this matter?

This is not a new concept to the master-gunner community. Although various adaptations of RRLFAST have been trialed in the past, research has provided no suitable metric to gauge prior success. The use of armor-defilade targets was the one thing lacking in the previous trials and the one significant issue facing the current method of LFAST. The two companies from Fort Stewart used H1T armor-defilade targets in their lead-up tables (IV/V), replacing all frontal armor targets with

the H1T armor-defilade target.

It goes without saying that "the best defense is a good offense!" In the next conflict, to fight and win, American Armored Forces will undoubtedly go on the offense against defended positions. Every T-series tank from the T-72 to the T-14 Armata has its own entrenching blade, allowing it to dig into a hull-defilade position. A target that is harder to see is naturally harder to engage. A target that has extra defenses is going to be harder to kill.

Gunners are taught to aim center of visible mass. If the visible mass is only one meter high, the 175-centimeter circle used to confirm accuracy is woefully ineffective and, most importantly, has the potential to place our tanks and crews in an unnecessary disadvantage on the battlefield.

Conclusion

The one thing that hasn't changed in many decades within the Armored Force is our LFAST procedure. Close enough is certainly not good enough, and given the current climate, operational tempo and recent events globally, tank-on-tank engagements are becoming a realistic prospect. This would suggest that we need to be as accurate as possible in training to build and reinforce the confidence of armored crews.

The Abrams has undergone significant changes and development over the years, from its inception to the latest M1A2 SEP V3 being fielded. The Infantry Branch has developed and adjusted its procedures as a result of lessons-learned – maybe it's time we do the same and implement a procedure that many Abrams master gunners have long advocated.

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ACRONYM QUICK-SCAN

APFSDS-T – armor-piercing, fin-stabilized, discarding sabot-tracer
CCF – computer-correction factors
CM – centimeter (figures)
LFAST – Live-Fire Accuracy Screening Test
RRLFAST – Reduced Range Live-Fire Accuracy Screening Test
USMC – U.S. Marine Corps
WOIT – Warrant Officer Instructor Tank (Australian army)

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:

• <u>Blog</u>: Original articles on topics relevant to junior officers. New content from junior officers is welcome.
• <u>Document database</u>: A repository of professional documents written by other junior officers and shared to help others.
• <u>CCLPDs</u>: Mobile-friendly leader professional development modules with short videos, articles and discussion questions.
• (Coming soon) <u>On-line leader challenge</u>: Put yourself in the shoes of a junior officer facing a tough dilemma with no clear right answer.
• <u>On-line forums</u>: 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:

• <u>Leader challenge</u>: Video-based leader development program with discussion.
• <u>Great-teams exercise</u>: Share and learn from others' experience on a great team.
• <u>Dogtag exercise</u>: Build a visual plot of professional experience to reveal new aspects and talents of your team members.
• <u>Third-generation leadership talk</u>: A concept that focuses on impacting leaders who have yet to come into service.
• <u>Company-level leader Interviews</u>: Share your experience with a leadership challenge.
• <u>Leader/visual metaphor exercise</u>: Identify current values reflected in the organization and discuss future development.
• <u>Leadership psychology talk</u>: 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.

Tank-Maintenance Playbook While Cross-Attached at National Training Center

by LTC Ken Selby, MAJ Patrick Howlett and CPT Daniel Krizan

Company B, 2nd Battalion, 34th Armor Regiment, 1st Armored Brigade Combat Team (ABCT), 1st Infantry Division, at Fort Riley, KS, participated in National Training Center (NTC) Rotation 20-05 with 1st Stryker Brigade Combat Team (SBCT), 2nd Infantry Division, in March 2020 with noteworthy success.

Company B maintained an 85-92 percent operational-readiness rate through deployment; reception, staging, onward movement and integration (RSOI); force-on-force (FOF); SBCT live-fire exercise (LFX); and regeneration. Despite a nonorganic higher headquarters and lack of an associated M1A2-M3A3 Class IX authorized stockage list, this consistent state of mechanical readiness required thoughtful conditions-setting during planning and preparation. Facilitating vehicle maintenance and efficient Class IX requisitioning and distribution also required meticulous coordination and conscientious leadership from multiple tactical command-and-control nodes and many headquarters across Fort Irwin, CA, and Fort Riley.

This article outlines "a way" that worked for Company B.

Planning

Setting maintenance conditions for Company B before deployment required a team effort – company through brigade. Activating the training Department of Defense Activity Address Code (DoDAAC) at NTC for Company B required coordination among the 2-34 Armor maintenance-control technician (MCT), the 1st ABCT Property Book Office and 916th Brigade Supply-Support Activity (SSA) at Fort Irwin.

Once activated, the battalion MCT rehearsed ordering a dime-washer from Fort Riley, ensuring delivery at 916th's SSA. The MCT also created signature cards for three SSAs: 11th Armored Cavalry Regiment (ACR), Army
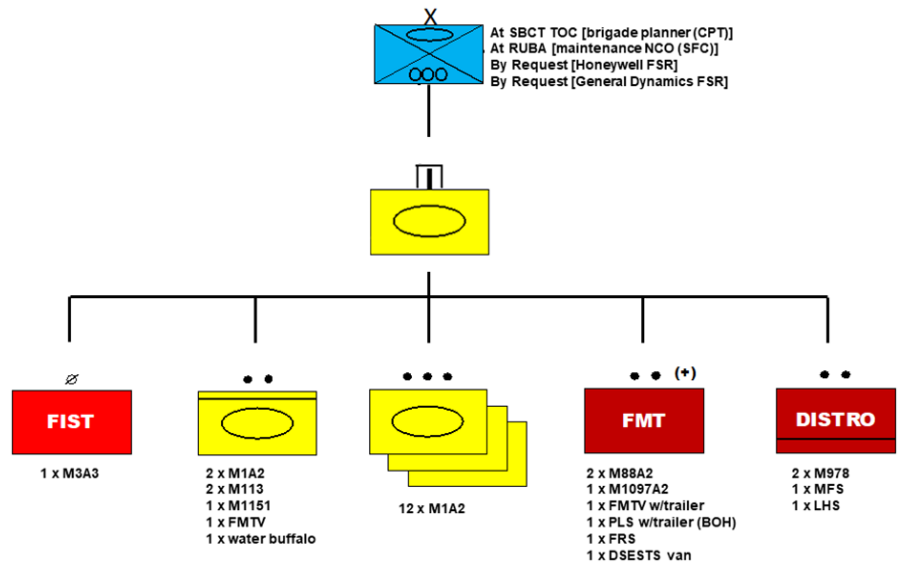

Figure 1. Task organization.

Materiel Command's Logistics Readiness Center (LRC) and 916th Brigade. This action provided access to all Fort Irwin Class IX resources while affording requisitioning flexibility.

Not surprisingly, the unit conducted a number of "walk-ups" at 11th ACR's SSA for line-replaceable units (LRU), nuclear/biological/chemical filters and V-packs (air filters for tanks) during the rotation. In coordination with 101st Brigade Support Battalion, 1st ABCT, Company B deployed a Direct Support Electrical Systems Test Set (DSESTS) that provided commensurate maintenance capability for the M1A2 SEPV2 and M3A3 Bradley Fire Support Team vehicle (11th ACR's DSESTS provides capability for M1A1 and M2A2 variant vehicles only).

More deployed sustainment capability included two M978 fuelers, one Modular Fuel System (MFS) trailer and two M88A2 tracked recovery vehicles. (See Figure 1 for complete vehicle listing). Company B also completed all tank annual services in February 2020, railed 14/14 fully-mission-capable (FMC) tanks at Fort Riley and deployed the company BOH cargo container with a full complement of shop-stock listing.

Furthermore, the Company B

commander participated in 1-2 SBCT's military decision-making process (MDMP) at Joint Base Lewis McChord, WA. The commander discussed capabilities, limitations and sustainment requirements while providing tactical employment considerations. Sustainment discussion centered on Class III bulk requirements exceeding an SBCT's conventional consumption rates, demanding unconventional logistical planning. Moreover, Class III package incompatibility such as Turbo-shaft and fire-resistant hydraulic fluid required pre-requisitioning to ensure on-hand supplies met demands.

Similarly, the unique Class IX requirements and M1A2 maintenance challenges required meticulous preparatory planning. Because of Operation Atlantic Resolve requirements, the commander could not participate in 1-2 SBCT's leader-training program at NTC.

Preparation

The 2-34 Armor deployed its S-3, MCT, maintenance-control noncommissioned officer (MCNCO), a Global Combat Support System-Army (GCSS-A) clerk, a General Dynamics field-service representative (FSR) and staff-captain liaison officer (LNO) to Fort

Irwin, overseeing both combat-power build and maintenance execution (Figure 2). Also, 2-34 Armor employed another Honeywell FSR from Twenty-nine Palms, CA, for tank-engine support as needed.
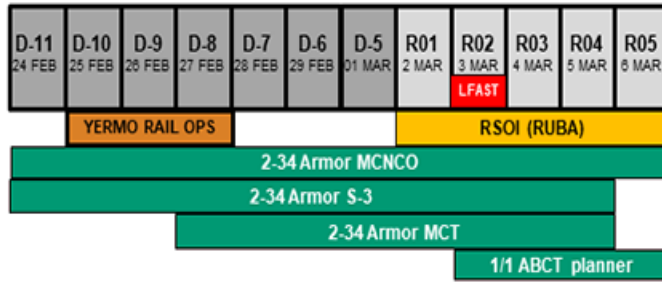

Figure 2. NTC 20-10 rotational design (updated branch).

Since attached to 1-14 Cav, the MCNCO configured his GCSS-A account to the squadron's Very Small Aperture Terminal (VSAT) to share both the equipment-status report and recoverable report. The MCNCO also coordinated with 1/2 SBCT's senior maintenance technician confirming that Company B's DoDAAC imported correctly. Of note, the MCNCO deployed with a 1st ABCT wifi "puck" (the puck is an interface to connect midi instruments wirelessly to smartphones, tablets, etc.), facilitating 24/7 visibility on both Fort Irwin and Fort Riley SSA parts availability, while monitoring Fort Riley Class IX shipments.

The MCT established points of contact with both Fort Irwin's Tank-Automotive and Armaments Command and Communications-Electronics Command for more maintenance resources. Concurrently, the S-3 coordinated with the Yermo team, ensuring efficient rail downloads and rapid onward movement of equipment to initiate RSOI and maintenance at the rotational-unit bivouac area (RUBA). The S-3 reported capability build and processing requests for information during both 1/14 Cav's and 1/2 SBCT's update briefs.

The S-3 also coordinated with the brigade S-4 and support-operations officer (SPO) on Class III consumption rates, fuel capacity, fueler placement, recovery-asset locations, logistics-status (LOGSTAT) reporting requirements and projected logistics package (LOGPAC) scheduling to avoid emergency resupply and potential backhaul. The S-3 also coordinated with sister battalion executive officers to advise on tank sustainment and recovery operations

for future cross attachments (Figure 2).

This team effort facilitated early and uninterrupted Class IX requisitioning and distribution to Company B. The cooperation allowed the Bravo commander to focus on readying his company for combat while executing the many RSOI tasks. Combined with a relentless field-maintenance team (FMT), Company B maintained 13/14 FMC during RSOI.

Execution

Once Company B deployed to the training area, the company executive officer executed a 72-hour 5988E cycle. The FMT verified faults, requested associated Class IX parts and packaged LOGSTAT via Joint Battle Command-Platform to 1-14 Cav's S-4 and 5988E reports through LOGPAC delivery to an embedded GCSS-A clerk at 1-14 Cav's unit maintenance-collection point (UMCP). The clerk validated requisitions for parts via VSAT communication to the MCNCO, who remained positioned with 916th Brigade's SSA. The MCNCO researched potential Fort Irwin or Fort Riley SSAs walk-ups.

Fort Riley SSA parts availability required coordination with 2-34 Armor's MCT for both the walk-up and overnight commercial shipment to Fort
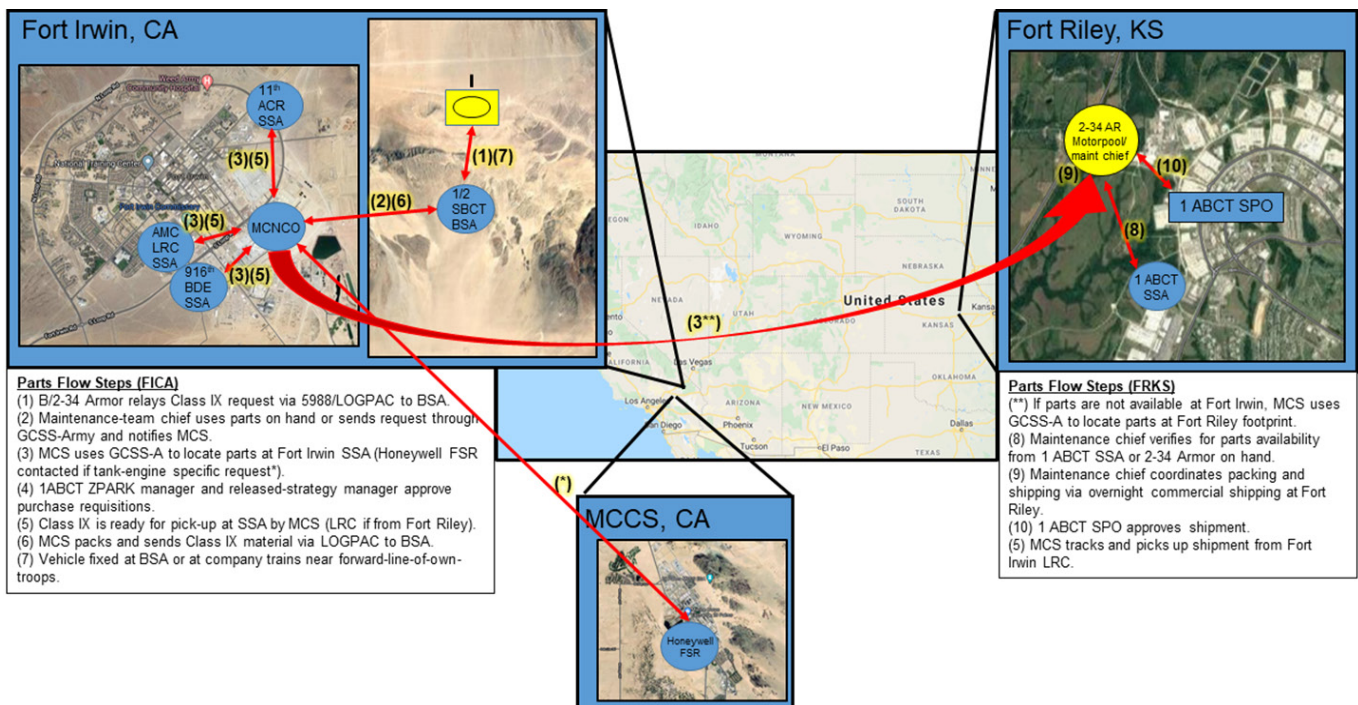

Figure 3. Parts flow at NTC.

Irwin. Concurrently, the MCNCO requested Class IX funding authorization through the 1st ABCT senior maintenance technician or SPO for procurement. Upon receipt of Class IX parts to the 916th SSA, the MCNCO validated and signed for parts while coordinating with 1-14 Cav's LNO at the 1-2 SBCT brigade-supply area (BSA) for both parts custody exchange and prioritization for distribution.

The 1-14 Cav LNO would then coordinate with 1-2 SBCT's SPO through daily logistical synchronization meetings for LOGPAC distribution to 1-14 Cav's UMCP and onward to Company B trains. Recoverable Class IX parts and updated 5988Es were then returned through the reverse-chain-of-custody procedure.

Also, the maintenance team used the 1st ABCT DSESTS trailer to repair multiple LRUs, while 11th ACR's electronic maintenance was also employed to fix two cryptographic-key-generation communications-security components (Figure 3).

The team also positioned a 1st ABCT Armor staff-captain LNO with 1-2 SBCT planners to verify current combat power while providing tank-movement rate recommendations, terrain considerations and employment options to maximize Company B's combat effectiveness. This LNO participated in all 1-2 SBCT MDMP cycles while facilitating current-operations battle tracking, answering requests for information and providing updates as required.

Assessment

Tank companies require effective maintenance to fight. Planning maintenance across time and space while setting conditions for personnel, equipment, communication and reporting is an essential prerequisite.

Establishing working relationships and procedural linkages, particularly with a non-organic higher headquarters, is paramount. Company B leveraged a team effort across echelons to prevent maintenance pitfalls and distractors that impede lethality.

Company B redeployed to Fort Riley after a 10-day FOF and four-day SBCT LFX with 13 of 14 tanks FMC. This maintenance system required relentless leadership and managerial oversight at echelon. Leaders quickly intervened to adjudicate friction points and delays to facilitate the maintenance process.

A consideration for improvement is re-instating the Commander's Exception Report to provide limited Class IX funding authorization at the point of repair, thereby reducing low-cost home-station transactions.

Though not perfect, these procedural maintenance methods worked and facilitated first-rate lethality training for both Company B and 1/2 SBCT.
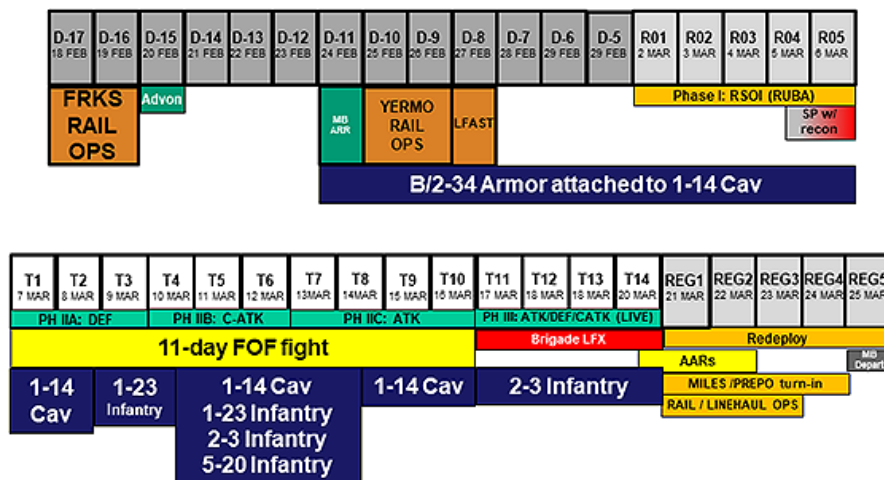

Figure 4. NTC 20-05 Rotation timeline. Notes: RSOI was five days. This timeline adjusts to include platoon LFX and troop LFX with squadron fires-coordination exercise (three days). There were transitions on Training Days 3, 6, 9, 14. There was a 14-day FOF with a four-day brigade LFX. The regeneration period was four days.

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ACRONYM QUICK-SCAN

(includes figures)

ABCT – armored brigade combat team
ACR – armored-cavalry regiment
BOH – name of a container, not an acronym
BSA – brigade-supply area
CGSC – Command and General Staff College
DoDAAC – Department of Defense Activity Address Code
DSESTS – Direct Support Electrical Systems Test Set
FICA – Fort Irwin, CA
FIST – fires-support team
FMC – fully mission capable
FMT – field-maintenance team
FMTV – Family of Medium Tactical Vehicles
FRKS – Fort Riley, KS
FRS – field-repair system
FOF – force-on-force
FSR – field-service representative
GCSS-A – Global Combat Support System-Army
LFAST – Live-Fire Accuracy Screening Test
LFX – live-fire exercise
LHS – load-handling system
LOGPAC – logistics package
LOGSTAT – logistics status
LNO – liaison officer
LRC – Logistics Readiness Center

LRU – line-replaceable unit
MCCC – Maneuver Captain's Career Course
MCCS – Marine Corps Community Services
MCNCO – maintenance-control noncommissioned officer
MCS – maintenance-control section
MCT – maintenance-control technician
MDMP – military decision-making process
MFS – Modular Fuel System
MILES – Multiple Integrated Laser-Engagement System
NCO – noncommissioned officer
NTC – National Training Center
PH – phase
PLS – palletized load system
RSOI – reception, staging, onward movement and integration
RUBA – rotational-unit bivouac area
SBCT – Stryker brigade combat team
SPO – support-operations officer
SSA – supply-support activity
TOC – tactical-operations center
UCMP – unit maintenance-collection point
USMA – U.S. Military Academy
VSAT – Very Small Aperture Terminal

The 120mm Smoothbore in the Recon Fight:
How the New Cavalry Squadron Structure is Performing at the Joint Multinational Readiness Center

by MAJ Brett T. Wright and CPT Jordan L. Woodburn

The Army's most recent addition to the cavalry squadron, the M1 Abrams, provides reconnaissance forces with a long-range, direct-fire capability. This capability enables the cavalry squadron to conduct aggressive reconnaissance, survive chance contact, protect the main body and more effectively destroy enemy reconnaissance forces.

At the Joint Multinational Readiness Center (JMRC) in Hohenfels, Germany, observers/coaches/trainers (O/C/Ts) observed firsthand how this implementation affected the cavalry squadron during decisive-action training environment rotations. These observations shaped the following recommendations in the areas of doctrine and training – specifically an update to the mission-essential task list (METL) and more emphasis on crewmember fundamentals.

Observations at JMRC

In a recent JMRC rotation, the squadron commander initially task-organized the tank company with two tank platoons and one scout platoon, consisting of the scout Bradley modified table of organization and equipment (MTOE), six Bradleys and 36 dismounts. The company then task-organized internally with one organic tank platoon and two platoons that consisted of a section of tanks and a section of Bradleys in a "hunter-killer" formation (see Figure 1). When employed, the tank company saw success destroying armored reconnaissance threats and preventing penetration of the friendly screen.

The concept, though seeming to accomplish the intent of the MTOE conversion covered in the ***Cavalry Squadron Organizational and Operational Concept***,[1] still has a few issues that need correction before the company's implementation is fully successful.

While the role of the military-occupation specialty (MOS) 19K crewmember does not change drastically among formations, the reconnaissance skillset must be fostered in the leadership of the tank platoon to unleash the tank organization's potential. At JMRC specifically, the ability to train with multinational allies and partners is unique and tests a cavalry organization's ability. Here these organizations are expected to be able to comfortably operate along, and own, the forward-line-of-troops (FLoT).

This presents new dilemmas to the 19Ks who find themselves in somewhat new territory. Now they are not only expected to master and apply careful, calculated gunnery techniques, but also to rapidly identify enemy and friendly vehicles, conduct adjacent-unit coordination more frequently and potentially conduct reconnaissance for follow-on forces.

As a member of the cavalry squadron, the tank company is now assigned the task to confirm or deny priority intelligence requirements (PIR). These PIR usually involve identifying the composition and disposition of enemy forces to allow commanders at echelon to make effective and timely decisions. With this in mind, the role of the tank company becomes not only to destroy enemy reconnaissance forces but also to conduct specific reconnaissance tasks.

When task-organized, a tank-platoon leader or platoon will find himself/itself leading cavalry scouts and being assigned reconnaissance and security (R&S) missions. Unless that leader has attended the Army Reconnaissance Course (ARC) or has had some informal training in reconnaissance tasks, he isn't properly prepared to conduct unique reconnaissance tasks. These observations point to a more important issue that currently resides in the tank company of the cavalry squadron: the lack of distinction in the METL between it and the tank company in the combined-arms battalion (CAB).

Reasons for change

After analyzing the composition of the enemy division tactical group (DTG), brigade tactical group (BTG) and advance-guard reconnaissance forces of the opposition forces (OPFOR) threat-model template, and comparing these to that of the traditional cavalry
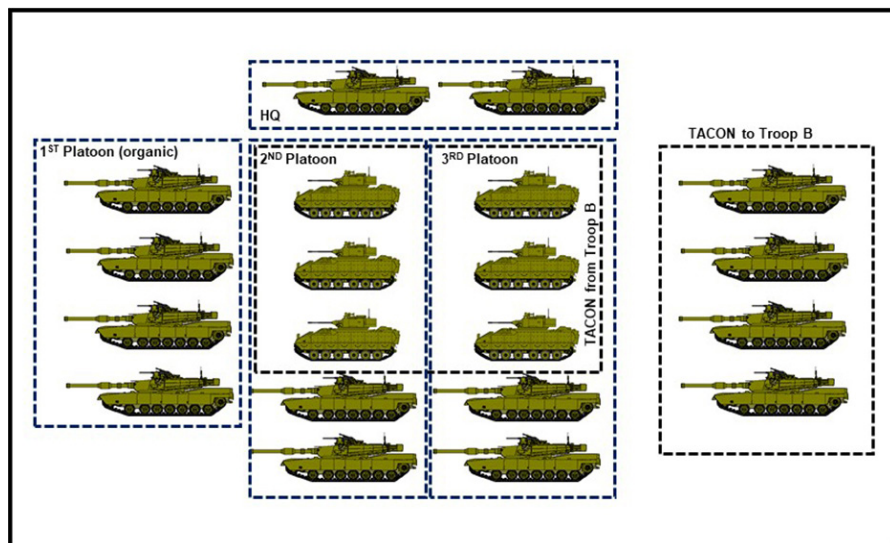

Figure 1. Commonly observed tank-company task organization in the cavalry squadron. The working relationships among these formations must begin early. *(Graphic by CPT Jordan Woodburn)*

squadron, the need for an asset that provides more mobile firepower is apparent. The advance guard often consists of more than 30 *Boyeva Mashina Pekhoty* 2 (BMPs) and 10 T-72 tanks, which highlights the gap in combat power that exists between it and the cavalry squadron without the M1 Abrams.

To assess where the enemy main body will attack, the cavalry squadron must be prepared to identify, and potentially attrit, elements of the advance guard. With the addition of the tank company, it is more feasible for the cavalry-squadron commander to mobilize firepower to degrade the enemy armor threat to the endstate directed in the commander's security guidance. This gives the cavalry squadron a greater capacity to destroy enemy reconnaissance assets, which is frequently a secondary key task for cavalry squadrons at JMRC.

When employed in depth and with appropriate target handovers, the Abrams is very effective at destroying most types of enemy armor. Armed

with more survivability and firepower at its fingertips, the cavalry squadron is then better suited to answer questions and develop the situation for higher headquarters as the formation fights for information.

At JMRC, units that conducted force-on-force operations with this MTOE had a higher destruction rate of OPFOR vehicles as they attempted to penetrate the rotational-unit screen. In fact, the task-organized tank company destroyed four tracked OPFOR vehicles for every one friendly tracked vehicle lost during direct-fire engagements. This enabled the cavalry squadron to provide more reaction time and maneuver space to the brigade, which enabled effective decision-making.

The tanks were used most effectively by placing dismounts forward and using the tanks in depth, where they would receive targets to facilitate the destruction of identified enemy vehicles. Also, when elements at the FLoT identified a significant armored threat, the commander had the option to rapidly reposition the mobile firepower of

the Abrams and defend against it.

Opportunities for improvement

We saw a few areas where tank companies in cavalry squadrons can improve: armed-forces vehicle identification (AFVID), adjacent-unit coordination and vehicle camouflage.

The first trend is not unique to this specific formation but to tank companies in general. **AFVID** is part of the gunnery-skills test, and it requires tank crewmembers to correctly identify enemy and friendly vehicles. Most units only train this skill during the weeks before a gunnery density. This amount of training for a skill that is not only crucial but perishable is insufficient for tankers in the cavalry squadron and across the Army.

To correct this problem, commanders need to emphasize AFVID and use available whitespace to conduct more training. This training requires little resourcing and can take place in small or large time blocks.
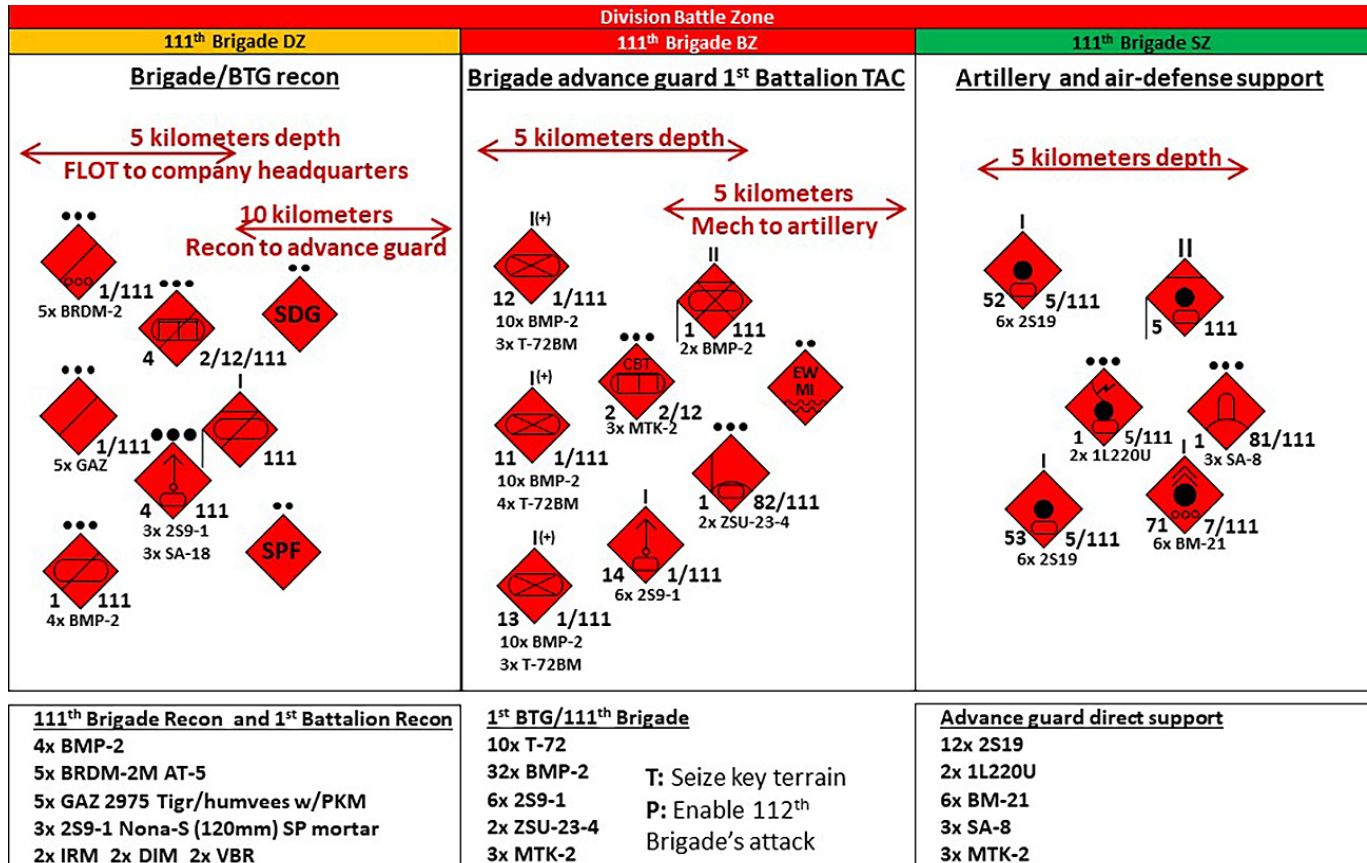
In addition to implementing more

Figure 2. JMRC threat template for 111th Brigade reconnaissance and the advance-guard battalion. *(Source: JMRC S-2)*

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Figure 3. An M1A2 Abrams tank assigned to 1st Battalion, 8th Cavalry Regiment, 2nd ABCT, 1st Cavalry Division, secures its fighting position during training exercise Combined Resolve XIII at JMRC in Hohenfels, Germany, Jan. 29, 2020. *(U.S. Army National Guard photo by SSG Gregory Stevens)*

frequent vehicle-identification baseline training, commanders can direct that instructor/operators of the Advanced Gunnery Training Simulator implement shoot/don't shoot scenarios into the simulation and as part of Gunnery Table II. These scenarios help refine tank commanders' and gunners' abilities to identify friendly vehicles. In environments such as JMRC, where the enemy and friendly forces may share common vehicle types and variants, this skill is indispensable to the tanker in the cavalry squadron.

The misidentification of vehicles can have additional, compounding consequences for the cavalry squadron. Specific vehicle types and amounts define and represent different enemy parent organizations, which may drive certain decision points for adjacent battalions and the brigade in which the cavalry squadron works.

For example, the misidentification of a BMP or lightly tracked vehicle as a tank may lead the observer and commanders to believe they are observing the advance guard when in reality, it may be lead elements of the enemy BTG reconnaissance.

Adjacent-unit coordination is another area in which the tank company must improve. Frequently, elements of the tank company encounter friendly forces operating within its area of operations (AO). Without proper far and near signaling methods, this can trigger confusion and friendly-fire incidents.

Commanders develop standing operating procedures (SOPs) that define how the unit communicates with an unconfirmed force, and then they rehearse the SOP. In addition, commanders should know, and clearly brief to the lowest level, where adjacent units are located, who is responsible for coordination with them and what the link-up method will be.

This is established and synchronized at the company level and can be discussed among company commanders at events such as the brigade or squadron combined-arms rehearsal. Coordination with adjacent units should be continuous and annotated on the company's common operating picture, an important resource for every member of the reconnaissance squadron.

A well-defined day and night vehicle-marking SOP that is properly disseminated to allies and partners in the formation facilitates effective close-range identification and coordination.

Vehicle camouflage is important when operating in heavily forested areas such as the European theater of operations. Effective camouflage provides friendly vehicles enhanced survivability and affords the element of surprise.

Scouts who emplace their vehicles into hide positions should train to

Figure 4. An M1A2 tank as seen by a 1ˢᵗ Battalion, 4ᵗʰ Infantry Regiment, quadcopter. *(U.S. Army photo by CPT Adam Wojciechowski)*

become masters of this craft and know how to do it in a timely manner in differing terrain. Tank companies can train this specific task using vehicle-camouflage classes, preparing camouflage nets for quick employment and developing SOPs for using foliage. Combined training with engineer assets within the brigade during field exercises builds familiarity with dig assets, dig time available and how to prepare friendly positions in time-constrained environments.

Lastly, to minimize the OPFOR's ability to compromise essential command and support platforms, company trains' personnel should also train in these tasks. This is magnified at JMRC, where the OPFOR has a robust aerial reconnaissance and special-purpose-forces capability.

METL

While the tank company is a recent addition to the cavalry squadron, the Army is now multiple years into the transition. However, the Headquarters Department of the Army-directed METL for the company remains the same as a tank company in a CAB. This forces units to either deliberately ignore their METL and focus on tasks associated with missions they are prone to execute, or to train and maintain a proficiency in tasks that are likely to be unrelated to their mission.

This is not a decision that needs to

rest with company and squadron commanders. Operational requirements currently send armored brigade combat teams (ABCTs) to Europe, Korea and Kuwait, with each deployment preceded by rotations to a combat-training center (CTC). This provides plenty of feedback on ways to make updates. Until the METL is more aligned with mission requirements, the companies will continue to be forced to conform, never fully reaching their full potential.

The employment of the tank company in the cavalry squadron is different depending on the unit, varying from performing duties as the brigade reserve to habitually task-organized hunter-killer teams with their sister reconnaissance troops.

As a unit directly assigned to the brigade's reconnaissance organization, the cavalry squadron, the tank company is now undoubtedly a reconnaissance asset. To designate it as the brigade reserve is in direct violation of the fundamentals of reconnaissance, which states not to keep reconnaissance assets in reserve. As such, using the task to perform duties as the brigade reserve to preserve an antiquated METL is not valid.

Task-organization in hunter-killer teams pushes more lethality down, potentially to the platoon-level, but it is not a ready-made solution. All attempts to task-organize across the

squadron present the problem of having a limited number of MOS 91As (M1 Abrams systems maintainers) to go around. Task-organizing one tank platoon to each of the reconnaissance troops is a solution, but it marginalizes the command team's impact within the tank company, as well as possibly sidelining the subject-matter experts on the platform. Any other combination of tank and reconnaissance platoons requires deliberate decision-making on the purpose and composition of each troop.

The company can bridge the gap between what the cavalry squadron traditionally is comfortable engaging and having to conduct a battle handover (BHO) with a CAB. Its ability to strong-point likely avenues of approach or vulnerable areas in the screen can greatly expand the squadron's capability. By training on the same reconnaissance tasks as the scouts, the tank company can perform these missions and task-organize as needed when the mission requires.

From observations at JMRC, recommended changes to the tank company METL (specific to only the tank company in the cavalry squadron) are to add the tasks "conduct an area reconnaissance" (17-TRP-4011) and "conduct a screen" (17-TRP-9225). These tasks would replace "conduct an area defense" (17-CO-1030) and "conduct an attack" (17-CO-1094).

Justification for METL changes

O/C/Ts assigned to the JMRC Grizzly Team (reconnaissance and cavalry trainers) point to one major key to success during screening operations for the cavalry squadron: engagement-area development (EA DEV). During the screen, reconnaissance forces must conduct EA DEV to be successful in identifying likely avenues of approach, emplacing key weapon systems, and identifying and mitigating deadspace.

For this reason, the tank company in the cavalry squadron (with the recommended METL changes in Table 1), while not deliberately training the area defense, will still be proficient in the fundamentals associated with it. Thus 19Ks in the cavalry squadron will

Current tank-company METL
Conduct area security (07-CO-1272)
Conduct an area defense (17-CO-1030)
Conduct a movement-to-contact (17-CO-1074)
Conduct an attack (17-CO-1094)
Conduct expeditionary deployment operations in support of the offense, defense, stability and defense support of civil authorities (DSCA) (55-CO-4830)
Proposed tank-company METL (cavalry squadron)
Conduct area security (07-CO-1272)
Conduct a screen (17-TRP-9225)
Conduct a movement-to-contact (17-CO-1074)
Conduct area reconnaissance (17-TRP-4011)
Conduct expeditionary deployment operations in support of the offense, defense, stability and defense support of civil authorities (DSCA) (55-CO-4830)

Table 1. Proposed changes to the tank company (cavalry squadron) METL.

still receive training in these areas, since performing tasks such as the sector sketch and developing a plan for movement to alternate, subsequent and supplementary positions are necessary in both of the overarching tasks.

While the tank company may be task-organized and separated throughout the cavalry squadron, and therefore the FLoT, all efforts must be made to prioritize the identification of gaps in the screen and enemy forces attempting to penetrate. The major difference between the screen and the area defense is setting conditions for the reconnaissance handover (RHO) or BHO and the fact that, at some point, the screen will transition into the next phase of the operation. This involves a more specific emphasis on reconnaissance-specific tasks such as RHO/BHO rehearsals, forward- or rearward-passage-of-lines supporting graphics, reconnaissance and security.

The tank company must be proficient in all these to best serve the needs of its "reconnaissance customer." The mechanisms associated with "conduct an area defense" are important for tankers to be proficient in, but the task itself is more suited to a formation that is supported by reconnaissance elements forward. It does not account for elements that are critical to the

scout, such as R&S guidance, which defines when elements of the cavalry squadron are permitted to engage enemy forces, displace to a subsequent position or disengage an enemy force while maintaining contact.

Also, the 19K in the cavalry squadron must understand that, as a member of the cavalry squadron, his/her actions directly define the fight for the rest of the brigade (such as through the use of a targeted area of interest to illicit a certain enemy response). For this reason, tank-company personnel in the cavalry squadron must understand PIR and how they relate to decision points for commanders at all levels.

The emphasis on the intelligence-collection aspect in the "conduct a screen" Training and Evaluation Outline (T&EO) more accurately defines what this unique formation should be training. Moreover, the "conduct an area defense" T&EO focuses very heavily on the construction of deliberate obstacles to define enemy actions in the engagement area. This is something that rarely applies to the tank company in the cavalry squadron due to limited time available before first contact and the fact that brigade engineer battalion vehicles seldom are committed as far forward as the FLoT.

Regardless if the tank company is

filling gaps in the screen or serving as the brigade reserve, the actual use of the "conduct an area defense" T&EO is limited and does not place emphasis on the incorporation of R&S fundamentals.

While the recommended replacement of "conduct an attack" T&EO with the "conduct an area reconnaissance" T&EO is not as cut and dried, it is still relatively axiomatic. The tank company, while not designed to conduct reconnaissance tasks such slope and bridge classification, is more than capable of providing information to follow-on forces.

For example, during movement toward the screen, the tank company is suited to identify recommended battle positions for follow-on maneuver battalions, position areas for artillery and route trafficability (to name just a few). The nature of the platform and lack of dismounts lead to these tasks being conducted hastily and with only the information collected from the hatch or through optics, but they still place emphasis on the collection and dissemination of information.

Currently the 19Ks in the cavalry squadron may struggle to understand the "tempo" of the reconnaissance mission assigned because nothing in their training curriculum requires

Figure 5. A tank returns fire on enemy forces. *(U.S. Army photo by SGT Megan Zander)*

them to practice it. Without a basic understanding of tempo and how it defines and dictates their movement, the tank company may not be within the commander's intent as it enters the screen. Incorporating an abbreviated area reconnaissance task assists the tank company in using the fundamentals of reconnaissance and prepares it to serve as another sensor for the cavalry squadron.

By retaining the "conduct a movement-to-contact" T&EO, the tank company is prepared to rapidly reposition to meet a significant armored threat. This enables the tank company to continue to train offensive tasks but to also focus on the cavalry squadron's information-collection responsibility.

Conclusion

The tank company's integration into the cavalry squadron enables the squadron to fight for information more effectively against armored enemy-reconnaissance assets. The ability for the commander to quickly maneuver firepower to different areas of the AO enables PIR collection and allows the squadron to accomplish a commonplace key task: destroying elements of the DTG and BTG reconnaissance forces.

To facilitate appropriate training guidance, the METL of this specific formation should reflect what the company is actually asked to do in the cavalry squadron. This includes the tasks of conducting a screen and conducting an area reconnaissance.

Lastly, commanders of these formations should focus on specific cavalry tasks to be successful at any CTC and during combat operations. These tasks include vehicle identification, adjacent-unit coordination and vehicle camouflage, all of which will continue to make the implementation of the 120mm smoothbore into the reconnaissance squadron a success.

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Notes

[1] Department of the Army, ***The Universal Brigade Combat Team Cavalry Squadron Organizational and Operational Concept, Vol. 1, Cavalry Squadron***, Fort Benning, GA: U.S. Army Maneuver Center of Excellence, Feb. 29, 2016.

ACRONYM QUICK-SCAN

ABCT – armored brigade combat team
AFVID – armed-forces vehicle identification
AO – area of operations
ARC – Army Reconnaissance Course
BHO – battle handover
BMP – *Boyeva Mashina Pekhoty* (Russian fighting vehicle)
BRDM -- *Boyevaya Razvedyvatelnaya Dozornaya Mashina*
BTG – brigade tactical group
BZ – battle zone (Figure 2)
CAB – combined-arms battalion
CLC – Cavalry Leader's Course
CTC – combat-training center
DIM – does not translate but represents a Russian mine-detecting reconnaissance vehicle (Figure 2)
DTG – division tactical group

DZ – disruption zone (Figure 2)
EA DEV – engagement-area development
EW – electronic warfare
FLoT – forward-line-of-troops
GAZ – *Gorkovsky Avtomobilny Zavod* – a Russian vehicle manufacturer that produces their equivalent of the humvee (Figure 2)
IRM – *Inzhenernaya Razvedyvatel'naya Mashina* – Russian engineer reconnaissance vehicle (Figure 2)
JMRC – Joint Multinational Readiness Center
MCCC – Maneuver Captain's Career Course
METL – mission-essential task list
MI – military intelligence
MOS – military-occupation specialty
MTOE – modified table of organization and equipment
O/C/T – observer/coach/trainer

OPFOR – opposition forces
PIR – priority intelligence requirement
PKM – acronym does not translate but is close to "Kalashnikov machinegun modernized" and represents the Russian equivalent of the M240B machine gun (Figure 2)
RHO – reconnaissance handover
SDG – scout division group (Figure 2)
SOP – standing operating procedure
SP – self-propelled (mortar)
SPF – special-purpose forces (Figure 2)
SZ – support zone (Figure 2)
T&EO – Training and Evaluation Outline
TAC – tactical control
TACON – tactical control
VBR – *vehicle blinde a roues* – armored reconnaissance vehicle (Figure 2)

Honoring our Armor and Cavalry Medal of Honor Heroes

Derived from Center of Military History information provided at https://history.army.mil/html/moh/civwaral.html. Listed alphabetically. Note: Asterisk in the citation indicates the award was given posthumously.

DAVIS, JOHN PVT
Unit: Company F, 17th Indiana Mounted Infantry. Place and date of action: Culloden, GA, April 1865. Entered service: Indianapolis, IN. Born: Carroll, KY. Date of issue: June 17, 1865. Citation: Capture of flag of Worrill Grays (CSA).

DI CESNOLA, LOUIS P. COL
Unit: 4th New York Cavalry. Place and date of action: Aldie, VA, June 17, 1863. Entered service: New York, NY. Born: June 29, 1832, Rivarola, Piedmont, Italy. Citation: Was present, in arrest, when, seeing his regiment fall back, he rallied his men, accompanied them without arms in a second charge, and in recognition of his gallantry was released from arrest. He continued in the action at the head of his regiment until he was desperately wounded and taken prisoner.

DODDS, EDWARD E. SGT
Unit: Company C, 21st New York Cavalry. Place and date of action: Ashbys Gap, VA, July 19, 1864. Entered service: Rochester, NY. Born: Canada. Date of issue: June 11, 1896. Citation: At great personal risk rescued his wounded captain and carried him from the field to a place of safety.

Infantry Brigade Combat Team Scout Platoon Anti-Armor Engagements at the Joint Readiness Training Center

by CPT Christopher R. Brown

Often operating forward of the brigade's main body, scout platoons may come into contact with enemy armored vehicles. In a security mission, platoons must provide counter-reconnaissance, or "the act of destroying or repelling enemy reconnaissance to prevent enemy observation of the protected force."[1] The platoon may also encounter armored forces that meet their engagement criteria, which specifies when and how friendly forces initiate engagement with an enemy force.[2]

At the Joint Readiness Training Center (JRTC), scout platoons often receive screen missions during the infantry brigade combat team's (IBCT) defense portion of the exercise. Before departing the intermediate staging base, scout-platoon and cavalry-troop leadership are confident in their Soldiers' ability to use anti-armor weapons (hereafter referred to as AT for brevity) – specifically the tube-launched, optically tracked, wireless-guided (TOW) missiles, Javelin and AT-4 – to destroy enemy armored vehicles. As observers/coaches/trainers (O/C/Ts), however, we consistently see units struggle with AT engagements; at the troop-and-below level, units are ill prepared to properly plan for and execute effective engagements against enemy armor. Because scout platoons in a screen can expect to observe and engage armored targets with their organic direct-fire weapons, this ineffectiveness reduces the protected force's ability to react to the enemy's course of action.

Based on O/C/T observations over three IBCT training rotations, cavalry-squadron AT engagements are generally less effective than what gunners and leaders expect. These engagements are ineffective primarily due to engaging at very short ranges, lack of effective engagement-area (EA) development and a lack of operator mastery of AT systems. Failure to remedy these issue will have major repercussions in the country's next major conflict.

Observations

We collected data concerning the IBCT cavalry squadron's use of organic AT weapons during three JRTC rotations. When Soldiers fired these systems, the unit's assigned O/C/T reported the type of weapon fired and the damage to the target. (Note that this data does not take into account instances in which a Soldier attempted to engage a target but operator error resulted in failure to fire.) If the projectile (or Multiple Integrated Laser Engagement System laser) struck the intended target, the O/C/T reported this as a hit, regardless of the adjudicated level of damage.

The data show that, of the 27 AT engagements observed, only about 19 percent were effective (defined as a registered hit), averaged across all AT systems. Although the data may appear to show that, as a raw percentage, Javelin engagements are more effective than TOW engagements, there is not enough data to demonstrate a statistically significant difference in effectiveness among the three systems (via chi-squared proportion test,). Therefore, we cannot definitively conclude that scouts are better at the employment of one system than any other, but effectiveness is generally low.

We attribute low effectiveness rates to a lack of understanding of engagement distances and insufficient detail in planning for employment of the systems. (Note: Although on the modified table of organization and equipment (MTOE), no cavalry squadrons brought M3 Carl Gustaf systems to JRTC during the data-collection period, so that system is excluded from this analysis.)

Engagement distances

To protect the firer from the blast and debris created when the projectile detonates on contact with a target, the projectiles of these systems must travel a certain distance before the projectile is armed. In most ineffective engagements, Soldiers tried to engage targets short of the system's arming distance.

In one case, we witnessed a gunner fire his humvee's mounted TOW-2B system from his position in the treeline toward an armored column
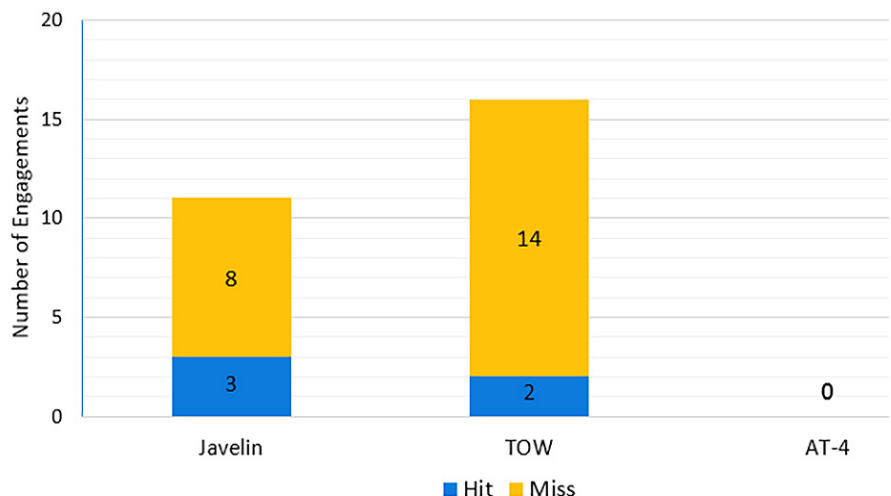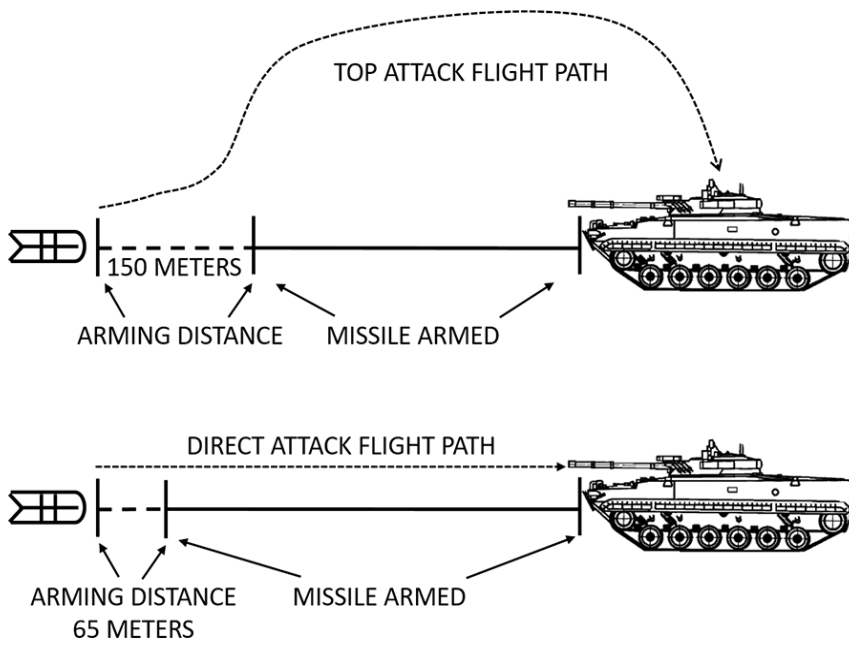

Figure 1. Number of hits and misses by system.

Figure 2. Javelin arming distance (500m to target).

breaching a minefield on the adjacent road. There were fewer than 100 meters between the firer and the target, and the engagement was unsuccessful.

During the after-action review the next morning, when asked about the engagement, the gunner was aware of the approximate distance from his humvee to the target but believed this to be enough for a TOW engagement. (See figures in Figure 2 for comparison of arming distances between systems.)

This illustrates a problem we see in many units' AT engagements: Soldiers and leaders do not understand the ranges required to employ these systems. Engagements, particularly with the TOW and Javelin, are often short of the system's arming range. At such distances, these become, at best, non-explosive kinetic projectiles and will certainly not defeat armored targets. Gunners must understand the minimum engagement distance of their organic AT systems, and leaders must plan for maximum standoff to detect targets, prepare the system, track the target and fire.

As one of the world's most effective man-portable anti-tank missile systems, scouts should be well-trained in the employment of the FGM-148 Javelin. This system requires, at minimum, 65 meters for a direct shot and 150 meters for a more effective top-attack shot (Training Circular (TC) 3-22.37). Leaders shouldn't simply use 65 meters as a minimum distance to let gunners get closer to the target but should determine the risk inherent in having less standoff available, the type of vehicles the enemy is likely to employ and how the enemy is expected to maneuver. (Platoon leadership should pay particular attention to the squadron S-2's assessment of the enemy composition and course of action to determine how to array the platoon for the desired effect on the expected enemy.)

For example, a direct shot against the rear of a T-80 is likely to result in a catastrophic kill, whereas a frontal shot would have minimal effects. By obtaining more than 150 meters of standoff, Javelin gunners can achieve a top-attack shot, which is catastrophic against most armored vehicles. (Note: JRTC does not currently replicate Active Protection Systems (APS), which are becoming more common among potential adversaries. The tactics discussed here assume that enemy vehicles are not fitted with any type of APS.)

TOWs require at least 200 meters standoff (TC 3-22.32) for all 2B missile variants, which are the type most commonly in use. Similar to the Javelin, these can be used in both top-attack and direct-fire modes, but both modes require 200 meters to arm the missile.

Leaders should also be aware of the specific missile type they are using, as some variants use different guidance methods. Wire-guided variants are susceptible to interference when the guidance wire falls across electrically conductive materials, and vegetation may sever the wire, particularly in heavily wooded areas like most of JRTC's training areas; radio-frequency-guided variants do not have this problem.

Obtaining enough standoff for AT engagements at JRTC can be difficult. With the exception of drop zones, some of the larger helicopter landing zones and a multi-purpose range complex in the west side of the training area, sightlines are obstructed by pine forests and rolling hills. Leaders must be deliberate in their selection of battle positions (BPs) if they want to effectively engage the enemy.

While the restrictive terrain impairs
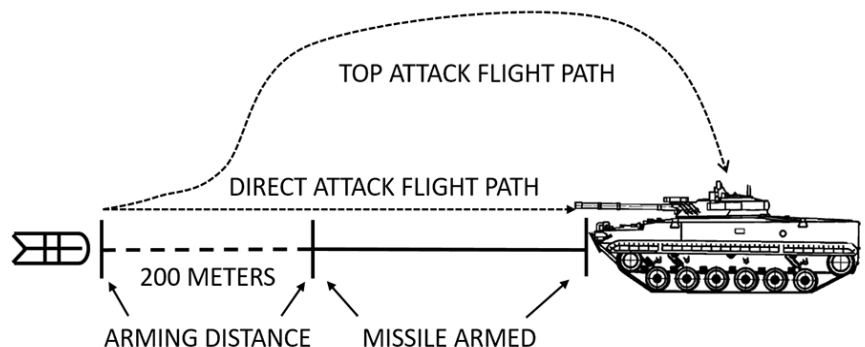
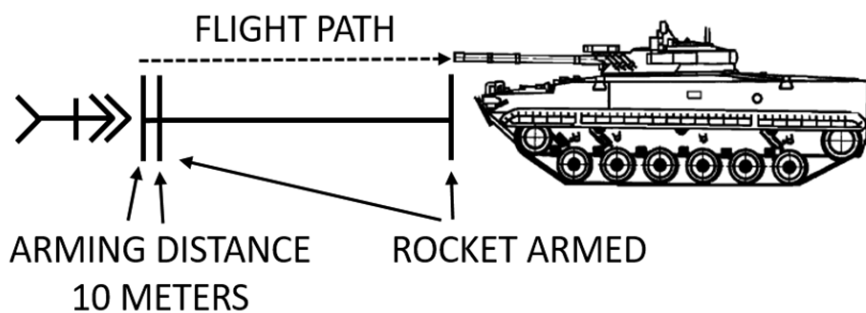**Figure 3. TOW arming distance (500m to target).**

Figure 4. AT-4 arming distance (200m to target).

both enemy and friendly forces, the terrain often allows the adversary to maneuver close to the scout platoon and within the arming distance of Javelins and TOWs. The scout platoon, with the minimal protection afforded by armored humvees, is then vulnerable to the enemy's high-caliber weapons. However, opposing-force vehicles are often restricted to areas favorable to Javelin and TOW engagements, especially roads and wider trails, where Javelin and TOW gunners may be able to observe enemy vehicles rounding a corner with sufficient standoff to engage before they can be detected.

When terrain is too restrictive for TOW or Javelin engagements, scout platoons often have the AT-4 at their disposal. Although significantly less effective than other weapons, it can be employed at much shorter ranges due to its 10-meter arming distance.

When planning AT-4 engagements against armored targets, anticipate the need to bring multiple weapons to bear against the same target, in a coordinated-volley fire, to compensate for the smaller explosive payload.

Solutions

Beginning at the section-leader level, leaders must have an understanding of EA development and the capabilities of their organic weapon systems. But it is not enough to memorize the steps of EA development or the minimum and maximum effective range of different systems. Leaders should practice, if only on a map or whiteboard, thinking through the development of an EA, how they will place their personnel and systems, and how they will engage the enemy. When possible, commanders should take their units to a piece of land in the

training area to practice selection and occupation of observation posts (OPs) and BPs.

In a field environment, subordinate leaders should plan and emplace their positions, then create range cards at each position. The platoon leader then incorporates those range cards into a sector sketch (see boxed sidebar), with which he can begin to refine the plan and develop direct-fire-control measures. These control measures should include trigger lines and disengagement lines for each system, which take into account maximum and minimum engagement distances.

Each OP and BP should have these direct-fire-control measures on their respective range cards and, when possible, visibly marked on the terrain.

Once platoon leaders have developed a tentative plan, another vehicle or dismounted troops should traverse the EA from the expected enemy direction of advance. This will allow platoon leadership to rehearse and understand how the terrain impacts the use of their AT systems and the effectiveness of the direct-fire-control measures.

Troop commanders should then integrate their platoons' sector sketches into a comprehensive troop sector sketch. This master diagram of the troop's sector gives the troop commander a detailed visualization of how his platoons are arrayed, allowing him to easily identify and address any gaps in the security plan. A troop sector sketch also allows for easier battle tracking and streamlined reporting, giving the troop commander better situational awareness.

Many scout platoons fail to rehearse actions upon enemy contact at JRTC,

although they often have ample time to thoroughly develop their EAs. Rehearsals, as the final step of EA development, are often an afterthought and seen as unnecessary. As a result, security plans often fail upon direct fire contact with the enemy.

Leaders seem to know intellectually what their EA area should look like but need practice to experience how it should feel in reality. Actually taking the time to train EA development in a field environment will help our scout platoons experience what does and doesn't work in differing environments.

In planning and rehearsals, platoon leadership must think through the steps of the engagement process: detect, identify, decide, engage, assess. This is the decision cycle the platoon uses, either explicitly or implicitly, upon contact with suspected enemy.[3] The platoon must detect potential targets; identify the target to characterize and classify (friendly, neutral or enemy; if enemy: composition, location and level of threat); decide whether to engage and with what weapon systems; engage the target with the appropriate system; and assess whether the engagement resulted in the desired effect. Leaders must attempt to reduce the time to execute this process to more quickly react to threats and make decisions faster than the enemy can react to them.

In restrictive terrain such as that at JRTC, it can be beneficial to employ dismounted OPs ahead of BPs. This allows the platoon to make enemy contact with the smallest-possible element, allowing them to retain freedom of maneuver in accordance with the fundamentals of reconnaissance. Dismounted OPs can conceal themselves better than humvee-mounted or carried AT weapons, allowing the enemy to approach closer without compromising the platoon.

In this manner, the dismounted OPs act as "hunters" and the mounted TOWs or dismounted Javelins as "killers." In this hunter/killer configuration, the dismounted OPs can maintain radio contact with the rest of the platoon, providing early warning of enemy vehicle advance. This will allow the

STANDARD RANGE CARD

For use of this form see ATP 3-21.8; the proponent agency is TRADOC.

May be used for all types of direct fire weapons.

MAGNETIC NORTH

SQD A22
PLT 2
CO A

DATA SECTION

32 28 24 20 16 12 8   8 12 16 20 24 28 32

POSITION IDENTIFICATION			DATE		
PRIMARY A22			1 MAY 2019/1140 HRS		

WEAPON			EACH CIRCLE EQUALS		
M2 A-22			400 METERS		

NO.	DIRECTION/DEFLECTION	ELEVATION	RANGE	AMMO	DESCRIPTION
L	300°/5800M	0M	2000M	TOW2	FARMHOUSE
R	105°/920M	+10M	2600M	TOW2	R/SIDE WOODLINE
1	6400M	+30M	3200M	TOW2	RP-HILLTOP
2	5910M	+10M	2700M	TOW2	TRP-AB00Z RJ
3	60M	-10M	1800M	TOW2	TRP-AB002 RJ

REMARKS:
4 WRP - RJ AT 13629411, 240° AT 320M

DA FORM 5517, FEB 2016

Figure 5. Sample of completed range card. *(Adapted from Figure 4-20, ATP 3-20.98)*

"killer" crews time to prepare (system startup and thermal cool-down) their weapons, shortening the reaction time needed to engage the targets.

This method can shorten the "decide" and "identify" steps of the engagement process. When platoons use this tactic at JRTC, they are able to achieve more hits on moving vehicles than those that sacrifice depth for width or concentrated firepower.

Clear and thorough engagement criteria is important to shorten the "decide" step of the engagement process. Engagement criteria should specify what type and number of targets should be engaged by which weapons.

For example, if the platoon encounters two or fewer T-80 tanks, Javelin gunners will engage with top-attack mode, one per target. Implicit in this criterion is the requirement that Javelin gunners **not** waste a missile on lesser targets such as a *Boyevaya Razvedyvatelnaya Dozornaya Mashina* (literally, "combat reconnaissance patrol vehicle").

With clear engagement criteria, the troop or platoon leader has already made the decision to engage. All that is left is to engage the target and assess damage.

The Infantry School at Fort Benning, GA, offers an institutional solution to

some of the problems presented here in the form of the Heavy Weapons Leader Course (HWLC), aimed at 11B and 19D Soldiers. This course teaches Soldiers to plan for and employ the Javelin and TOW systems in offensive and defensive missions from the section to troop level. This course is underused among 19Ds, likely because they are ineligible for the associated additional-skill identifier (ASI) (B8), but it presents a great opportunity to make experts of scout leaders who can return to their home stations and serve as experts in AT operations, using their newfound expertise to train others in their units.

To facilitate the emphasis on AT training, we should consider allowing 19D Soldiers to earn the B8 ASI and adding B8 positions to the cavalry-squadron MTOE.

There exists an ASI to identify Soldiers qualified on the Javelin and denote positions requiring that qualification within IBCT cavalry-squadron MTOEs. In the past, 19D Soldiers could earn the 2C (Javelin gunner) ASI by completing Fort Benning's Javelin course. Because this course hasn't existed since at least 2011, there is now no way to earn this ASI, and it is effectively obsolete.

If we want cavalry squadrons to take advantage of their organic AT weapon systems' fantastic capabilities, we should consider acknowledging Soldiers who have developed expertise on these systems with the associated ASIs. It would be of great benefit to the IBCT cavalry squadron to send noncommissioned officer (NCO) leadership to HWLC to learn the employment of these systems, earning the B8 ASI in the process, so they can be identified as experts in AT weapon employment.

We should send any cavalry-scout NCO who attends the Advanced Leader's Course (or any other course) at Fort Benning to HWLC, minimizing the additional cost to the Army. These NCOs can then assist in the development of TOW and Javelin gunnery programs at their home stations to qualify individual gunners. We could then keep the 2C ASI on the cavalry-squadron MTOE, and HWLC-qualified NCOs could then

evaluate Javelin gunners and award them the 2C ASI at the completion of a successful Javelin gunnery.

Conclusion

In future high-intensity conflict, scouts may not be able to count on air superiority or the ready availability of external assets we have enjoyed throughout almost two decades of continuous conflict in Iraq and Afghanistan. The cavalry squadron must regain proficiency with its organic AT weapon systems to accomplish the mission they will invariably be asked to do – specifically to provide early warning to higher-level commanders and delay or disrupt enemy attacks to provide those commanders with reaction time and maneuver space, especially against a military peer.

To that end, IBCT cavalry troops and scout platoons should focus their efforts on AT gunners' individual training, understanding of systems' differing engagement distances and how they are impacted by terrain, and developing thorough EAs that mitigate the impact of terrain on AT engagements. As a cavalry community, we should allow AT weapon operators to prove their expertise, earning ASIs that would identify them as experts across the force.

JRTC is seen as the antidote to "America's first battles"; this is the idea that, as a military, we are historically ill prepared for the first few battles of a major conflict. Eventually we learn from our mistakes and are able to regain the initiative. However, this cannot work unless we spend time preparing for a large-scale, high-tempo training event like a brigade JRTC rotation.

While we do our best as O/C/Ts to ensure units learn from their experiences, we want units to be prepared to perform effectively and refine their techniques, rather than learn from the ground up in the two weeks they have available to them. Without effective training and preparation prior to arriving at JRTC, we will continue to fall victim to "America's first battles," which we cannot afford to lose.

CPT Chris Brown is the cavalry troop senior O/C/T, assigned to Operations Group, JRTC, Fort Polk, LA. Previous
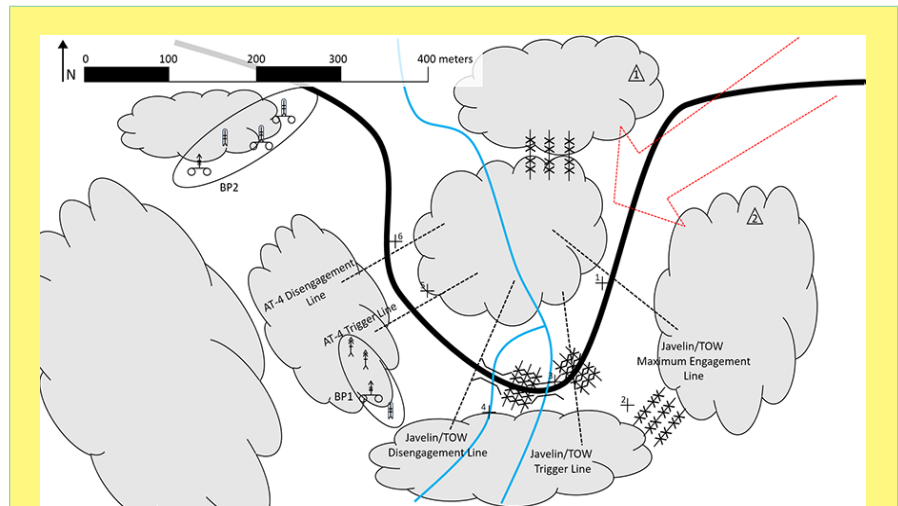

Figure 6. Platoon sector sketch.

Example scenario

The brigade S-2 expects the advance of enemy mounted reconnaissance elements, likely reinforced with a small number of T-80s. The troop commander has directed a platoon to screen the area depicted in this platoon sector sketch to identify enemy reconnaissance elements and destroy armored vehicles to disrupt the enemy's reconnaissance efforts and provide reaction time and maneuver space for the main defense.

Because of the terrain's restrictive nature, the platoon leader has placed two OPs to the east to detect and identify advancing enemy elements. These OPs are dismounted and can therefore remain well hidden to avoid compromise by the enemy. Wire obstacles are placed and integrated with the terrain to canalize enemy vehicles and force them to either cross the bridges at the bend in the road or bypass the bridges by fording the creek. Either course of action will slow the enemy advance, allowing Javelin and TOW gunners time to fire on their targets.

BPs are selected to provide enough standoff to allow gunners to prepare their weapons for firing, and track and fire upon multiple targets in the engagement area. Each BP is assigned a mounted M2 to augment local security and destroy any dismounts.

OPs 1 and 2 first hear the approach of vehicles, including tracks. They visually identify specific vehicle types and transmit that information to the platoon leader. When enemy vehicles reach the Javelin/TOW trigger line, Javelin teams and mounted TOW gunners at BPs 1 and 2 fire in top-attack mode. The Javelin at BP 1 keeps fires between Target Reference Point (TRPs) 1 and 2 (physically marked on the ground or using terrain features as a reference) and fire as far as the maximum engagement line to avoid endangering the OPs. The two TOW gunners and single Javelin team at BP 2 fire between TRPs 3 and 4 while the enemy is attempting to breach or bypass wire obstacles on the bridges.

assignments include commander, Company E, 1st Battalion, 29th Infantry, Fort Benning, GA; plans officer, 3/3 Infantry, Fort Benning; scout-platoon leader, Company B, 8th Battalion, 1st Cavalry, Fort Lewis, WA; and platoon leader, Company B, 2nd Battalion, 1st

Infantry, Fort Lewis. His military schooling includes Armor Basic Officer Leader's Course, Army Reconnaissance Course, Maneuver Captain's Career Course and Cavalry Leader's Course. CPT Brown holds a bachelor's of science degree in engineering psychology

from the U.S. Military Academy and a master's of science degree in operations research from Ohio State University.

Notes

[1] Army Technical Publication 3-20.98.

[2] Ibid.

[3] Ibid.

For Company- and Platoon-Level Leaders' Professional Development: *Musicians of Mars, Vol. 3: the Cobra Strikes*

One of the Center for for Army Lessons Learned (CALL)'s recent products (published in February 2019), it is a series of tactical vignettes in the same vein as *Duffer's Drift* and should aid mounted-maneuver leaders in conducting professional development with their junior officers / noncommissioned officers. From the CALL Website:

"*Musicians of Mars III The Cobra Strikes* picks up the tale of ... Task Force Mustang in the aftermath of their successful defense (in CALL Handbook 16-12, *Musicians of Mars II*) of Engagement Area Blackjack. ... As with *Musicians of Mars II*, this handbook takes the reader through a fictional scenario where the tactical leaders make decisions, some good and some not so good, that impact subsequent actions. *Musicians of Mars III* will have its leaders learning and improving as they progress through tactical engagements. This was intentional in the development of this publication and is designed to facilitate tactical discussions at the company and platoon levels."

All three *Musicians of Mars* publications are available by going to the CALL Website, https://call.army.mil, and clicking on "Publications." Direct links are *Musicians of Mars III: The Cobra Strikes*, https://usacac.army.mil/sites/default/files/publications/19-08.pdf; *Musicians of Mars II*, https://usacac.army.mil/organizations/mccoe/call/publication/16-1; *Musicians of Mars I: A Story of Synchronization for the Company/Team Commander,* https://usacac.army.mil/node/2358. The publications are also available to order in hard copy. (Books and shipping are free to unit address. To order publications, visit https://call2.army.mil/rfp (CAC login required). General questions can be directed to CALL's Request for Information line at (913) 684-2255 (CALL).)

From foreword:

"There is still a tendency in each separate unit ... to be a one-handed puncher. By that I mean that the rifleman wants to shoot, the tanker to charge, the artilleryman to fire. ... That is not the way to win battles. If the band played a piece first with the piccolo, then with the brass horn, then with the clarinet, and then with the trumpet, there would be a hell of a lot of noise but no music. To get harmony in music, each instrument must support the others. To get harmony in battle, each weapon must support the other. Team play wins. You musicians of Mars ... must come into the concert at the proper place at the proper time." -MG George S. Patton Jr., address to 2nd Armored Division, July 8, 1941
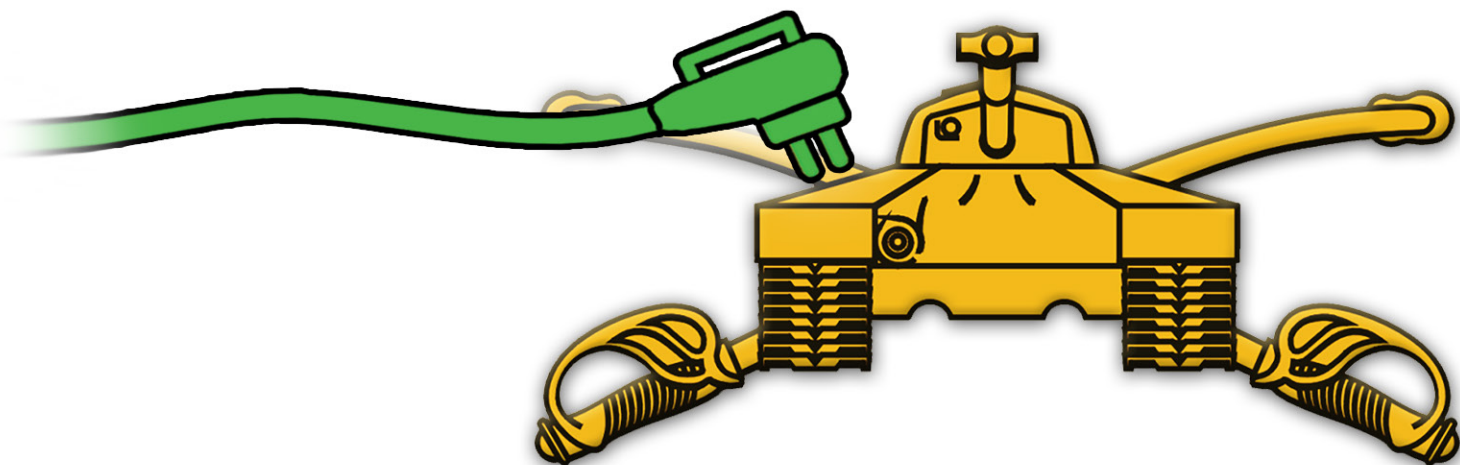
Electric Propulsion: a Game Changer

by MAJ Ryan Ressler, MAJ Brian Ottestad and Mike Smith

America's adversaries have closely studied our recent operations. They know the American way of war well. Simultaneously, emerging technologies – including artificial intelligence, machine learning, nanotechnology and robotics – are driving a fundamental change in the character of war. Strategic competitors such as China and Russia are deploying capabilities to fight the United States through multiple layers of stand-off in all domains: space, cyber, air, sea and land.

In an era of great-power struggle, the American way of war must evolve and adapt.

As the world changes, so must the Army change how it fights. Electric-powered vehicles offer the potential to double the ground forces' operational reach; increase lethality and survivability at the tactical and operational levels; and reduce the Army's logistics burden by half. The rapid and widespread adaptation of vehicle electrification, from hybrids to fully electric vehicles, has begun to alter the full spectrum of the automobile industry and will dramatically revolutionize the way we maintain and sustain vehicles.

A significant vulnerability of forward-deployed ground combat forces is their dependence on bulk-petroleum fuels. These traditional fuels are essential for maneuver forces; they power weapon-systems and command-and-control systems, and aid in gathering information and decision-making. Maneuver-force endurance and operational reach is determined by the ability to ensure open lines of communication, with a supply of bulk petroleum readily available.

Nearly "half of American deaths in Iraq and almost 40 percent of deaths in Afghanistan"[1] are attributed to roadside-bomb attacks. Fuel convoys are soft targets, yet they are a major line of effort during large-scale combat operations (LSCO).

Throughout modern history, there are many examples of military operations losing tempo due to disrupted and degraded supply lines. For example, during World War II, both the Allies and Axis powers were impacted by fuel shortfalls during their campaigns across North Africa. Also, GEN George S. Patton's Third Army's drive into Germany was at the mercy of bulk-petroleum requirements.

In today's Army, multi-domain operations (MDO) will further increase the time and space between units and drive increased power demands, causing strain on sustainment capabilities and highlighting the need for a more efficient vehicle fleet.

Sustainment advantages of electrification

The U.S. Army must focus more effort and resources on increasing the endurance and ability of ground forces to operate semi-independently. Electric-powered combat vehicles will do this by overcoming the energy logistics challenges of future battlefields while providing increased reliability, survivability, lethality and cost-effectiveness. Electrification can double the operational range of vehicles and potentially reduce the logistical

Figure 1. A Heavy Expanded-Mobility Tactical Truck fueler prepares to conduct refuel operations in an austere environment. *(U.S. Army photo)*

requirements of our current fleet by up to 45 percent.

Electric propulsion provides a means to address two of the most pressing challenges on the future battlefield: energy logistics and unit endurance. Fielding an electric-propulsion capability in combination with organic persistent-power-generation capabilities provides several distinct advantages over existing drivetrains. The most prominent of these advantages is the dramatic increase in the amount of time units can sustain operations without external logistical support. Electric-powered tactical and combat vehicles have significantly fewer moving parts and will be inherently more reliable than those with traditional drivetrains powered by internal-combustion engines.

Increased reliability directly translates into fewer maintenance manhours, a reduction in cargo space required to carry spare and repair parts, smaller logistic-support areas and an increased operational-readiness rate. These benefits allow our formations to operate longer and can better control tempo, providing commanders a competitive advantage over our adversaries.

Electric vehicles' tactical advantages

Introducing electric propulsion to the tactical and combat vehicle fleet enables the Army to integrate capabilities that were once thought of as only science fiction. Many of these advantages ascend from electric-drive motors and embedded electric-energy storage and internal-distribution systems. Electrification enhances the tactical aspect of maneuver platforms in three distinct ways:

- First, it enables silent mobility. Silent mobility, a long-desired attribute, will increase lethality and survivability in all formations. Imagine a motorized-cavalry troop fitted with a light reconnaissance vehicle that can conduct its mission set virtually undetected. This – combined with extended range and duration – has a dramatic impact on the overall effectiveness of the future cavalry squadron.
- Second, electrification will extend

the duration of silent watch, or the ability to sit in a hide position with all critical systems powered and the engine off. Through increased battery density, power-sharing and the ability to produce and prioritize onboard power, electrified vehicles will far outperform the current fleet in terms of power management.

- Third, electric-powered vehicles will dramatically reduce the thermal signature produced by vehicles, degrading adversarial detection capabilities. Reductions in both visible and acoustic detection will dramatically increase the element of surprise.

Further, platform electrification addresses the inevitable increase in high-demand future power requirements. Future ground-combat systems will be required to support a litany of high-energy systems such as advanced communications systems, directed-energy weapons and active/passive protection systems.

In addition, platform electrification will enable the concept of formation power. Formation power is defined as the ability to power all organic or habitually attached systems through the vehicle platform. This capability will allow Soldiers to ensure their mission-essential power demands are met.

As robotics and artificial-intelligence technology advances, electrification will facilitate adaptation of smart-power capabilities. Smart power optimizes power conversation and power sensing to ensure both the platform

and Soldiers maximize their use of power resources.

Finally, electric-powered vehicles are well known for their ability to instantly deliver high torque and rapid acceleration. A commercial example is the Tesla S P90D, a mass-produced and mass-marketed four-door all-wheel-drive sedan, delivering 762 horsepower and 713 pounds-per-foot of torque, able to accelerate from 0 to 60 miles per hour in an astonishing 2.4 seconds.[2] Before the development of modern electric vehicles, this type of performance was found only in exotic high-performance vehicles, not production sedans.

The Army must leverage capabilities such as these to save lives and provide decisive lethality.

In addition to these performance advantages, electric-powered vehicles offer other benefits beyond traditional drivetrains. As the employment of electric-powered vehicles continues to expand, it is likely that their design and configuration will evolve. The use of conformable batteries will dramatically affect design considerations. By no longer designing a vehicle around heavy, bulky engines and transmissions, electric-powered vehicles can alter their shape and profile. This facilitates the ability to better design platforms and meet the ever-growing roles of the future ground fleet.

Challenges

Compared to commercial industry, the Army has unique design challenges when adapting tactical and combat

Figure 2. A Joint Light Tactical Vehicle convoy performs mounted-movement techniques in a desert environment. *(U.S. Army photo)*

platforms to electrification.

The technology required for all-electric propulsion for light tactical vehicles exists today. However, the technology required to sustain these vehicles in an austere environment does not. In the future operational environment, formations employing MDO will be widely dispersed and may not have the ability for a daily logistics package to rearm/refit every unit. Semi-independent operations may last for days without external support.

Specific challenges lie in battery density or the ability to store power for heavier platforms; the ability to produce and transport power on the battlefield; and rapid recharging. The Army has invested in a significant number of propulsion, power and battery initiatives to address these challenges. The Army must continue to leverage industry investments and expertise to help us solve these complex, but not insurmountable, challenges.

Path to platform electrification

Based on current technology, the most viable path to electrification is through the light-tactical-vehicle fleet as the Army's entry point into electric propulsion. The near-term strategy should be centered on hybrid drivetrains.

It's been estimated that hybrid technology can produce up to a 45-percent

Figure 4. A fuel convoy moves to provide fuel to combat forces in support of sustainment operations. *(U.S. Army photo)*

reduction in Class III bulk petroleum. Applying this theory to an armored brigade combat team's (ABCT) light-tactical-wheeled fleet, the ABCT could save 36,000 gallons a day in LSCO.

The mid-term goal is to advance hybrid-electric-drive technologies to heavier platforms. Applying this theory to the entire ABCT fleet, the ABCT can save up to 133,000 gallons of Class III per day in LSCO.

The far-term goal is to transition the Army to an all-electric-capable ground force. As power and battery technologies mature, a transition to an all-electric force will dramatically enhance the effectiveness of our combat and tactical vehicles.

Conclusion

The future is now. Traditional fuel is a high-demand commodity that is difficult to move and distribute on the battlefield. Limitations of fuel-capacity drive operational reach and will impact our influence in future contested environments. Adopting electric-propulsion alternatives while increasing power generation, storage and distribution capabilities will reduce our dependence on traditional fuels; increase the lethality and survivability of units; and enhance the overall effectiveness of the force.

The Army must be an electric-propulsion innovator and continue to strengthen ties with industry regarding propulsion, power and battery technologies. Through the right investments, programs, initiatives and resources, the Army can push these technologies and drive innovation that facilitates continued dominance in the ground domain.

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Figure 3. Soldiers finalize camouflage in preparation for a mounted reconnaissance mission. *(U.S. Army photo)*

Division, Fort Campbell, KY; and platoon leader/executive officer, 6th Squadron, 8th Cavalry, 4th BCT, 3rd Infantry Division, Fort Stewart, GA. His military schooling includes Command and General Staff College (CGSC); Defense Acquisition Workforce Improvement Act Program Management Level III; Maneuver Captain's Career Course (MCCC); Ranger, Airborne and Air-Assault schools; Mortar Leader's Course and Army Acquisition Basic Course/Army Intermediate Program Management Course. MAJ Ressler has a bachelor's of specialized studies degree in foreign affairs from Ohio University and a master's of science degree in business from the University of Kansas.

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JRTC, Fort Polk; commander, heavy-weapons company, Company D, 3rd Battalion, 7th Infantry, 4th Infantry Brigade Combat Team (IBCT), 3rd Infantry Division, Fort Stewart; and plans officer, Headquarters and Headquarters Company, 3-7 Infantry, 4th IBCT, 3rd Infantry Division, Fort Stewart. His military schooling includes CGSC, MCCC, Ranger School and Airborne School. MAJ Ossestad holds a bachelor's of science degree in history from the University of Wisconsin-Stevens Point.

Mike Smith is a contractor serving as a capability developer at MRD, MCDID. Previous assignments include training developer, Directorate of Training and Doctrine, Fort Benning; senior drill sergeant, Fort Benning; platoon sergeant, Fort Hood; platoon sergeant, Fort Hood; and Bradley master gunner, "various assignments." Mr. Smith's military schooling includes Bradley Master Gunner School, Drill Sergeant School and Advanced Noncommissioned Officer School. His awards and honors include the Meritorious Service Medal.

Notes

[1] Christopher Helman, "For U.S. Military, More Oil Means More Death," *Forbes*, Nov. 12, 2009, https://www.forbes.com/2009/11/12/fuel-military-afghanistan-iraq-business-energy-military.html#6e24e6064562.

[2] Tesla, "Model S Performance," https://www.tesla.com/models.

ACRONYM QUICK-SCAN

ABCT – armored brigade combat team
BCT – brigade combat team
CGSC – Command and General Staff College
IBCT – infantry brigade combat team
JRTC – Joint Readiness Training Center
LSCO – large-scale combat operations
MCCC – Maneuver Captain's Career Course
MCDID – Maneuver Capabilities Development and Integration Directorate
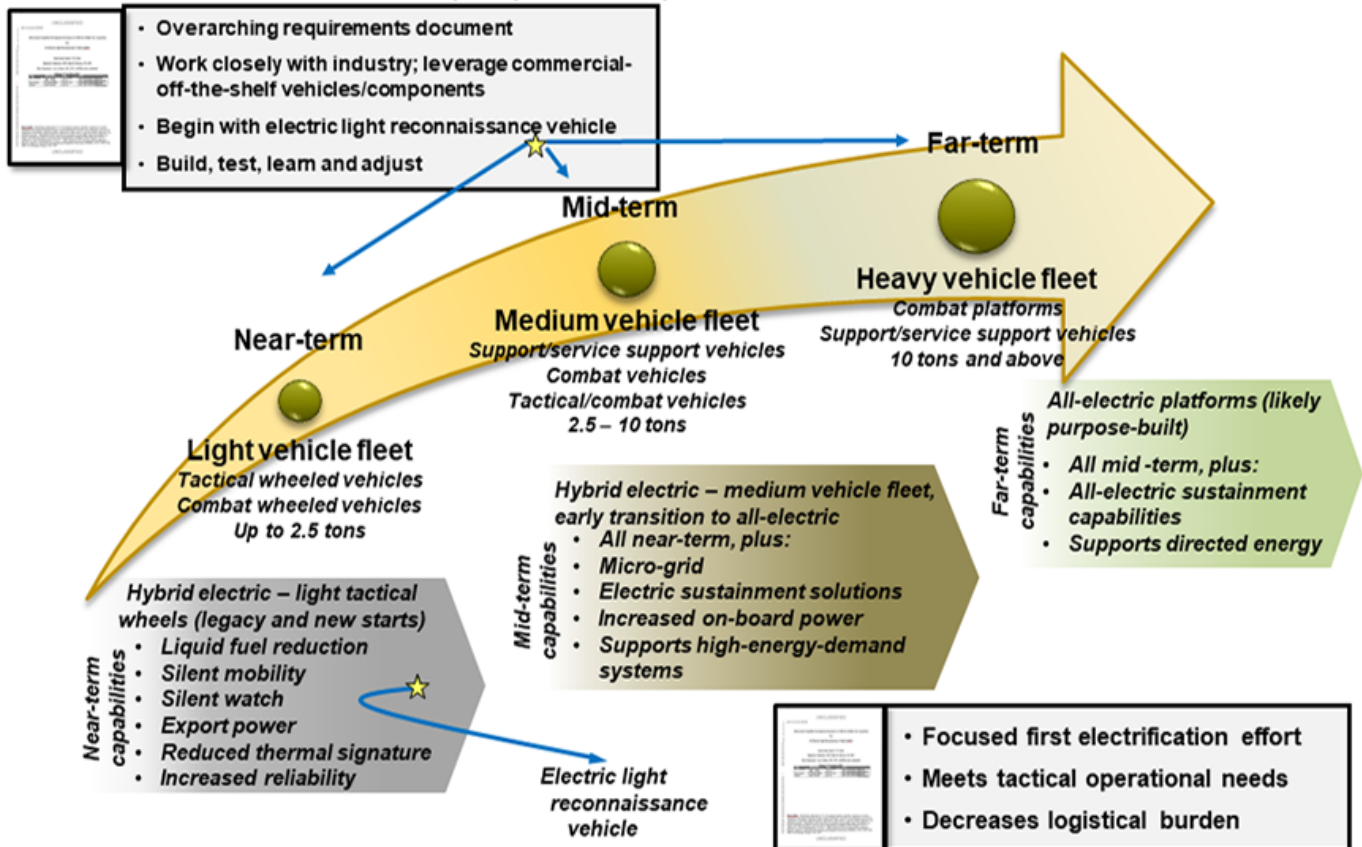**MDO** – multi-domain operations
MRD – Maneuver Requirements Division

Figure 5. Possible path to tactical- and combat-vehicle electrification.

Master the Fundamentals

by MAJ Lance C. Rae and
MAJ Bradley Y. Winsted

The seven fundamentals of reconnaissance are the bedrock principles upon which successful reconnaissance operations are built. Knowing, understanding and implementing these fundamentals are crucial to mission accomplishment for cavalry squadrons, and for enabling the brigade combat teams' (BCTs) decisive operations.

This article will first state each fundamental of reconnaissance, illustrate the relevant Army doctrine to show "what doctrine says" before stating instructor insights and tactics, techniques and procedures under "instructor's note." We hope this article helps our cavalry troops better understand and implement the fundamentals in future operations.

Fundamental: orient on reconnaissance objective

Field Manual (FM) 3-90-2, *Reconnaissance, Security, and Tactical Enabling Tasks, Volume 2*:[1] "Commanders orient their reconnaissance assets by identifying a reconnaissance objective in the area of operations. ... The reconnaissance objective clarifies the intent of the reconnaissance effort by specifying the most important result to obtain from the reconnaissance effort. Every reconnaissance mission specifies a reconnaissance objective. The commander assigns a reconnaissance objective based on priority intelligence requirements (PIR) resulting from the intelligence preparation of the battlefield (IPB) process and the reconnaissance asset's capabilities and limitations."

Orient on the reconnaissance objective (instructor's note): *Orient on the reconnaissance objective* is the "first among equals" of reconnaissance fundamentals. Once you identify the reconnaissance objective and orient collection efforts around it, all other fundamentals can be applied appropriately.

Failure to identify your reconnaissance objective can and usually will result in mission failure or in violation of one or more of the other fundamentals. The reconnaissance objective is not simply a named area of interest (NAI); it must encompass the task and purpose (the why) behind the reconnaissance, enabling disciplined initiative.

Link to commander's intent (instructor's note): You must nest the squadron's reconnaissance objective with the brigade commander's intent, specifically the expanded purpose and the endstate. Nesting the reconnaissance objective to the commander's intent ensures unity of effort and enables disciplined initiative. Likewise, the reconnaissance objective must directly support the attainment of the commander's endstate.

The cavalry squadron conducting a tactical-enabling task always has a customer. Understanding what your customer is asking you to do will assist in understanding your reconnaissance objective.

Link to commander's critical information requirement (CCIR)/PIR

Figure 1. Soldiers from 2nd Battalion, 4th Field Artillery Regiment, 3rd Armored Brigade Combat Team, 1st Cavalry Division, observe enemy territory during Decisive Action Rotation 15-07 (May 2015) at the National Training Center, Fort Irwin, CA. *(U.S. Army photo)*

(instructor's note): You must link reconnaissance objectives directly to the commander's PIR. Think of the reconnaissance objective as the nexus or point at which PIR and endstate meet. PIRs are extremely important to understand because once a PIR is answered, it requires the commander to make a tactical decision on the battlefield.

You also understand what the focus of your mission will be.

Link to commander's reconnaissance guidance (CRG) (instructor's note): You can refine the reconnaissance objective from the *focus* component of the CRG. It must be much more specific than the four broad categories of *threat*, *infrastructure*, *terrain/weather* and *society*. The reconnaissance objective must be briefed as part of the CRG's focus.

The *Reconnaissance and Security Commander's Handbook* provides a great example: The commander states that the focus of reconnaissance is terrain. The commander then elaborates, providing his/her elements with the reconnaissance objective: Determine the suitability of Route Gold for brigade movement into the battle zone.[2] In this example, the focus is very broad; the reconnaissance objective is very specific.

Link to NAIs (instructor's note): The reconnaissance objective can be physically linked to NAIs. "Reconnaissance objectives can be a terrain feature, geographical area, enemy force, adversary or other mission or operational variable," according to FM 3-98, *Reconnaissance and Security Operations*. NAIs are "the geospatial areas[3] where scouts gather and report on indicators."

After the troop or squadron analyzes its scouts' reports, it turns their information into intelligence. This process unfolds during IPB and is part of the squadron's information-collection (IC) plan. Squadrons employ the appropriate forms, methods and management of reconnaissance in and around NAIs. Indicators may be in one or many NAIs to help answer the reconnaissance objective.

Clarification of terms (instructor's note): Many students struggle to understand the concept of the reconnaissance objective. One of the primary reasons for this struggle is the word *objective*. It is a loaded word in the U.S. Army with its unique definition and associated graphics-control measure. "Objective: A location on the ground used to orient operations, phase's operations, facilitate changes of direction and provide for unity of effort," according to Army Doctrinal

Reference Publication (ADRP) 1-02, *Terms and Military Symbols*.[4]

As combat-arms Soldiers, we have been instructed and trained to interpret objectives as locations on the ground that need to be seized, cleared and retained during offensive operations through combined-arms maneuver. To grasp the meaning of the reconnaissance objective requires a slight shift in context. The more appropriate meaning of the word *objective*, in this case, is "the clearly defined, decisive and attainable *goal* toward which every operation is directed."[5] Perhaps the *reconnaissance goal* or *reconnaissance endstate* would be a more appropriate term and could prevent some of the confusion caused by the current vernacular.

Fundamental: don't keep recon assets in reserve

ADRP 3-90, *Offense and Defense*: "Reserve – (Army) That portion of a body of troops which is withheld from action at the beginning of an engagement to be available for a decisive moment."[6]

FM 3-98, *Reconnaissance and Security Operations*: "Do not keep reconnaissance assets in reserve. … BCTs task and position reconnaissance assets at the appropriate time, place and in the right combination (human, sensor and technical means) to maximize their impact, allow for timely analysis of information and aid decision-making at the appropriate echelon."[7]

Do not keep reconnaissance assets in reserve (instructor's note): A commander of a cavalry organization should not withhold a reconnaissance asset with the intent of it acting as a reserve. Doctrine is quick to point out that sequencing reconnaissance assets in time and space through reconnaissance management (cueing, mixing and redundancy) and the different reconnaissance methods (dismounted, mounted, aerial, reconnaissance by fire) are not the same as designating a portion of a force as the reserve.

When talking reserves, the questions (and heated debate) often asked by students at the Cavalry Leader's Course (CLC) is: "What about the

squadron's tank company – can't they act as a reserve?" In these particular instances, we have been given platforms with tremendous combat power that we typically associate with offensive and defensive operations. The short answer is yes, but it can be argued that any element designated as the reserve cannot conduct reconnaissance and therefore is not a reconnaissance asset. If it is not a reconnaissance asset, it cannot support IC tasks, and the IC manager should not include it in the IC plan. On the other hand, if the tank platoons *have* been tasked to collect information in support of the squadron or brigade IC plan, then they *are* considered reconnaissance assets, and therefore it would be inappropriate for the commander to designate them as the reserve.

A clearer distinction should be drawn in regard to the squadron's scout platoons: They are an organic element designed to conduct reconnaissance and security operations. Using your scout platoons as a reserve when conducting a form of reconnaissance is a clear violation of this fundamental. It is important to note that FM 3-98 discusses times when a cavalry squadron should have a designated reserve, primarily when conducting security operations or if the squadron is fulfilling an economy-of-force role and has been tasked to conduct offensive or defensive operations. However, the reserve will often come from one of the infantry or armor battalions. (See FM 3-98.)

Remember, a reserve does not have a tactical task; it only has planning priorities. Reconnaissance generally precedes offensive operations, therefore a follow-and-support/follow-and-assume-mission for a Stryker weapons troop is not holding those assets in reserve.

The only thing worse than holding a reconnaissance asset in reserve is failing to employ it in the first place. Do not forget to plan for and employ your Raven; attached assets such as multifunctional teams, engineer reconnaissance teams and chemical, biological, radiological and nuclear (CBRN) reconnaissance teams; fire-support teams; rotary assets; and all other IC assets the brigade can attach to you. There is no excuse for failing to employ all your assets, neither out of ignorance nor failure to plan. Every asset is needed to perform continuous reconnaissance.

Fundamental: ensure continuous reconnaissance

FM 3-98: "BCTs require continuous [IC] throughout all phases and critical events of all operations. … Continuous reconnaissance provides commanders with a constant flow of information in close contact with the enemy and civilian populace to identify and seize key terrain, confirm or deny enemy composition, disposition, strength and courses of action, and provides reaction time and maneuver space for unpredicted enemy actions."[8]

Ensure continuous reconnaissance (instructor's note): The cavalry squadron must ensure continuous reconnaissance throughout the BCT's planning and operational timeline. CLC

Figure 2. Soldiers in an M1A2 Abrams tank assigned to Company D, 3rd Battalion, 8th Cavalry Regiment, 3rd Brigade Combat Team, 1st Cavalry Division, roll off the Clabber Creek Multiuse Range June 6, 2014, on Fort Hood, TX, during a platoon qualification table (Table XII) exercise. Whether tank assets could be used as reconnaissance or reserve is hotly debated. *(Photo by SGT Brandon Banzhaf, 3rd BCT Public Affairs)*

students often confuse "conducting continuous reconnaissance" to mean all elements must be collecting simultaneously from the start to the end of an operation. This is rarely doable. As a consequence, human beings physically crash after about 72 hours of nonstop operations.

Squadrons must effectively manage reconnaissance to ensure proper reconnaissance handover, and through IPB determine the best NAI with start and end times for observation. The operational environment is ever-changing and the enemy is ever-elusive. Therefore it is critical to maximize your assets by understanding the battlefield in time and space; don't allow gaps in collection at critical points.

The ability to perform continuous reconnaissance is the result of a well-planned and rehearsed operation. Problems occur when there is a lack of information or reconnaissance handover during operations between echelons (division to brigade, brigade to battalion). As a consequence, each echelon must start from the beginning, building situational awareness using its own time and assets.

Unfortunately, most of the time each echelon merely scratches the surface of understanding the operational environment, and what little information gained is useless if not passed on.

The ability to perform continuous reconnaissance comes from the capability to hand off information collected by one asset to another. It is essential to know and understand how to conduct recon handovers. This can be completed easily enough within a unit's organic assets; however, when done between subordinate units at all echelons, it's difficult and often much information is lost.

Annex L (instructor's note): In the classroom environment, students fail at all echelons from brigade to platoons to hand off information that supports the commander's CCIR. This is due to a failure in developing and distributing a plan that synchronizes assets with proper handover plans such as Annex L for an operation. Alternatively, at the troop level, commanders lack a plan on how to get information from squadron- or higher-level asset already on the battlefield. The ability to perform continuous

reconnaissance comes from knowing the capabilities of your assets, understanding how they operate and how to communicate with them for handover.

Once all available and tasked IC assets are determined, both the S-2/G-2 and S-3/G-3 shops must construct an Annex L (the annex itself in five-paragraph format), the IC plan and the IC overlay as a joint effort, ensuring all warfighting functions support the collection plan. At the troop level and below, an Annex L is not created. Instead the commander uses the Annex L from higher headquarters to create the troop's operational graphics, troop synchronization matrix and a troop operations order. If a complete Annex L is created, updated and passed on to subordinate units, situational understanding of the battlefield will flow from corps level to platoon level, ensuring continuous reconnaissance.

Fundamental: develop situation rapidly

FM 3-98: "Effective cavalry forces understand how time impacts movement (both friendly and enemy) and how timely collection of intelligence requirements impacts the commander's decisions. Cavalry forces collect on directed reconnaissance objectives in close contact with civilian populations while selectively choosing to fight enemy forces to determine intent, disposition, composition and strength."[9]

Develop the situation rapidly (instructor's note): Unit mottos such as "Always Ready," "Let's Go" or "Strike Hard" illustrate the significance that cavalrymen place on taking quick action or *developing the situation rapidly*. Due to the nature of cavalry operations, it is imperative that cavalry units take initiative and are able to plan and operate in an ambiguous environment. Cavalry squadrons and their subordinate troops can ensure they develop the situation rapidly by adhering to the three following steps:

- Issue clear and concise CRG;
- Operationalize and execute off the IC plan, ensuring they plan for latest-time-information-is-of-value (LTIOV); and
- Understand the difference between reconnaissance and surveillance.

Figure 3. The first wave of Soldiers from 1st Air-Cavalry Brigade (ACB) based at Fort Hood, TX, begin streaming into northern Afghanistan in June 2011, setting the stage for the pending transfer of authority of U.S. aviation operations in Regional Commands North and West from 4th Combat Aviation Brigade to 1st ACB. The inbound Soldiers will benefit in performing continuous reconnaissance if the handover is not a well-planned and rehearsed operation. Problems occur when there is a lack of information or reconnaissance handover during operations between echelons. *(U.S. Army photo)*

CRG (instructor's note): As discussed earlier, establishing a clear focus (threat, infrastructure, terrain/weather or society) and reconnaissance objective will ensure your scouts are collecting the right information on what matters the most for the operation, saving time and ensuring you develop the situation rapidly for the commander. Reconnaissance tempo is a measure of the level of detail (rapid or deliberate) and level of covertness (forceful or stealthy). To ensure that scouts are developing the situation rapidly, the commander must articulate the reconnaissance tempo accordingly. The four possible combinations are:

- Rapid and forceful;
- Rapid and stealthy;
- Deliberate and forceful; or
- Deliberate and stealthy.

While the individual tempos do not necessarily correlate to time (for example, *rapid* is a measure of detail, not *speed*), the overall reconnaissance tempo will have an impact on movement techniques, formations and employment of weapons systems, and thus the ability to develop the situation in contact. If a *deliberate* tempo is given, scouts must conduct all the prescribed tasks within the essential mission task. If a *rapid* tempo is given, a scout is only collecting the information relative to the key tasks or desired PIRs.

Engagement/ disengagement (and by-pass) criteria assist scouts in developing the situation rapidly by laying out the appropriate actions to take once they establish a form of contact with the enemy. It states what is to be engaged (and with what weapons system), what is not to be engaged (and why), and those forces scouts should bypass to maintain the tempo of the operation. Displacement criteria can be thought of as the trigger to stop conducting reconnaissance or to shift focus to a new reconnaissance objective or security mission. It can either be event-based, threat-based or time-based. Establishing displacement criteria for each phase of a reconnaissance operation gives scouts a backstop and spurs the scout to take action and develop the situation rapidly.

How operationalizing the IC plan helps you develop the situation rapidly (instructor's note): During mission analysis, the S-2 helps develop the IC plan (in close concert with the S-3) based on the results of the IPB. Through the four steps of IPB, the IC matrix pairs PIR to NAIs, lists and nominates potential collection assets that can assist in answering those PIR, and determines when information should be collected in each NAI. During the military decision-making process (MDMP) steps of course-of-action (CoA) development and CoA analysis, the squadron will produce a detailed plan that is synchronized in time and space, syncing all elements of the operation.

At CLC, we call this product the op-sync matrix, which the squadron staff develops during the wargame. The scout now has a clear picture in time and space of where he needs to be and when he needs to be there. Scouts must answer specific indicators within an assigned NAI the troop commander has given them. The commander must establish clear and defined triggers to shift focus and conduct reconnaissance elsewhere, or to conduct reconnaissance handover and rear-passage-of-lines. All this allows the scouts to develop the situation rapidly both in and out of contact with the enemy.

How understanding the difference between reconnaissance and surveillance helps to develop the situation rapidly (instructor's note): Reconnaissance is a human endeavor that requires scouts to actively develop the situation in close contact with civilian populations and/or enemy forces. Surveillance is passive by nature and relies mostly on collection systems that afford observation without exposing the collector to physical contact. We need to understand when best to employ these two forms of IC and when to transition from one to the other to develop the situation rapidly.

Surveillance allows scouts to understand a baseline and build indicators. When proper indicators are identified (for example, anomalies to the baseline), it can trigger scouts to transition from surveillance to reconnaissance. Or stated in another way: transitioning from letting the situation develop (surveillance) to developing the situation (reconnaissance).

Fundamental: Gain and maintain enemy contact

FM 3-98: "Cavalry forces find and sustain contact with the enemy on terms and conditions of their choosing by using at least one of the eight forms of contact. Once units make contact,
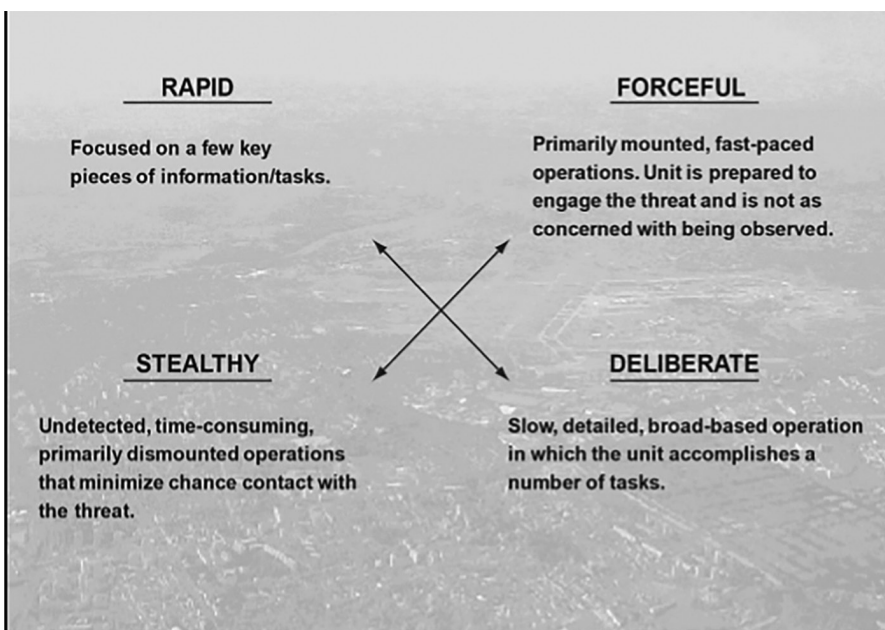

Figure 4. Reconnaissance tempo, illustrated. *(Adapted from Figure 4-2, FM 3-98; https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/fm3_98.pdf)*

cavalry forces maintain contact until specific orders are given, a change of mission occurs when disengagement or displacement criteria dictate, or the unit conducts reconnaissance handover with another unit. Maintaining contact with the enemy provides real-time information of the enemy's composition, disposition, strength and actions that allow staffs to analyze and make recommendations to the commander based on current intelligence."[10]

Army Doctrinal Publication 3-90's forms of contact: "There are eight forms of contact: visual, direct, indirect, non-hostile, obstacles, aircraft, CBRN and electronic (electronic contact includes contact in cyberspace). In today's operational environment, units may simultaneously experience all forms of contact. Leaders always assume that they are in contact with peer threats, particularly electronic contact."[11]

How knowing organic assets and capabilities can help gain and maintain enemy contact (instructor's note): At the beginning of each week in CLC, students conduct a task-organization brief for the BCT they will enact. While conducting the task-organization brief and during each phase of MDMP, CLC instructors press students to truly understand the capabilities of the assets available to each echelon from brigade to platoon level. Instructors have noticed that most students do not know the capabilities of optics or of organic weapon systems. Many students operate off past experiences of what they have done or heard and not off what doctrine indicates.

Publications such as Army Techniques Publication (ATP) 3-20.97, *Cavalry Troop*, provide the capabilities of all available equipment for planners to consider and use during MDMP. Cavalry leaders cannot limit themselves to only organic assets to gain and maintain contact with the enemy; a unit must use all assets available that will maximize its collection capability. Assets such as Q-50 and Q-53 counterfire radar, multifunctional teams (such as human-intelligence teams and signal-intelligence systems), the CBRN platoon, engineer recon teams, the brigade organic unmanned aerial

system platoon and rotary assets from supporting aviation battalions are invaluable to the cavalry squadron to gain and maintain contact.

Once students know all the capabilities organic to brigade operations, they need to learn how to provoke the enemy into showing its hand. If the enemy is acting in a stealthy manner, scouts need to use their reconnaissance methods to raise the enemy's detection threshold.

Detection within a peer-to-peer battle is a chess game, and the winner is the one who understands the electromagnetic scale. Whichever side can cover the spectrum with detection assets while having the discipline not to give a larger signature will be victorious.

How CRG can help scouts gain and maintain enemy contact (instructor's note): Because it is so important to maintain survivability within cavalry units, the Army ensures that commanders give particular guidance to units within the CRG and commander's security guidance (CSG) for units to understand when to maintain kinetic contact and when to conduct stand-off surveillance. Commanders articulate this guidance during the engagement/ disengagement criteria portion of the CRG and CSG.

The order to disengage does not relieve scouts of responsibility to maintain a form of contact. Instead, it denotes when units must stop kinetic contact until mutually supported by another element.

As noted, there are eight forms of contact. Cavalry scouts must establish and maintain at least one of the eight forms of contact with the enemy until the commander directs they can break that contact.

It is critical that the commander articulates engagement/disengagement criteria to the scouts to ensure they know what to do once they are in a form of contact with the enemy. Failure to do so can result in elements either losing contact with the enemy (bad) or potentially becoming decisively engaged by that enemy (worse).

Fundamental: retain freedom of maneuver

FM 3-90-2: "If these assets are decisively engaged, reconnaissance stops and a battle for survival begins. Reconnaissance assets must have clear engagement criteria that support the commander's intent. Before initial contact, the reconnaissance unit adopts a combat formation designed to gain contact with the smallest possible friendly element. This provides the unit with the maximum opportunity for maneuver and enables it to avoid having the entire unit become decisively engaged. The IPB process can identify anticipated areas of likely contact to the commander."[12]

Retain freedom of maneuver (instructor's note): How many maneuver units are there in a BCT? One could argue that there are four maneuver units. Of these four, there is only one cavalry squadron. A brigade commander can reconstruct two battalions from three battalions with combat losses. However, the cavalry squadron is a one-time-use unit if it incurs large amounts of combat losses until the operational-theater assets can provide more combat power.

Due to this fact, it is imperative for the brigade commander to conserve the squadron's combat power. Doctrine provides the cavalry squadron the fundamental of retaining freedom of maneuver to ensure it retains combat power and has the flexibility to react quickly. We gain this freedom by gaining contact with the enemy only on our terms.

How do we do this? Much of this comes down to conducting IPB effectively. Where we commonly see CLC students struggle is when they rush through Steps 1 and 2 of IPB. This causes them not to understand the area of operations they have been assigned. When proper IPB is conducted, the commander can visualize the battlefield to understand how to array forces to maximize freedom of maneuver.

The second area we see students struggle with is when the S-2 provides a detailed modified combined-obstacle overlay and enemy-situation templates, but the S-3 does not take into

account friendly forces and the maneuver plan when arraying them on the overlay. Since the enemy does not operate in a vacuum and reacts to friendly forces, the resulting maneuver plan often puts cavalry units directly in the enemy kill zones without taking into account the overwatching enemy positions. In doing so, the unit is decisively engaged or gains direct contact with a force outside its engagement criteria.

Decisive engagement: "An engagement in which a unit is considered fully committed and cannot maneuver or extricate itself. In the absence of outside assistance, the action must be fought to a conclusion and either won or lost with the forces at hand."[13]

Decisive engagement (instructor's note): Leaders must develop clear and concise CRG to ensure scouts do not become decisively engaged. As discussed in the "develop the situation rapidly" and "gain and maintain enemy contact" sections of this article, the third component of the CRG, engagement/disengagement criteria, enables units to understand what element they can engage and when.

We often see students fail to plan this down to the appropriate level. For example, squadrons should plan for platoons and troops should plan for sections. Also, students often do not understand and plan for battlefield math for their engagement ratios. Seen in FM 6-0, *Commander and Staff Organization and Operations*, Table 9-2, the Army has identified the historical data from which to start, after which students should take into account relative combat-power comparisons. From this, planners can properly identify when their cavalry units can fight for information and when they need to disengage.

Understanding operational frontages (instructor's note): Lastly, under this fundamental, where we see students failing is in their misunderstanding of operational frontages. Our students usually fall into two categories: First, they give their subordinate units a very small area of operation in relevance to the amount of combat power they own. This constrains them to only be forceful in their reconnaissance

tempo and often does not allow them to make contact with the smallest force possible or on their terms. This can also hinder massing of combat power.

Second, and conversely to the first, the students will give a unit too large an area to handle with its allocated or organic assets. This limits its ability to assign mutually supported units within its concept of maneuver. When units have this problem, it is unable to reinforce elements in contact.

When students understand frontages (these frontages can be found in ATP 3-20.97, Appendix B), they can retain freedom of maneuver and react rapidly to whatever they discover during their reconnaissance, allowing them to report and react.

Fundamental: report all info rapidly, accurately

FM 3-98: "Commanders develop plans and make decisions based on the analysis of information collected by subordinate units. Quick and accurate reports are required for the commander to make informed decisions on the proper application of his/her forces. Rapid reporting allows staffs maximum time to analyze information and make timely recommendations to the commander. Information requirements tied to decision points with an LTIOV date-time group provide a focus for units collecting information and ensure units report information to facilitate timely decisions."[14]

Report all information rapidly and accurately (instructor's note): The word *rapidly* is used in two of the reconnaissance fundamentals, which is no coincidence. The job of the cavalry squadron is to answer questions and paint the picture for the commander to make timely decisions. If used properly, scouts will allow their supported unit to gain a relative advantage on the battlefield.

That advantage only presents itself in a small window in space and time. It is essential for the cavalry squadron to identify this window and rapidly report it to its customer. The squadron staff must predict and analyze the enemy's actions through the IPB process

and understand the higher mission to help create LTIOV to assist the squadron with its reconnaissance management.

During observations of operations and planning, CLC has observed that units receive many information requirements that are not CCIR. It is critical that cavalry leaders understand the big picture to report the relevant information to shape the fight for their higher headquarters.

Once a decision-support matrix is made, it is important that cavalry leaders report in accordance to its outcomes. Scouts can report many things, but if they are the wrong things or give information that does not necessarily matter in the context of the current situation, then the relative advantage on the battlefield is lost. Cavalry squadrons are a brigade asset, which means the staff and troop commanders need to see and report on the big picture for the brigade.

After students see the big picture, the other aspect we need to address with them is the term *accurately*. Assessments can and should be made by the cavalry squadron. However, facts are different than assessments and need to be stated as such. To be successful on the battlefield, assessments will need to be made. The enemy rarely shows its full hand. Therefore cavalry units need to accurately distinguish their reports between facts and assessments to allow their customer to make a timely and informed decision.

Communications (instructor's note): When discussing reports, we have to talk communication capabilities. The cavalry lives and dies with its ability to communicate. This aspect is often overlooked during planning.

The Army has constructed its different BCT cavalry units with different communication capabilities. The squadron must understand its limitations and assets to communicate at all echelons. The Army has multiple avenues for communication: frequency modulation, high-frequency modulation, ultra-high frequency and satellite communications. It's important to learn how to use retransmission sites and the emplacement of command nodes at all levels. It's also important to read

terrain and understand how it will effect communication.

It is incumbent on the lower-level echelon to maintain communication with its higher-level command echelon. This is true for squadron to brigade and a platoon to its troop. A fleeting moment on the battlefield identified by a scout without any means of communication to his/her higher is useless. To ensure free flow of information, squadrons need to establish primary, alternate, contingency and emergency (PACE) plans to talk to their higher command and PACE plans to talk to subordinates. Scouts are the BCT's eyes and ears who answer the brigade commander's CCIR, but if they have no way to report their findings, the scouts' information will never allow the BCT to maintain relative advantage on the battlefield.

Conclusion

The seven reconnaissance fundamentals are the bedrock principles upon which all successful reconnaissance operations are planned, prepared and executed. Through mastery of the fundamentals, we enable the success of the decisive operation.

It is our sincere hope this article has sparked some interest, caused discussion and maybe encouraged more thumbing through our doctrinal manuals. The instructor's notes provided some practical examples of how to ensure you adhere to the fundamentals of reconnaissance. We encourage all our mounted leaders to attend CLC if they have not already done so.

If you have any questions, thoughts or new opinions, do not hesitate to reach out to the CLC instructors.

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Notes

[1] FM 3-90-2, *Reconnaissance, Security and Tactical Enabling Tasks, Volume 2,* March 2013.

[2] "Reconnaissance and Security Commander's Handbook," *CALL* [Center for Army Lessons-Learned] *Handbook* 17-12, April 2017.

[3] FM 3-98, *Reconnaissance and Security Operations*, July 2015.

[4] ADRP 1-02, *Terms and Military Symbols*, November 2016.

[5] Joint Publication 5-0, *Joint Planning*, June 2017.

[6] ADRP 3-90, *Offense and Defense*, August 2012.

[7] FM 3-98.

[8] Ibid.

[9] Ibid.

[10] Ibid.

[11] Ibid.

[12] Ibid.

[13] ADRP 1-02.

[14] Ibid.

Figure 5. A Soldier radios another combat team. The cavalry lives and dies with its ability to communicate. *(U.S. Army photo)*

LEGENDS OF ARMOR

General Donn A. Starry - The Architect of Air-Land Battle

Cdr, 1st Bn. 32d Armor (Bandits), 3d Armored Division - 1963-64

Cdr, 11th Armored Cavalry Regiment (Blackhorse) (RVN) - 1969-70

CG, The Armor Center - 1973-76   CG, V Corps (FRG) - 1976-77

CG, Training and Doctrine Command - 1977-81

Commander in Chief Readiness Command - 1981-83

SADDLES AND SABERS

From Medical Squadron to Armored Medical Battalion: Developing Medical Support for Mechanized Cavalry

by Dr. Grant T. Harward

When COL Daniel Van Voorhees and MAJ Adna R. Chaffee Jr. began mechanizing cavalry regiments in the early 1930s, they focused on the combat units. These armored pioneers needed to develop vehicles, organization, tactics and doctrine for combat units, but they neglected doing the same for support units – especially the medical service.

MAJ Merton Farlow, Medical Corps (MC), a surgeon in 1st Cavalry when it was mechanized, recalled "a great deal of talk about the future and probable utility of mechanized cavalry itself" but much less discussion about how to support it. "It was admitted that to render adequate medical service would probably be a difficult task," Farlow wrote.[1]

The Army Medical Department (AMEDD) faced an unprecedented challenge. Medical support for mechanized cavalry would have to be mobile to keep up, flexible to support a range of missions and capable of evacuation over long distances, but also be small enough to not encumber operations.

AMEDD took up the challenge with only limited help from the Cavalry Branch. The efforts to square that circle would be the foundation for the medical service for the Armored Force in World War II.

1920s mechanized cav

Mechanized cavalry resulted from the failure to create an independent tank force. The Army had established the Tank Corps in France in 1917 during World War I, but military and civilian leaders immediately questioned the need for it after the armistice in 1918. A post-war review board concluded that the tank was an "infantry-supporting weapon incapable of independent decisive action."[2] Consequently, the National Defense Act of 1920 abolished the Tank Corps and assigned tanks to the Infantry Branch.

This situation started changing in 1927 when the U.S. Secretary of War observed the British Experimental Mechanized Force's maneuvers, which demonstrated improvements in tank speed, range and reliability. That year, the Cavalry Branch also adopted an organization that made it smaller and more mobile by substituting some cavalrymen in combat units with machineguns and by motorizing some support units. These changes were supposed to keep cavalry relevant but unintentionally began a process of mechanization and motorization that eliminated horses from the Army.[3]

The War Department created the

Figure 1. An experimental cavalry ambulance is landed during an exercise for testing. This hybrid vehicle, horse-drawn but with modern tires, illustrates the Cavalry Branch's schizophrenic approach during the interwar years as it mechanized and motorized but still held onto its horses. *(MFSS scrapbook collection, AMEDD Center of History and Heritage Archives, Fort Sam Houston, TX)*

Experimental Mechanized Force in 1928 to test armored vehicles and concepts.[4] A board recommended creating an independent mechanized force, but the timing for it was terrible.[5] In 1929, the Great Depression hit America, devastating the economy. The War Department's budget was slashed, and the Army deemed the mechanized force, created in 1930, a "luxury" it already could no longer afford.[6]

All branches to motorize

In May 1931, Chief of Staff GEN Douglas MacArthur disbanded the mechanized force, and he issued the "General Principles to Govern Mechanization and Motorization throughout the Army." Missions, not equipment, would dictate organization, so all branches were to adopt mechanized and motor vehicles as far as practical. The tank's role expanded from infantry support to include cavalry missions like reconnaissance, security, exploitation and pursuit.[7]

The Cavalry Branch's mechanization program was limited to one mechanized-cavalry regiment for testing. In January 1932, Camp Knox, KY, was upgraded to Fort Knox to become the garrison for mechanized cavalry.[8] In November, 1st Cavalry arrived to bid farewell to horses and say hello to armored vehicles.

The War Department ordered all branches to mechanize and motorize; however, mechanization primarily impacted the Infantry and Cavalry Branches.[9] Mechanization was the use of any mechanical means to enhance a combat unit's tactical effectiveness and mobility, but it became associated with the used of armored vehicles. Motorization, on the other hand, was the substitution of draft animals by motor transport in support units for greater operational mobility.[10]

With the Infantry Branch's monopoly over tanks broken, the Cavalry Branch began developing its own tank organization, tactics and doctrine.[11] To bypass congressional mandate, tanks in the Cavalry Branch were called "combat cars." The machines were basically identical, but the roles for Infantry Branch tanks and Cavalry Branch combat cars were utterly different. Tank regiments supported slow-moving

infantry divisions, so the existing services only needed minor tweaking to provide support to these new combat units. In contrast, mechanized-cavalry regiments operated independently, advanced rapidly and fought dispersed or widely separated, which presented a myriad of problems for support units – including medical.

Bare minimum

The Cavalry Branch's priority for maneuver meant cutting support units to the bare minimum and only added to the difficulties confronting support services. In February 1932, 1st Cavalry (Mechanized) consisted of a headquarters and headquarters troop, a machinegun troop, a scout-car troop, an armored-car troop and a combat-car squadron with two combat-car troops.

Only after field testing and analysis could service units be added. The General Staff cautioned, "Our cavalry regiments (mechanized) must be kept stripped – and if we make any errors, they must be on the side of cutting out vehicles rather than adding a single one, no matter how very valuable the particular vehicle might be under certain considerations."[12]

In March 1933, 7th Cavalry Brigade

(Mechanized) was established, but it was really only a small command cell. By January 1934, cavalry planners had solidified new tactics and doctrine. Mechanized cavalry would operate in small groups dispersed over a broad front, with armored cars carrying out reconnaissance, and two combat-car spearheads supported by machinegunners and engineers assaulting and then enveloping the enemy.[13]

In May, 1st Cavalry (Mechanized) impressed observers during maneuvers, but the Cavalry Branch moved slowly to mechanize another cavalry regiment.[14] Nonetheless, it was clearly time to seriously examine what support a mechanized-cavalry brigade needed.

Cavalry planners added the bare minimum of support units, skimping particularly on medical assets. A 1934 Command and General Staff School (CGSS) paper by an Ordnance Department officer on supply and evacuation for a mechanized-cavalry brigade suggested adding medical detachments to subordinate units and a medical squadron.[15] Regimental medical-detachment ambulances would provide first aid and evacuate casualties to a brigade

Figure 2. An airplane view of a hospital station set up for a demonstration near the Washington Monument by 1st Medical Regiment. This medical asset is what cavalry planners wanted to cut from the mechanized-cavalry brigade so as not to impede its "great mobility." *(MFSS scrapbook collection, AMEDD Center of History and Heritage Archives, Fort Sam Houston, TX)*

ARMOR

collecting station, where corps or army ambulances – possibly even "ambulance airplanes" – would then evacuate wounded to corps or army medical facilities. The study declared that because of the need for "great mobility," the mechanized-cavalry brigade should not have a brigade hospital station that might slow it down.[16]

In April 1935, the War Department added a motorized field-artillery battalion to 7th Cavalry Brigade (Mechanized), but the medical squadron remained notional. It also authorized an updated organization for 1st Cavalry (Mechanized) that included a regimental headquarters, an armored-car troop, a machinegun troop, two combat-car squadrons, a service troop and a regimental medical detachment.[17]

AMEDD discussion

AMEDD planners believed the current medical squadron was unsuited for a mechanized-cavalry brigade, however. AMEDD tasked instructors and students at the Medical Field Service School (MFSS) to study the best solution for providing medical support to mechanized cavalry. MFSS was established at Carlisle Barracks, PA, in 1921 to train medical officers in field operations.[18] Also, MFSS functioned like an AMEDD think tank. Students at MFSS had time to examine current problems and future challenges, so AMEDD used them to find innovative solutions.

For example, MFSS held an advanced course for field-grade officers each year that required students to write research papers on important medical issues facing the Army. Although student papers were not official, they were influential because the Army was smaller than today, and officers who attended such centers had greater impact. The creation and expansion of mechanized cavalry resulted in a slew of MFSS papers about how to best organize a medical service for these new units.

Obviously, mechanized cavalry needed motorized medical support. The existing medical squadron numbered 13 officers, 207 enlisted men, 211 animals, 18 wagons and 17 motor vehicles. It had a headquarters troop, a collecting troop, an ambulance troop (half motorized), a hospital troop and a veterinary troop.[19] This "mixed" medical squadron was supposed to fulfill the needs of horse, partly motorized or mechanized-cavalry regiments.

MAJ Adolphus McDaniel, MC, in his 1935 MFSS paper on the medical squadron's capacity to evacuate wounded for a cavalry division, argued that it was unbalanced and that instead there should be two types of medical squadrons, either animal-drawn or motorized, depending on the cavalry division's composition.[20] Without horses the veterinary troop became superfluous, except for meat and food inspection, so only one of two veterinary officers and one of 50 veterinary enlisted men should be retained for the motorized medical squadron.

McDaniel also suggested that the motorized medical squadron combine the collecting and ambulance troops and be equipped with a "small body vehicle" (like a machinegun cart or a half-track) capable of transporting two medics (still officially referred to as "aid men" at the time) and two litter cases.[21] However, the Cavalry Branch only had one mechanized-cavalry regiment and just a few partly motorized cavalry regiments, so it held onto its "mixed" medical squadron.

Medical support limited

AMEDD planners were not only worried about the notional medical squadron for 7th Cavalry Brigade (Mechanized) but also the existing regimental medical detachment with 1st Cavalry (Mechanized). It was too small. After jettisoning 14 veterinary enlisted men, the regimental medical detachment only had three officers and 15 enlisted men plus an ambulance, two half-tracks, a truck and a motorcycle with a sidecar.[22] This left just 18 medical personnel to care for 799 other soldiers.

In his 1935 MFSS paper on evacuating the wounded in a mechanized-cavalry regiment, MAJ Levy Johnson, MC, argued that this pigmy medical unit was unequal to the mission, especially considering the nature of mechanized-cavalry operations. Horse-cavalry regiments could advance 30 miles in a day's march, but mechanized-cavalry regiments could conceivably race 150 to 250 miles a day. Mechanized-cavalry attacks would be violent, rapid and dispersed, leaving casualties spread over dozens or scores of miles. "A more difficult situation as a problem for the medical service is hard to imagine,"[23] Johnson warned.

Johnson expressed great concern about the armored-car troop because its reconnaissance missions into hostile territory were sure to produce isolated and widely spaced losses. "Information concerning such losses might, from the medical point of view, easily be fatally late in reaching the main body,"[24] Johnson said. Yet after filling regimental surgeon, assistant regimental surgeon, regimental dental surgeon, seriously-wounded department assistants, slightly-wounded department assistants, drivers and other key positions, the existing regimental medical detachment only had four medics to provide first aid to, collect and evacuate casualties. Moreover, since the two half-tracks with two medics each were assigned to trail the two combat-car squadrons, the armored-car troop and machinegun troop lacked dedicated medics.[25]

Johnson recommended adding seven more enlisted men to the regimental medical detachment, for a total of 25, allowing four medics to be assigned to each half-track and two medics to be assigned to the machinegun troop. He also emphasized the need for first-aid supplies in each vehicle and "thorough instruction of the individual [mechanized cavalryman] in the use and application of first-aid measures" because medics could not be everywhere – especially with the armored-car troop.[26]

AMEDD planners thought the great distances involved in mechanized-cavalry operations might overstretch the capabilities of motorized evacuation and examined other solutions. AMEDD considered fixed-wing air evacuation for mechanized cavalry. MAJ Ernest Harrison, MC, predicted in his 1935 MFSS paper on air evacuation that in a few years, most evacuation would be by motor transport, and in a couple of decades, practically all evacuation would be done by air transport.[27] His futurist depiction included fleets of large and small aircraft, with compartments for medical treatment operating from forward unimproved landing strips to established rear-area runways, but it was
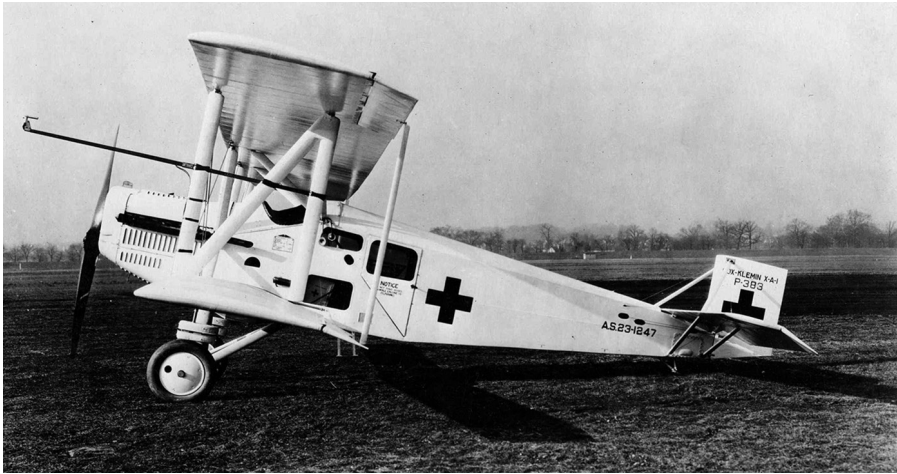
Figure 3. An example of an interwar "ambulance airplane." This was the only type of airplane capable of operating from unimproved airfields to evacuate casualties from near the front, but it was vulnerable to navigational errors, bad weather and enemy air defenses. *(Reeve photograph collection, Otis Historical Archives, National Museum of Health and Medicine)*

light on practical details and ignored challenges of navigation, weather and enemy air defenses.[28] The limitations of aircraft technology excluded air evacuation as a solution to AMEDD's problem.

Leaving wounded Soldiers behind?

Despite budgetary limitations and resistance to "dehorsing" the cavalry, the Cavalry Branch moved forward with turning 7th Cavalry Brigade (Mechanized) into a real unit.[29] In July 1936, 1st Cavalry (Mechanized) issued an organization mission statement for a mechanized-cavalry brigade emphasizing its increased speed, firepower and armor, but noting its more restricted cross-country mobility, greater reliance on supply (especially for fuel) and increased maintenance requirements.[30] During 2nd Army's maneuvers in Michigan, 7th Cavalry Brigade (Mechanized) was temporarily augmented with another motorized-artillery battalion, a motorized-infantry battalion, service units and a squadron of observation aircraft to confirm that its tactical doctrine worked and motorized infantry could keep pace with mechanized cavalry to carry out double envelopments.

In September, 13th Cavalry moved to Fort Knox to be mechanized. After examining the summer maneuvers, observers recommended adding an infantry battalion, an air-reconnaissance squadron, an engineer troop, a signals

detachment, an ordnance company and a quartermaster squadron to 7th Cavalry Brigade (Mechanized) – all of which was approved except assigning motorized infantry.[31] Cavalry planners omitted an organic medical squadron or even a brigade medical detachment.

There had also been no effort to improve the regimental medical detachment, so Farlow's 1936 MFSS paper on the medical service for mechanized cavalry again addressed the issue. Based on MFSS lectures and his own time with 1st Cavalry (Mechanized), he questioned the ability of the regimental medical detachment to do its job, arguing, "[T]he fact that casualties, under certain conditions, are supposed to be left with the civilian population is in itself an admission of failure."[32]

The Cavalry Branch's efforts to make horse-cavalry regiments leaner and meaner had cut support units, including the medical service, to the bone. The mechanization of cavalry regiments had worsened the situation by removing veterinary personnel from their regimental medical detachments. Due to insufficient medical support, Cavalry Branch doctrine allowed casualties to be left behind with enemy civilians if combat units needed to keep advancing.[33]

Farlow took umbrage not only at the insufficient number of enlisted men but also that there was "no information as to how the 15 enlisted men are

to be used."[34] He believed adding more medics and litter bearers would allow the regimental medical detachment to properly collect wounded men so they were not left spread across the battlefield lost, forgotten or captured.

Also, Farlow argued that the regimental medical detachment lacked the necessary vehicles to keep up with combat units, especially a mechanized evacuation vehicle with enough space to treat six casualties. He believed there should be five officers and 23 enlisted men, plus four mechanized evacuation vehicles manned by a driver and three medics (with an accompanying motorcyclist each for communicating messages because there were no radios for individual vehicles) assigned to the two combat-car squadrons, machinegun troop and service troop.

Since there was no room for medics in armored vehicles, cavalrymen would evacuate wounded to the medics. Once enough wounded had been collected, the mechanized evacuation vehicles would transport them to an ambulance center. From the ambulance center, the ambulance would evacuate casualties directly to a division hospital because there would be no brigade hospital.[35]

Farlow did not challenge the assumption that there was no need for more brigade medical assets for mechanized cavalry.

Hawley's influence

Other AMEDD planners believed the whole medical service for the mechanized-cavalry brigade needed to be redesigned from the ground up. MAJ Paul Hawley, MC, was a veteran World War I surgeon, former Philippine Department medical inspector, recent instructor at the Army Medical School and a rising star in AMEDD. Hawley wrote a CGSS paper about the evacuation and hospitalization for a mechanized-cavalry brigade in 1936, pushing for change at every level.

"After pondering these problems for almost a year, I am convinced that the present doctrine of evacuation must be modified if a satisfactory medical service is to be provided for any force that is considerably more mobile than the echelon upon which it depends

Figure 4. A mobile surgical unit consisting of trucks with a special operating-room body. During the mid-1930s, MFSS experimented with such vehicles to try to find a solution to providing mobile medical support to mechanized and motorized units. *(MFSS scrapbook collection, AMEDD Center of History and Heritage Archives, Fort Sam Houston, TX)*

Figure 5. A look inside one of the trucks with special operating room body.
(MFSS scrapbook collection, AMEDD Center of History and Heritage Archives, Fort Sam Houston, TX)

ultimately for supply and evacuation," Hawley wrote.[36]

Hawley argued that the "most critical link in the entire chain of evaluation" was moving a casualty from place of injury to an aid station for emergency treatment and organized transport to the rear.[37] Therefore, he reasoned, a mechanized-cavalry brigade needed aid stations on wheels stripped of all but the most essential equipment to keep pace with combat-car squadrons. Lacking equipment, these mobile aid stations needed to evacuate casualties as soon as possible after providing stabilizing first aid.[38]

In Hawley's conceptual framework, each combat-car squadron should have a squadron medical detachment of one officer and five enlisted men, with two or three ambulances. The ambulances would rotate: one would be the aid station until it needed to evacuate casualties to the brigade hospital station, when the second would come forward to take its place, then the pattern would repeat.[39] The machinegun troop would have similar support, but the armored-car troop would have to transport its wounded in its own vehicles.

The regimental medical detachment would be responsible for the regimental aid station, which would have more equipment and supplies to collect, provide care to and evacuate casualties.[40] Hawley thought a regimental medical detachment should have five officers and 45 enlisted men, with eight ambulances, two trucks and three motorcycles. This was twice what MFSS papers had suggested.

Finally, the medical troop would focus on supply and hospitalization at the brigade level. The brigade hospital station needed to be just as mobile as squadron aid stations because Hawley expected it would have to move so often that it would have no time to waste unpacking and repacking equipment, setting up and taking down tents, or loading and unloading wounded. He suggested using "metropolitan" ambulances as mobile hospital stations because they could carry the necessary equipment, and two litter cases.[41]

The brigade medical troop had to evacuate casualties because higher medical echelons might not know where it was

Figure 6. A 1934 ambulance shown in contrast to the 1942 ambulance. The "metropolitan" ambulance on the right is the type considered for use as a mobile hospital station due to its roominess, comfort and ability to heat the inside temperature (to help treat shock). *(U.S. Army Signal Corps photograph collection. Otis Historical Archives, National Museum of Health and Medicine)*

as it hurried to keep up with the rest of the unit.[42] The brigade medical troop should have five officers and 60 enlisted men with 10 ambulances, eight trucks and eight motorcycles.

After graduating from CGSS, Hawley was promoted and became both the commander of 1st Medical Regiment (a training/demonstration unit co-located at Carlisle Barracks) and an instructor at MFSS, ensuring his ideas about the medical service for mechanized cavalry entered the mainstream of AMEDD thought.

Eve of war
Despite AMEDD's legitimate concerns, the Cavalry Branch ignored the medical-service issue even as it began pushing in 1937 to create a mechanized-cavalry division.[43] This prompted the War Department to re-examine its mechanization policy, as some believed mechanized cavalry was turning into a *de facto* independent branch and the mechanized force should be resurrected. However, Chief of Staff GEN Malin Craig decided against this in March 1938.[44] The War Department rejected the Cavalry Branch's proposed mechanized-cavalry division in May 1939; however, it suggested establishing another mechanized-cavalry brigade.[45]

In September 1939, as German panzer divisions overran Poland, the Cavalry Branch again attempted to convince the War Department of the need for a mechanized-cavalry division. In December, the Infantry Branch established the Provisional Tank Brigade at Fort Benning, GA, belatedly beginning its own experiments in employing a large mechanized formation.[46] In May 1940, during Third Army maneuvers in Louisiana, the General Staff experimented with mechanized units, including turning 7th Cavalry Brigade (Mechanized) into a provisional mechanized-cavalry division and combining 7th Cavalry Brigade (Mechanized) and the Provisional Tank Brigade into the Provisional Mechanized Force.[47]

Coincidentally, the day after the maneuvers started, Nazi Germany invaded France. The fall of France, changes that increased the chief of staff's authority, a growing budget and pressure from key people prompted Chief of Staff GEN George C. Marshall to radically change mechanization policy.[48] A mechanization conference decided to create two mechanized divisions under a mechanized corps, reorganize tank regiments like mechanized-cavalry regiments, put mechanized-cavalry officers in charge and adopt mechanized-cavalry doctrine.

In July, the War Department created the Armored Force and gave it control over all tactical and technical developments for mechanized units.[49] The term "armored" instead of "mechanized" emphasized the force's independence from the other branches and the tank's new primacy on the battlefield.

The Armored Force initially consisted of I Armored Corps with 1st and 2nd Armored Divisions, which were built from 7th Cavalry Brigade (Mechanized) and the Provisional Tank Brigade, respectively, and 70th Tank Battalion (Medium). Armored divisions consisted of a headquarters and headquarters company, a reconnaissance battalion, an armored brigade (with two light tank regiments, a medium tank regiment, an engineer battalion and an artillery regiment), an infantry regiment, a signal company, a supply battalion, a maintenance battalion and a medical battalion.[50]

Now-LTC Hawley (again an instructor at MFSS after graduating from the Army War College) reprinted his four-year-old CGSS paper on the medical service for a mechanized-cavalry brigade so AMEDD could use it as the framework for the medical service for an armored division.

America enters war
In December 1941, the Japanese attack on Pearl Harbor brought the United States into World War II. The Armored Force hurriedly made more changes to its armored divisions. By March 1942, an armored division consisted of a division headquarters (including two combat commands), two armored regiments (with one light-tank battalion and two medium-tank battalions each), three artillery battalions, an armored infantry regiment, an engineer battalion and a division train, including a maintenance battalion, a supply battalion and a medical battalion.[51] AMEDD had ensured the Armored Force enjoyed robust mobile medical support.

The chapter on the Armored Force medical service in Field Manual (FM) 8-5, *Mobile Units of the Medical Department*, was updated in May. It began by emphasizing the Armored Force's speed and paucity of hospitals below armored corps level.[52] A division surgeon advised on sanitation and medicine, oversaw medical training and liaised with forward medical units.

Each armored division had an armored medical battalion consisting of a headquarters and headquarters company with 13 officers and 90 enlisted men, and three armored medical companies that could be detached to either combat command or division train.[53]

Each armored medical company had a headquarters platoon, a litter platoon, an ambulance platoon and a treatment platoon, with 11 officers and 122 enlisted men, a half-track, 31 trucks and

Figure 7. A display of new equipment by 1ˢᵗ Cavalry (Mechanized) at Governor's Island in New York harbor in 1939. A medical trailer marked with a Red Cross is clearly visible. Despite AMEDD's efforts, 1ˢᵗ Cavalry (Mechanized) still only had an understrength medical detachment with few vehicles to support the entire regiment. *(Frank R. McCoy photograph collection, U.S. Army Heritage and Education Center)*

two trailers. The treatment platoon even had trucks mounted with a special operating room body instead of tents to unpack and repack.[54]

A unit surgeon in charge of health and running a unit medical detachment was assigned to each of the various regiments and battalions in an armored division. Every regimental medical detachment contained a headquarters section and two (sometimes more) battalion sections, with trucks and a half-track, and operated the regimental aid station.[55] Every battalion medical detachment had a headquarters squad and an aid-station squad (an extra aid-men squad or a litter-bearer squad was assigned to the reconnaissance battalion, infantry battalions and engineer battalion) that operated a battalion aid station.

Establishing battalion aid stations in the rear before an attack was deemed "impracticable" and squads were supposed to "advance along the axis and establish at the rallying point, where they will take over casualties removed from the armored vehicles."[56]

The only major Armored Force addition to the original AMEDD plan was an emphasis on radios as the primary means for medical units to communicate and coordinate on the battlefield.[57] No one in the Army knew exactly how many casualties an armored division could expect to suffer while on campaign, although the British Army had begun sharing its figures from battles in North Africa, so only the test of battle would prove if the medical service for armored divisions was equal to the task.

From 1932 to 1939, the Cavalry Branch ignored mechanized cavalry's medical requirements while focusing on combat units and maneuver warfare to the extent that it planned to abandon wounded troopers in enemy country. AMEDD continued trying to provide support and find a better solution. The unsung efforts of MFSS students laid the groundwork for the firm foundation upon which AMEDD helped the Armored Force build its medical service at breakneck speed after 1940.

Today the Medical Center of Excellence

(successor to MFSS) works to integrate medical support into the Army so units have both force health protection and treatment for wounded, ill and injured. Hopefully, Armor Branch and AMEDD collaborate better today and in the future than Cavalry Branch did during the interwar years.

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Holocaust that will be published by Cornell University Press in a year or so."

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ACRONYM QUICK-SCAN

AMEDD – Army Medical Department
CGSS – Command and General Staff School
FM – field manual
MC – Medical Corps
MFSS – Medical Field Service School

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