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CHIEF OF ARMOR'S HATCH

BG Chad C. Chalfont
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Ready for Next Fight: Armor Force Training Standards

It is an honor to join the United States Armor School and serve each of you and our branch as the 55th Chief of Armor. We thank our 54th Chief of Armor, BG Simmering, for his outstanding work over this past year. His efforts, along with your efforts, resulted in real readiness gains across the Armor Force. We are in better shape in terms of manning, maintenance, and training because of BG Simmering's leadership.

With this first opportunity to communicate to the Armor Force, we should consider one message: today's situation demands that the Armor Force reinforces and invests in its training standards. Here are some thoughts on this.

Today, we know the Armor Force operates at a high operational tempo. The pace of our operations is demanding, and this presents both opportunities and challenges. Our units execute tough training at home station, at the National Training Center, and on operational deployments. Our training strategies offer tremendous leader development opportunities: today's platoon leaders and platoon sergeants will draw upon their current experiences when, years from now, they lead battalions. Still, every Armored Brigade Combat Team feels the pressure of not having enough time. Every day, leaders in the Armor Force make hard choices on the many things that they must do, perhaps wishing they had just a little more time to do just a few things very well.

The demands for Armor Brigade Combat Teams persist, particularly after February 24, 2022. And the war in Ukraine has confirmed what we have known for some time: in our next war, we will fight on a battlefield that is transparent, extended in depth, and incredibly lethal. We must think hard about how the Armor Force will fight in the next war. Our Armor and Cavalry formations must be able to survive and accomplish the mission during periods where battles are characterized by heavy *attrition* and a more static battlefield. In other periods, the Armor Force must be able to move rapidly to exploit opportunities where *maneuver* gives commanders positions of advantage and holds at risk that which what the enemy values. The all-arms Armored Brigade Combat Team delivers the decisive combination of mobility, firepower, and shock effect to fight and win on today's battlefield. In a dangerous world, there's no better place to be than in our Army's Armor and Cavalry formations.

With this in mind, it is clear that the Armor Force has begun to move the needle in a positive direction on its manning challenges. We have seen a remarkable turn-around in 19K recruiting. Two years ago, our 19K accessions were well below the target; this year we project to bring tankers into the Army at or above the target. Establishing the 19C Bradley Crewmember MOS is our first payment on a new investment in the Armor Force's mounted maneuver expertise. And while implementing the Army's new structure has created turbulence for our Scouts and Cavalry formations, it has also allowed us to reinforce manning in our ABCTs. Still, these positive developments come with a significant challenge: a lot of new Soldiers are joining our ranks, and they require training.

This trifecta – high operational tempo, the changing character of war, and manning turbulence – points to a singular imperative: we must reinforce and invest in the Armor Force's training standards. Here are some ideas on where we might start working on this:

- Drive increased lethality by implementing the new tank gunnery standard outlined in the new TC 3-20.31-120 (Gunnery: Heavy Tank)
- Set conditions for tough, realistic live-fire training by assessing our home station range capability gaps and then prioritizing resources to resolve these gaps
- Assist leaders in their efforts to prioritize training by clearly defining what our "fundamentals" are for tank platoons, scout platoons, tank companies, and cavalry troops
- Develop clear standards for maintenance training – both for

operators and mechanics

- Develop clear standards for simulations training so that we can train better during maneuver and live-fire training
- Reinforce our current unit programs that incentivize and prepare candidates to succeed at the Master Gunner Course
- Improve our current crew gunnery training strategy to standardize how we track and maintain readiness across the four fundamentals of mounted maneuver: shoot, move, communicate, and maintain
- Adapt our current Armor Force training standards to drive tougher training (for example: night training, stress shoots, force on force repetitions as competition)
- Review our training standards and course outcomes at the US Army Armor School, with particular focus on NCOPDS, Scout Leader Course, and Cavalry Leader Course
- Enforce the standard for Preventive Maintenance Checks and Services, leveraging certification programs in our units and certification at every US Army Armor School course

Whatever you think of these ideas, it is what *you* think and do about training that matters most. The choices you make and the direction you provide to your teammates will be decisive in being ready for the next fight. The challenge is for us to reinforce our training standards. Start with your standards – define them clearly – and then move out to prioritize, plan, prepare, and execute tough training.

Again, it's an honor to serve the Armor Force. While we should be excited about the opportunities that are out there for us in the coming months, we should also be clear-eyed about the challenges we face. Please know that the Armor School is here to support you in whatever you are doing – we are invested in your success. If there is ever anything that we can do to assist you, do not hesitate – just holler.

Forge the Thunderbolt!

Acronym Quick-Scan

ABCT – armored brigade combat team
MOS – military occupational specialty

A U.S. Army M1A2 Abrams Tank, with 2nd Squadron, 16th Calvary Regiment, conducts range training during Armor Basic Leaders Course at Fort Moore, GA. The Armor Basic Leaders Course, led by 2-16 Calvary, trains and develops tank platoon leaders who are competent leaders of character capable to lead, fight, and win in the multi-domain environment while increasing Soldier readiness and strengthening family and community bonds. *(U.S. Army Reserve Photo by Staff Sgt. Joshua Wooten)*

GUNNER'S SEAT

CSM Waylon D. Petty
Command Sergeant Major
U.S. Army Armor School

Develop Future Master Gunners

The master gunner (MG) is the subject matter expert for all weapon system platforms in armored brigade combat teams (ABCTs). MGs advise commanders at all echelons and are a crucial part in the operations process on combat and gunnery related training. For armor specifically, there are two master gunner courses — Abrams Master Gunner (AMG) and Bradley Master Gunner (BMG). Both courses are very demanding and require candidates to pass multiple technical tests to earn the coveted MG badge.

The term "master" is in the title for a reason because, quite frankly, we need subject matter experts within our formations. Therefore, the challenge is to train, in most cases, a junior NCO to achieve the level of mastery within their craft. The AMG/BMG cadre are up to this challenge and do produce MGs, but we do not produce enough of them. Therefore, identifying, training, and selecting candidates to attend the AMG/BMG Course must be a top priority for divisions with ABCTs.

There needs to be an understanding between the U.S. Army Armor School and the operational force to identify the need and produce more MGs to increase lethality and be better warfighters.

Career Management Field 19 Soldiers will primarily train/operate within ABCTs where platforms are the most technical and casualty-producing pieces of equipment in the formation; therefore, MGs are needed more than ever. For our armored crewmembers (Abrams and Bradley crews), I would argue the training focus needs to be more on the technical aspect, where MGs are empowered to provide that level of training. There has always been a need for military occupational specialty (MOS) 19K (Armor Crewman) Abrams MGs, but with the implementation of MOS 19C (Bradley Crewmember) that goes live on Oct. 1, 2024, we need to ensure they have priority to attend the BMG Course to instill a culture of mastery within that MOS.

There are quite a few changes within Master Gunner Course that will help produce more MGs for the Abrams and Bradley platforms. Master gunner Common Core will close in October 2024 when we go to pure AMG/BMG standalone courses. AMG/BMG Course prerequisites will be reestablished and enforced. With the implementation of MOS 19C, the Armor School will work with other proponents to ensure unit authorizations are adjusted appropriately (especially for Bradley Master Gunner). Finally, the Armor School will propose a standing operating procedure (SOP) for identifying, training and selecting candidates to attend the AMG/BMG Course. This SOP will require III Corps, divisions with ABCTs, and the Armor School to work together to ensure future MGs are identified early and trained to standard at unit level, and the best Soldiers selected to attend the AMG/BMG Course.

MGs at echelon will need to be empowered by their commanders with MG unit training being prioritized and protected. The SOP will go into detail on how this will be accomplished, but essentially, company/troop MGs will identify talent, division MGs will run a pre-MG course twice a year (commonly referred to as SABOT Academy), and III Corps will manage the AMG/BMG slots through a consolidated order of merit list.

The details are currently being determined to include the division-run SABOT Academy instruction. In the near term, we need to identify and train quality candidates to attend the AMG/BMG Course. In the long term, we need to create a culture where every Abrams and Bradley Gunner is inspired to be a MG by selecting the best gunners to attend SABOT Academies.

Master gunners are crucial for our armored crewmembers' training progression to increase lethality, now more than ever. With the AMG/BMG Course realignment and the need to

fill authorized MG positions, we need to develop future MGs by identifying potential candidates, providing them quality training at the unit, and selecting the best candidates to attend the course. The goal is to build a funnel of candidates early in their careers so that by the time they are tank and Bradley commanders, they have the experience and possess the prerequisites to attend the AMB/BMG Course and earn the MG badge.

Forge the Thunderbolt!

Acronym Quick-Scan

ABCT – armored brigade combat team
AMG – Abrams Master Gunner
BMG – Bradley Master Gunner
MG – master gunner
MOS – military occupational specialty
SOP – standing operating procedure

MONS, BELGIUM (Sept. 1, 2024) – U.S. Soldiers, assigned to 2nd Battalion, 5th Cavalry Regiment, 1st Armored Brigade Combat Team, 1st Cavalry Division, pose for a photo on their M2A3 Bradley Fighting Vehicle during the Tanks in Town commemoration event in Mons, Belgium, Sept. 1, 2024. Events like this one help rotational Soldiers supporting V Corps connect with local community members and inspire trust and confidence in the U.S. military. *(U.S. Army photo by PFC Richard Morgan)*

Combat Vehicle Service Optimization: Efforts to streamline services for Abrams and Bradley Family

by LTG Heidi J. Hoyle, BG Michael J. Simmering, and MAJ Dirk K. van Ingen

In his address at the Association of the U.S. Army (AUSA) Annual Meeting and Exposition Oct. 10, 2023, GEN Randy George, Army Chief of Staff (CSA), expressed the Army is over-servicing our equipment, therefore placing a load on formations that have very little time.[1] He stated "modest changes" to maintenance intervals could save Soldiers time to focus on training or spend with their families.[2] Following an in-depth M1 Abrams and M2 Bradley service requirements review led by the U.S. Army Armor School and the subsequent implementation of a pilot at Fort Moore, LTG Heidi Hoyle, Army Deputy Chief of Staff for Logistics (G-4), announced March 27, 2024 changes to M1 Abrams and M2 Bradley services across the Army as part of an effort to reduce maintenance complexity and increase readiness.[3]

LTG Hoyle's remarks were immediately followed by an exception to policy allowing U.S. Army Forces Command (FORSCOM) units to implement revised service schedules that, among other changes, align the M1 Abrams and M2 Bradley family of vehicles (FoV) to the Army's Regionally Aligned Readiness and Modernization Model (ReARMM), the force generation process used to provide predictable forces capable of supporting the National Defense Strategy.[4]

For the M1 Abrams these changes will shift current semi-annual service tasks to eight months, current annual tasks to 16 months, and current biennial tasks remain at 24 months. For the M2 Bradley FoV, this revision would merge current semi-annual and annual service task into a single 12-month requirement.

These revisions to M1 Abrams and M2 Bradley scheduled service requirements provide more time for unscheduled maintenance, reduce scheduled maintenance complexity, and synchronize the demands of these platforms with the operations tempo (OPTEMPO) of today's force generation process, without sacrificing readiness or Soldier safety.

Figure 1. Tank and Bradley services underway in 2017 at Fort Bliss, TX. *(U.S. Army photo by Matt Perdue)*

Starting in June 2023, the Army assembled a group of senior chief warrant officers with the task of determining how the Army could "unburden Soldiers and create true readiness."[5] The output of this group's work was Headquarters, Department of the Army (HQDA) Execution Order (EXORD) 335-23, which among other things, was an important step directing the development of a deliberate process to methodically replace time-based standards with usage-based standards. Previously, the Army started this effort with the publication of the Non-combat Operations Maintenance Plan (NCOMP).

These programs were designed to better align maintenance requirements to actual usage rather than time-based service intervals during non-combat operations, with the intent to eventually replace the Low Usage Program described in AR 750-1.[6] However, these programs largely focused on the Army's wheeled fleets, leveraged additional administrative requirements on units to enroll vehicles into the program and did not provide an alternative for how the Armored Force serviced combat vehicles.

The Army traces the standard for how we service equipment back to 1938, 86 years ago as of the writing of this article.[7] For the Armored Force, the first M1 Abrams and M2 Bradleys were fielded in the 1980s with major modernization programs that delivered most of today's combat platforms in the early 2000s and again starting in 2015+. During this time, the Abrams and Bradley systems have become older, and with periodic upgrades to these platforms, significantly more complex. In the 40+ years these vehicles have been in the fleet, the Army maintained a standardized approach to services regardless of OPTEMPO, equipment utilization rates, or trends over time. Concerningly, the operational readiness (OR) rates for these fleets have continued to drop for the last several years with units finding it more and more difficult to achieve a 90 percent rating due to the combined demands of OPTEMPO, unscheduled and scheduled maintenance.

Due to the age, complexity, and demands of these platforms, and the call to action from Army Senior Leaders, the U.S. Army Armor School hosted an M1 Abrams and M2 Bradley service review Nov. 8 - 9, 2023, to review opportunities to reduce the demands these

complex platforms place on our crews and mechanics without sacrificing Soldier safety or readiness levels.

During the M1 Abrams and M2 Bradley FoV service review, the U.S. Army Armor School hosted participants from across the Armor enterprise to conduct analysis of current M1 Abrams and M2 Bradley scheduled service plans to inform recommendations for modified service checklists and a possible U.S. Army Armor School pilot. Participants included representatives from the Program Executive Office Ground Combat Systems (PEO-GCS), Tank-Automotive & Armaments Command (TACOM), Army Capabilities Manger - Armored Brigade Combat Team (ACM-ABCT), the Maneuver Center of Excellence (MCoE), TACOM Field Maintenance Expansion (TACOM-FMX), and subject matter experts from FORSCOM units, including 1st Armored Division, 1st Cavalry Division, 1st Infantry Division and 3rd Infantry Division.[8] This audience conducted analysis of the equipment service standard currently required of ABCTs on M1 and M2 fleets to inform possible technical solutions for Army senior leader consideration. The response generated from the force on this subject showed that across the Armor enterprise, leaders are interested in streamlining and improving our approach to services to maintain the highest readiness levels possible while keeping our Soldiers safe.

BG Michael Simmering, the 54th Chief of Armor, asked the participants to critically review current M1 and M2 annual and semi-annual service maintenance tasks. In addition to this critical review, his guidance to participants focused on three areas. First, assessing the strengths and weaknesses of moving service windows for equipment from a routine, purely time-based, six-month model to one aligned with the Army's ReARMM force generation processes' requirements. Second, provide recommendations to inform updated M1 Abrams and M2 Bradley service checklists. Third, provide recommendations the U.S. Army Armor School can pilot and implement at no risk to FORSCOM units, to see if they have the desired effect. BG Simmering's litmus test for any possible changes was, "would the implementation of these changes save formations time and maintain readiness without inducing a safety risk to Soldiers?"

In answering BG Simmering's questions, the assembled experts from PEO-GCS, Abrams and Bradley product management teams, and senior maintenance chief warrant officers and non-commissioned officers from FORSCOM units produced the following five recommendations.

1. **Align the M1 services to the Army's ReARMM force generation process by shifting current semi-annual service tasks to eight months, current annual tasks to 16 months, and current biennial tasks remain at 24 months.** The allowed service variance would remain at 10 percent of the service period. Several individual service checks were modified by frequency or usage trigger.
2. **Align the M2 services to the Army's ReARMM force generation process by merging current semi-annual and annual service tasks.** This will remove redundancies and afford commanders flexibility by offsetting from the M1 service schedule.
3. **Recommend a U.S. Army Armor School led pilot of the TACOM-FMX maintained MCoE Abrams and Bradley fleets.** This pilot started in January 2024, with initial findings anticipated by May 2024, to determine impacts of the service task and schedule revisions on OR rate, equipment availability, and maintainer to task ratio spent between scheduled and unscheduled maintenance.
4. **Recommend consideration of categorizing transit time from the port of departure to port of arrival as non-service time or not counting towards time-based service intervals.**
5. **The U.S. Army Armor School would continue to work with stakeholders to develop recommendations, including standardization of minimum pre-dispatch quality assurance and quality control (QA/QC) checks in accordance with AR 750-1 for Abrams and Bradley platforms, standardization of platoon services, and an M2 Bradley pre-gunnery checklist to align with existing M1 Abrams pre-gunnery requirements and best practices.**

While the M1 Abrams and M2 Bradley intervals in the recommendations are still time based, the team assessed this was a critical first step to meeting GEN George's intent by giving more time back to maintainers. Most importantly, the team assessed all changes added negligible risk to Soldiers or platforms. It would become the responsibility of the U.S. Army Armor School and Maneuver Center of Excellence (MCoE) to communicate the findings through MCoE back to the Sustainment enterprise and Army senior leaders with regards to the Abrams and Bradley fleets. The first critical step was the update of service plans for the fleet of 142 M1 Abrams and 122 M2 Bradleys by the MCoE TACOM-FMX team. These updated service plans drew from updated field service bulletins (FSBs) produced in a remarkable short turn from November to December by the Abrams and Bradley product management teams. These FSBs documented the changes identified during the Service Summit and were revised from the current published Abrams and Bradley technical manuals (TM).

Following the publication of an HQDA G-4 Exception to Policy to AR 750-1, the U.S. Army Armor School and MCoE's Abrams and Bradley Optimized Service pilot officially commenced in January 2024, focusing on evaluating its impact on operational readiness rates, equipment availability, and maintainer to task ratios. The U.S. Army Armor School, even more than the typical ABCTs in the operational force, requires a large daily training set of Abrams and Bradleys to meet its 19 series one station unit training, Armor Basic Officer Leader Course and functional course load. On any given training day, the Armor School requires an average of 100 of its 142 M1 tanks in the field. To put this in perspective, the Armor School has conducted nine M1 and nine M2 company size gunneries since the start of the 2024 calendar year.[9]

Through March 31, 2024, the pilot has produced promising initial results, with a seven percent increase in Abrams availability and a 15 percent rise in Bradley availability compared to the six

months prior. Most importantly, there have been no safety issues, no significant increase in unscheduled maintenance, repair part costs, or major assembly consumption. According to the MCoE Chief of Staff for Sustainment, COL Corey Woods, the flexibility of the pilot program has enabled the capture of more unscheduled maintenance needs for the M1 Abrams and M2 Bradley fleets, which might have otherwise been overlooked during routine service.

To ensure safety of Soldiers during the extended service windows, the MCoE directed the TACOM-FMX team to implement additional QA/QC checks during vehicle dispatching. For the Abrams FoVs, maintainers' QA/QC inspections included, at a minimum, checks of the battery box, steering, park and service brakes, main nuclear, biological, and chemical systems, class III oil leaks, any fuel leak, handheld fire extinguishers and automatic fire extinguishing systems (AFES), main gun replenisher, and drivers vision enhancer (DVE). For the Bradley FoVs, maintainers' QA/QC inspections included the battery box, steering, brakes, Class III oil leaks, any fuel leak, manual fire extinguishers and AFES, seatbelts, and DVE. Also, all vehicles in the pilot must still fulfill the HQDA EXORD 335-23 90-day operator road march requirement. Simultaneously, the Armor School is working with stakeholders to work towards implementation of the additional recommendations, by standardizing Abrams and Bradley platoon service requirements in the soon to be published TC 3-20.31-9, *Armored Platoon Services*, and ensuring the pre-fire checks for the M2 Bradley are referenced in future Bradley TMs as well as the pre-operational checks found in the platform's Commander's Tactical Display.

With approval of the FORSCOM request to deviate from current requirements on April 3, 2024, allowing operational units to implement the revised pilot service schedules for their M1 Abrams and M2 Bradley fleets spearheaded by the U.S. Army Armor School and MCoE, there is an opportunity to provide more time for unscheduled maintenance, reduce scheduled maintenance complexity, and see how commanders synchronize the demands of these platforms with the OPTEMPO of today's force generation models. Ultimately, while the Armor School's pilot sought to identify changes at no risk to operational units to see if change was possible and desired, voices from operational units saw the immediate benefit and opportunity to control their own destiny and meet the CSA's guidance to rebalance maintenance priorities.

While the FORSCOM exception to policy will expire one year from April 3, 2024, the DCS, G-4 Maintenance Directorate will reauthorize it if the "pilot" intervals are not first outlined in a revised technical manual or Maintenance Action Message by TACOM prior to the exception to policy's expiration. In the meantime, the two pilots are positioned to offer crucial insights and data to Army senior leaders, allowing them to make informed decisions regarding service optimization for these critical vehicles, and possibly expand the basic principles to other combat and combat support platforms across the operational forces' brigade combat teams. Rooted in a shared commitment to readiness, safety, and adaptability, these initiatives underscore a proactive approach to addressing future challenges that will be necessary to implement the CSA's vision of continuous transformation. While it is still too early to assess definitive conclusions regarding the pilot's effectiveness, early indications suggest that service intervals can be streamlined across the operational force without compromising Soldier safety or equipment performance.

LTG Heidi Hoyle *is the U.S. Army Deputy Chief of Staff, G-4, Washington, DC. Her pervious assignments include Director of Operations, G-43/5/7, Office of the Deputy Chief of Staff, G-4, Washington, DC; Commanding General, Military Surface Deployment and Distribution Command, Scott Air Force Base; Commandant, U.S. Army Ordnance School, U.S Army Sustainment Center of Excellence, Fort Gregg-Adams, VA; and Commanding General, Joint Munitions and Lethality, Life Cycle Management Command/Joint Munitions Command, Rock Island, IL. LTG Hoyle holds a master's of science degree in systems engineering from the University of Virginia and a master's of science degree in national resource strategy from National Defense University.*

BG Michael Simmering *is the 54th Chief of Armor and Commandant of U.S. Army Armor School at Fort Moore, GA. His previous assignments include Deputy Commanding General (Operations) for 1st Armored Division, Fort Bliss, TX; Commander for Operations Group at the National Training Center, Fort Irwin, CA; and Commander, 3rd Brigade, 4th Infantry Division, Fort Carson, CO. BG Simmering holds a master's of science degree in continuing education from Kansas State University and a master's of science degree in joint campaign plan and strategy from National Defense University.*

MAJ van Ingen *is the Chief, Commandant's Initiative Group at the U.S. Army Armor School, Fort Moore, GA. His previous assignments include Executive Officer, 2nd Armored Brigade Combat Team, 1st Armored Division, Fort Bliss, TX; Executive Officer, 1st Battalion, 35th Armored Regiment, 2nd Armored Brigade Combat Team, 1st Armored Division, Fort Bliss, TX; and planner, G-5, 1st Armored Division, Fort Bliss. MAJ van Ingen holds a master's of science degree in adult learning and leadership from Kansas State University and a master's of arts degree in military operations from the U.S. Army Command and General Staff College.*

Notes

[1] GEN Randy A. George, Association of the U.S. Army (AUSA) 2023: Army Senior Leader Press Conference, Washington D.C., Oct. 10, 2023.

[2] Joe Lacdan, "Army chief of staff outlines service priorities at AUSA," ***Army News Service***, Oct. 10, 2023, accessed April 15, 2024, https://www.army.mil/article/270691/army_chief_of_staff_outlines_service_priorities_at_ausa.

[3] AUSA, "New maintenance standards aim to unburden soldiers," ***AUSA.org***. March 29, 2024, accessed April 14, 2024, https://www.ausa.org/news/new-maintenance-standards-aim-unburden-soldiers.

[4] Director Maintenance Programs and Policy, "Exception to Policy, Army Regulation (AR) 750-1, ***Army Materiel Maintenance Policy***," Washington, D.C.; April 3, 2024.

[5] AUSA, "New maintenance standards."

[6] "HMMWV: Non-Combat Operations Maintenance Plan," ***PS Magazine***, March 22, 2021, https://www.psmagazine.army.

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[7] AUSA, "New maintenance standards."

[8] Note: The only active component armored brigade combat team not represented at least at the division level was 3rd Armored Brigade Combat Team, 4th Infantry Division due to its participation in National Training Center (Fort Irwin) Rotation 24-02.

[9] COL Corey Woods, "Rethinking Heavy Tracked Vehicle Maintenance: The M1/M2 Optimized Service Pilot," unpublished article, April 5, 2024.

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Acronym Quick-Scan

AFES – automatic fire extinguishing systems
ACM-ABCT – Army Capabilities Manger - Armored Brigade Combat Team
CSA – Army chief of staff
DVE – drivers vision enhancer
EXORD – execution order
FSB – field service bulletin
FORSCOM – U.S. Army Forces Command
FoV – family of vehicles
HQDA – Headquarters, Department of the Army
MCoE – Maneuver Center of Excellence
NCOMP – Non-combat Operations Maintenance Plan
OPTEMPO – operations tempo
PEO-GCS – Program Executive Office - Ground Combat Systems
QA – quality assurance
QC – quality control
ReARMM – Regionally Aligned Readiness and Modernization Model
TACOM – Tank-Automotive & Armaments Command
TACOM-FMX – TACOM Field Maintenance Expansion
TM – technical manuals

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"Armor Strong"

The Trouble with LOGSTATs

by MAJ Sarah A. Barron

"The logistics status report is the primary product used throughout the brigade and at higher levels of command to provide a logistics snapshot of current stock status, on-hand quantities, and future requirements. The logistics status report is a compilation of data that requires analysis before action. Providing the commander a bunch of numbers with percentages and colors is useless. The commander requires an analysis based on the data along with a recommendation for action." Field Manual (FM) 4-0, ***Sustainment Operations***, July 31, 2019.

The logistics statistics (LOGSTAT) report is a critical status report in sustainment operations. It is essential for forecasting and coordinating resupply and ensuring combat readiness by accurately reporting logistics and Army Health System support status. Army leaders must shift their mindset to optimize on-hand stockages and improve reporting accuracy to avoid emergency resupply needs. Challenges arise from inconsistent reporting frequencies hindering sustainment planning. Improving brigade LOGSTAT reporting is crucial for efficient operations, focusing on disciplined, accurate, and timely submissions to prevent unnecessary resupply missions and backhauling of supplies.

A comprehensive LOGSTAT is not just detailed, it is easily transmitted through multiple channels, universally understood, and regularly practiced. While an overly detailed LOGSTAT listing every Department of Defense Identification Code (DODIC) is excessive, a simplistic list of prowords or color codes hampers accurate resupply forecasting. LOGSTATs should not just be simple for platoon sergeants to gather data, they should be detailed enough for sustainment planners to refine estimates and reallocate assets as needed. A clear LOGSTAT reporting plan, including primary, alternate, contingency and emergency (PACE) methods, should not just be implemented in mission orders, it should be integrated into day-to-day operations, including routine garrison duties. Company, battalion, and brigade executive officers (XOs) are not just responsible for enforcing the process, they are crucial in ensuring timely, precise reports. Recipients and responsibilities for receiving, processing, and disseminating brigade LOGSTATs must be clearly defined to enable success.

A constant after-action review comment from the combat training centers is that rotational training units struggle to submit accurate and timely LOGSTATs or to accurately forecast required commodities. This results in emergency resupplies at every level from line companies to the division logistics package (LOGPAC), potentially desynchronizing the entire division sustainment infrastructure. The struggle to accomplish what, if taken at face value, is a simple task is attributed to a combination of poor time management at lower echelons (the platoon who ran out of time to count what they had

Logistics Status Report (LOGSTAT)

Unit:	A Co. 123rd AR BN	Date/Time:	151130MAY2021
Location:	Camp Smith	Headcount:	57

Line 1	Class I	Combat Load	On Hand	Next 24	Next 48	Next 72	Status %
	MRE (Case)	275	300	50	50	50	100%
	Water, Bulk (Gallons)	300	500	300	200	200	100%
	Ice (Bag)	250	150	125	125	125	60%
Line 2	Class II						
	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Line 3	Class III						
	JP-8 (Gallons)	60K	55K	30K	35K	35K	91%
	FRH (Gallons)	500	600	250	300	500	100%
Line 4	Class IV						
	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Line 5	Class V						
	120mm APFSDS-T	350	175	150	100	175	50%
	.50 cal AP	10K	8.5K	5K	2K	2K	85%
Line 6	Class VI						
	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Line 7	Class VII						
	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Line 8	Class VIII						
	Tourniquet	180	75	30	50	0	41%
	Lactated Ringer IV	70	60	20	40	15	85%

POC

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Figure 1: Example LOGSTAT Format from ATP 3-90.5 *Combined Arms Battalion* JUL 2021, Figure 6-3a, Pg 6-11. *(U.S. Army graphic)*

on-hand and simply reported "No change" from the previous report) and poor connectivity between lower and higher echelons ("We were jumping"; "NIPR [Non-Secure Internet Protocol Router] was down."; and "I sent it on JBC-P [Joint Battle Command-Platform]. Didn't you get it?" are all commonly heard phrases). Leaders will issue direct guidance to subordinates to do better and the timeliness of LOGSTATs will improve, but the reports remain largely inaccurate or insufficient to inform future sustainment planning. Our observations have found that the problem is not so much how the units are reporting, as much as that subordinate units do not have a clear understanding of what to report. This is further complicated by staffs at echelon who are simply consolidating subordinate unit reports and pushing them higher without doing any analysis or using the LOGSTATs to inform forecasts.

FM 4-0 states that LOGSTATs account for a unit's requirements based on their task organization and assigned mission and should include the current on-hand stockages as well as projected needs out to 72 hours.[1] Army Techniques Publication (ATP) 4-90, ***Brigade Support Battalion,*** further states that accurate LOGSTATs are tailored to the commander's critical information requirements to support decision making. It also says that the report should include both on-hand stockage levels as well as projections out to 72 hours.[2] Maneuver doctrine states that LOGSTATs should identify on-hand amounts and requirements to inform the commander's decision-making process.[3,4] While all of the reviewed doctrine stated that it was a unit responsibility to determine the exact format and reporting mechanism for LOGSTATs, if they showed an example format, they all used the same one (Figure 1). It is unrealistic for the same format to adequately meet the available reporting mechanisms and the level of detail required at all echelons.

To drive acuate reporting, the brigade must first standardize how the organization will count on-hand vs consumed, what constitutes a combat or basic load, and what green-amber-red-black actually mean as a percentage of

Defining Green/Amber/Red		
Green	80%	100%
Amber	50%	79%
Red	30%	49%
Black	0%	29%

Figure 2. Defining Green/ Amber/ Red/ Black in percentages. *(U.S. Army Chart built by MAJ Sarah Barron)*

on-hand stocks. A recommended tactic, technique and procedure (TTP) is to track commodities as on-hand until they are issued to the end user, at which point they are considered consumed; however, that TTP may not always apply for all commodities. If a battalion receives 350 cases of Meals Ready to Eat (MRE) (three days of supply, assuming an M-M-A ration cycle) and immediately issues the MREs to the individual Soldier, that Class I cannot be counted as consumed simply because it was issued to the end user. Likewise, a combined arms battalion that has just been refueled has more than 24,000 gallons of fuel in the vehicles. That fuel must be tracked at the company level and included in LOGSTAT reporting to fully inform commanders of their remaining operational reach.

Defining '100 percent'

Organizations must also clearly define what 100 percent means. Some commodities are easy: 100 percent of Class I rations is three meals per Soldier per day while 100 percent of Class IIIB is the total capacity of all available assets. Commodities such as Class IV and Class V can be slightly more difficult as each battalion has different requirements. The brigade staff must clearly articulate what the basic load is by DODIC, item, or combat configured load for each battalion. Once this allocation has occurred, it must be widely published to ensure that leaders at all levels understand what their "100 percent" looks like and how far they can operate before requiring a resupply.

This includes informing higher echelons of support of the defined value of 100 percent and what the total operational reach is expected to be based off those numbers. After the brigade has established how they are going to count each commodity, and at what point each commodity is considered consumed, and how 100 percent of a commodity is defined by unit, they must now set what percentage corresponds to green-amber-red-black for use in abbreviated reporting and what sustainment actions each report triggers.

Historically, units will begin reporting amber as soon as they fall below 90 percent and will be in the red at 70 percent. If the sustainment action tied to red on Class IIIB is to push an emergency resupply, the unit will be expending significant, unplanned energy to distribute less than a single fuel system worth of Class IIIB. Emergency resupplies are typically triggered by poor LOGSTAT procedures and can degrade the sustainment architecture of the brigade by placing unnecessary LOGPACs on the road.[5] This can further affect future operations as the drivers and convoy commanders are not able to achieve a proper work-rest cycle as well as desynchronizing planned resupply operations at both the battalion and brigade level. These inefficiencies can be mitigated by readjusting how the organization assesses green-amber-red-black.

Throughout the Global War on Terror and ensuing contingency operations, Army leaders grew comfortable having large amounts of commodities at hand and resupplied on all commodities easily. Units rarely operated at less than 50 percent of commodities on-hand. It will require a mindset shift among both maneuver and sustainment leaders to get comfortable using more of their on-hand stockages without calling for an emergency resupply,

knowing that the planned resupply will be able to return them to as close to full capacity as possible in accordance with the priority of support. Figure 2 shows a recommended green-amber-red-black dispersion.

Adjusted dispersion

This adjusted dispersion encourages subordinate units to consume more of their on-hand commodities before requesting resupply, which allows sustainment units to economize their movements. They can execute less frequent, larger LOGPACs which provides additional stability to the sustainment infrastructure by increasing predictability and improving work-rest cycle of sustainment executors. This provides the maneuver commander with a healthier enterprise and increased operational reach.

Once units have determined what data to report on the LOGSTAT, they must establish how each echelon will report that information. It is a delicate balance of ensuring lower echelons report enough information to properly inform decision-making while ensuring those echelons have the equipment and network necessary to submit the report. Regular brigade and division rotations at the National Training Center make it clear that LOGSTATs should look different at each echelon. A company that is conducting operations is unlikely to have access to a computer and network to submit a 60+ line Excel report. While vehicle mounted Joint Battle Command – Platforms (JBC-P) offer an Excel-like option, it is extremely difficult to manipulate a sheet of that size using the providing stylus and keyboard. It also becomes more difficult to transmit the sheet rather than a simple free text message. Company-level LOGSTATs should be formatted to enable easy transmission on JBC-P free text, FM radio, or hard copy as a contingency. Additionally, the company-level LOGSTAT should focus primarily on accurate, on-hand commodities. Figure 3 shows an example LOGSTAT for an armor company that can be easily sent by either JBC-P free text or FM.

Orange 1 – AR Co LOGSTAT (OH Qty)	
Line 1	a. DTG b. Unit c. Company Trains Location d. PAX Count (including attachments)
Line 2 CL I	a. MREs (OH at company trains) b. Hot As requested? (YES / NO) c. Water cans (gals OH/total capacity) d. Ice requested? (lbs)
Line 3 CL III	a. VIC Tank Level (By 1/4 tank increments) b. Fuel cans (gals OH/total capacity) c. Bulk fuel requested? (YES/NO) d. CL III (P) by type/qty
Line 4 CL IV	a. CCL required by type/qty b. C-wire (OH) c. Pickets (OH)
Line 5 CL V	a. C787 HEAT-MP-T b. CA26 APFSDS-T c. CA38 Canister d. A064 (5.56 link) e. A059 (5.56 ball) f. A131 (7.62 link) g. A557 (.50 cal link) h. Other
Line 6 CL VIII	a. CLS Pack b. IFAK Pack
Line 7 Combat Power	a. M1A2 (OH/FMC) b. M1064 (OH/FMC) c. M88 (OH/FMC)
Line 8	Special requests/Notes

Figure 3. Example Armor Company LOGSTAT format. *(Developed by MAJ Sarah Barron)*

Company commanders are responsible for submitting accurate and timely reports, to include LOGSTATs. They may choose to have their XO, or first sergeant gather and turn in the reports on their behalf, but that does not absolve them of their responsibility if the LOGSTATs are late or contain poor data. If the LOGSTAT format chosen by the battalion is too burdensome to be completed during operations, companies must provide feedback to adjust the format until it works for both echelons. Once the format is established, company commanders must prioritize accurate submissions or communication with higher if there is a delay.

As the battalion staff and forward support company (FSC) receive the LOGSTAT, they can now analyze the submissions, consolidate the data and compare with their forecasts, and prepare the battalion LOGSTAT. The staff, primarily the S-4 and the S-1, is responsible for reviewing each submission for accuracy, not simply consolidating bad data and passing in on. If a company reports an inexplicable gain of more fuel on-hand than they have capacity or states that they have gone from 100 percent Class IIIB to 15 percent since the last report but hasn't conducted any operation that would justify the change, the S-4 must reach out to the company to find out the ground truth. Units must adjust their culture and eliminate the idea that a report submitted on time, even if it has bad data, is acceptable or preferable to a slightly delayed, but accurate, report. Timely,

inaccurate reporting can have catastrophic effects on the unit. If each combined arms battalion reports that it needs 5,000 gallons of fuel that it doesn't have capacity for, the brigade will request more than 15,000 gallons of unneeded fuel from the division. This puts four M969 bulk fuel trucks with eight Soldiers on the road unnecessarily. It also causes the FSCs to each put an extra M978 with two Soldiers on their battalion LOGPACs, further disrupting work-rest cycles or preventing the FSCs from conducting proper maintenance on their equipment. This wasted effort would have been prevented if the S-4 had called the XOs to validate LOGSTATs when reports don't align with forecasts.

Before staffs can use forecasts to validate LOGSTATs, they must first build the forecasts. Forecasting should occur at all echelons; it is not simply on the support operations office (SPO) shop to create and maintain the forecasts for the brigade. The Army has several forecasting tools available and in production to assist forecasting, and sharing the forecasts with both supporting and supported units. The Operational Logistics (OPLOG) Planner and Quick Logistics Estimation Tool (QLET) are both developed by the Combined Arms Support Command (CASCOM) and available for download from the OPLOG Planner and Log Planning Tools Teams page.[6]

- QLET is an Excel sheet that is prefilled with Army Force Structure Designs and the G-4 Approved Planning Factors that enables a user to quickly forecast based on their chosen modified table of organization and equipment (MTOE) force file. Users can make minor changes to the anticipated consumption rate (Minimum/Average/Maximum) for some commodities as well as tailor available distribution asset types. The QLET data is assuming that the full MTOE of equipment is available, in use, and fully mission capable. Once the file is loaded on the user's computer it can be used offline. Each forecast would be saved as an additional file.
- OPLOG Planner is a program that must be loaded on a government computer by an administrator, which can make it more difficult to get started. It uses the same planning factors as QLET but is focused on higher echelons of support. OPLOG planner is highly flexible and allows for building tailored task forces and linking sustainment units to maneuver units. Planners at the brigade level and below might find OPLOG planner challenging to get the level of detail required to maintain accurate forecasts.
- CASCOM and the Army Software Factory are also developing the Mercury: Sustainment Planning Tool.[7] This tool allows the user to create highly tailorable sustainment forecasts, down to the company level. These plans can also be shared with other users to enable real-time, collaborative planning across echelons. As Mercury is a web-based tool, it requires connectivity to build and share plans, which becomes more challenging at lower echelons. The Mercury tool is still in active development and the development team invites all user to log on, make plans, and submit feedback to continue to improve the tool.
- The fourth option for forecasting is to use the Sustainment Planning Factors found in ATP 5-0.2-1, ***Staff Reference Guide Volume 1,*** to manually compute projected consumption based on the specific factors for the

Orange 1 – FSC Co LOGSTAT (OH Qty)	
Line 1	a. DTG b. Unit c. FTCP d. PAX Count (including attachments)
Line 2 CL I	a. MREs (OH at company trains) b. Hot As requested? (YES / NO) c. Water cans (gals OH/total capacity) d. Ice requested? (lbs)
Line 3 CL III	a. VIC Tank Level (By 1/4 tank increments) b. Fuel cans (gals OH/total capacity) c. Bulk fuel requested? (YES/NO) d. CL III (P) by type/qty
Line 4 CL IV	a. CCL required by type/qty b. C-wire (OH) c. Pickets (OH)
Line 5 CL V	a. A064 (5.56 link) b. A059 (5.56 ball) c. A131 (7.62 link) d. A557 (.50 cal link) e. Other
Line 6 CL VIII	a. CLS Pack b. IFAK Pack
Line 7 Combat Power	a. M978 (OH/FMC) b. TRM (OH/FMC) c. LHS/PLS (OH/FMC) d. M984 (OH/FMC) e. M88 (OH/FMC) f. VSAT (OH/FMC)
Line 8	Special requests/Notes

Orange 2 – FSC Bulk LOGSTAT (OH Qty)	
Line 1	a. DTG b. Unit
Line 2 CL I (Bulk)	a. MREs (OH for distribution) b. UGRs (Mods) c. Bulk water (gals OH/total capacity) d. Ice (bags OH for distribution)
Line 3 CL III	a. Bulk JP8 (gals OH/total capacity)
Line 4 CL IV	a. CCLs (OH for distribution) b. C-wire (OH for distribution) c. Pickets (OH for distribution)
Line 5 CL V	a. C787 HEAT-MP-T b. CA26 APFSDS-T c. CA38 Canister d. A974 APDS-T e. A975 HEI-T f. PU16 TOW g. A064 (5.56 link) h. A059 (5.56 ball) i. A131 (7.62 link) j. A557 (.50 cal link)
Line 6	Special requests/Notes

Figure 4. Example FSC LOGSTAT formats for both company internal and bulk. *(Developed by MAJ Sarah Barron)*

unit.[8] The ATP gives planning factors for everything from the gallons per minute bulk fill rate for a M978 to the number of casualties that can fit in a medium tactical vehicle. This is the recommend primary method of forecasting for battalion and below as it does not require any connectivity and can be conducted without a computer if the organization has identified key commodities to be forecasted ahead of time and written down the planning factors.

Continuous update

Regardless of which tools the staff chooses to utilize, they must continually update their forecasts and validate them against actual consumption. Validating the forecasts should be a continual give and take. New forecasts validate the submitted LOGSTATs to request commodities for the next 24 hours and the actual consumption from the previous 24 hours shows whether those forecasts were accurate. If the staff finds that their forecasts are continually wrong, they need to relook what planning factors they are using and make modifications as needed. Staffs must also ensure that they are forecasting against the planned operation, not just trying to get on-hand commodities back to 100 percent. In a resource constrained environment, requesting over-forecasted requirements to maintain 100 percent capacity will put unnecessary strain on the logistics enterprise. Conversely, if leaders are not forecasting for the mission, they may miss a critical resourcing shortfall where the operational requirements exceed capacity. When the shortfall is identified 24-48 hours out, there is usually time to either cross-level internally or request additional assets for a higher echelon of support to bridge the gap. If the shortfall is not identified until units are reporting that they are black, the unit is at risk of culminating, even if they were at full capacity after the LOGPAC.

After the battalion staff has reviewed and validated the company LOGSTATs against their forecasts, they can consolidate and prepare the battalion LOGSTAT for submission. At this echelon, it is likely that staff has access to computers, even if steady connectivity is a challenge. That allows the staff to utilize tools like Excel to assist in consolidating the FM or JBC-P company LOGSTAT submissions they received. This also enables them to compare the company LOGSTAT requirements against the FSC bulk on-hand commodities. It is highly recommended to have the FSC submit two LOGSTATs: the first is what they have on-hand to support their own movement and personnel; the second shows what they are carrying as bulk to support the battalion. This prevents miscounting commodities such as CL I MREs that are allocated to the FSC as being available for issue. Figure 4 shows an example of the recommended two FSC LOGSTATs.

Once the LOGSTATs are consolidated and analyzed, they can be submitted to brigade. Again, it is critical that brigade is mindful of what systems the battalions consistently have available to them when dictating the format and PACE for LOGSTAT submissions. They also need to ensure there is a codified feedback mechanism to inform the battalions when the LOGSTAT has been received. This prevents the "I sent the LOGSTAT three hours ago, didn't you get it?" conversations. The reporting echelon should assume that, if they did not receive a confirmation message, the LOGSTAT was not received, and they should move through the PACE to submit their report until they confirm receipt. Likewise, the higher echelon must set a time following a missed report that they begin reaching out to subordinate units to inquire about the status of the report, also utilizing the PACE if they receive no response.

Brigade level analysis

As the brigade staff receives the battalion LOGSTATs, they also conduct staff analysis to confirm accuracy and validate their own forecasts. The brigade S-4 and SPO must ensure that their forecasts do not conflict with each other and, if they identify any points of friction, they address them prior to submitting the LOGSTAT to division or confirming commodity requests to the division sustainment brigade (DSB). If the S-4 requests one thing in the submitted LOGSTAT and the SPO requests something different to the DSB, it can create confusion in the division sustainment enterprise and negatively affect the supplies that flow into the brigade's area of operations. It is vitally important that the brigade maintain and validate their own forecasts based on the upcoming operations to ensure they are feeding accurate requests to the division 48-72 hours out. Those requests can be refined by actual consumption in the 24- to 48-hour window, but the initial request must be submitted with enough time for the division to react. Figure 5 shows the flow of LOGSTATs through the brigade to the division and a brief description of responsibilities at each echelon.

Additionally, the SPO must capture the status of LOGSTAT submissions, and an assessment of critical commodities determined by operational requirements in a logistics common operating picture (LOGCOP) that is available to the staff and commander. The conditions described in the LOGCOP will drive commander decisions and should also drive future planning. An incomplete or stale LOGCOP fed by poor LOGSTAT reporting will energize command involvement to correct perceived shortcomings. This action can quickly destabilize the sustainment infrastructure and degrade command trust in the sustainment community.

Conclusion

In conclusion, the trouble with LOGSTATs is a more multifaceted problem than simply assuming that companies and battalions aren't doing what they're told. Leaders at every echelon and across warfighting functions must contribute to setting conditions for success, from clearly defining expectations for LOGSTAT submission to ensuring all echelons have the necessary equipment to submit according to the PACE.

As units refine and solidify their reporting processes, they must then practice them. LOGSTATs are rarely submitted outside of field problems or CTC rotations and the LOGSTAT and forecasting processes are highly perishable skills. They must be integrated into garrison operations and trained continuously at home station if we hope to change the story at the CTC.

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Notes

[1] FM 4-0, ***Sustainment Operations***, July 2019, Appendix E, Page E-1.

[2] Army Techniques Publication (ATP) 4-90, ***Brigade Support Battalion***, June 2020, Change 1, November 2021, Chapter 2, Pg 2-20.

[3] ATP 3-90.5, ***Combined Arms Battalion***, July 2021, Chapter 6, Page 6-10.

[4] ATP 3-21.20, ***Infantry Battalion***, December 2017, Appendix H, Page H-15.

[5] ATP 4-90, ***Brigade Support Battalion***, June 2020, Change 1, November 2021, Chapter 6, Page 6-3.

[6] TR-SCoE OPLOG Planner and Log Planning Tools [TR-SCoE OPLOG Planner and Log Planning Tools | General | Microsoft Teams.]

[7] Mercury: Sustainment Planning Tool https://mercury.swf.army.mil/.

[8] ATP 5-0.2-1***, Staff Reference Guide***, December 2020, Appendix G.

Acronym Quick-Scan

ATP – Army Techniques Publication
CASCOM – Combined Arms Support Command
DODIC – Department of Defense Identification Code
DSB – division sustainment brigade
FM – field manual
FSC – forward support company
JBC-P – Joint Battle Command-Platform
LOGCOP – logistics common operating picture
LOGPAC – logistics package
LOGSTAT – logistics statistics, (or) logistics status
MRE – Meals Ready to Eat
MTOE – modified table of organization and equipment
OPLOG – Operational Logistics
PACE – primary, alternate, contingency and emergency
QLET – Quick Logistics Estimation Tool
TTP – tactics, techniques and procedures
XO – executive officer

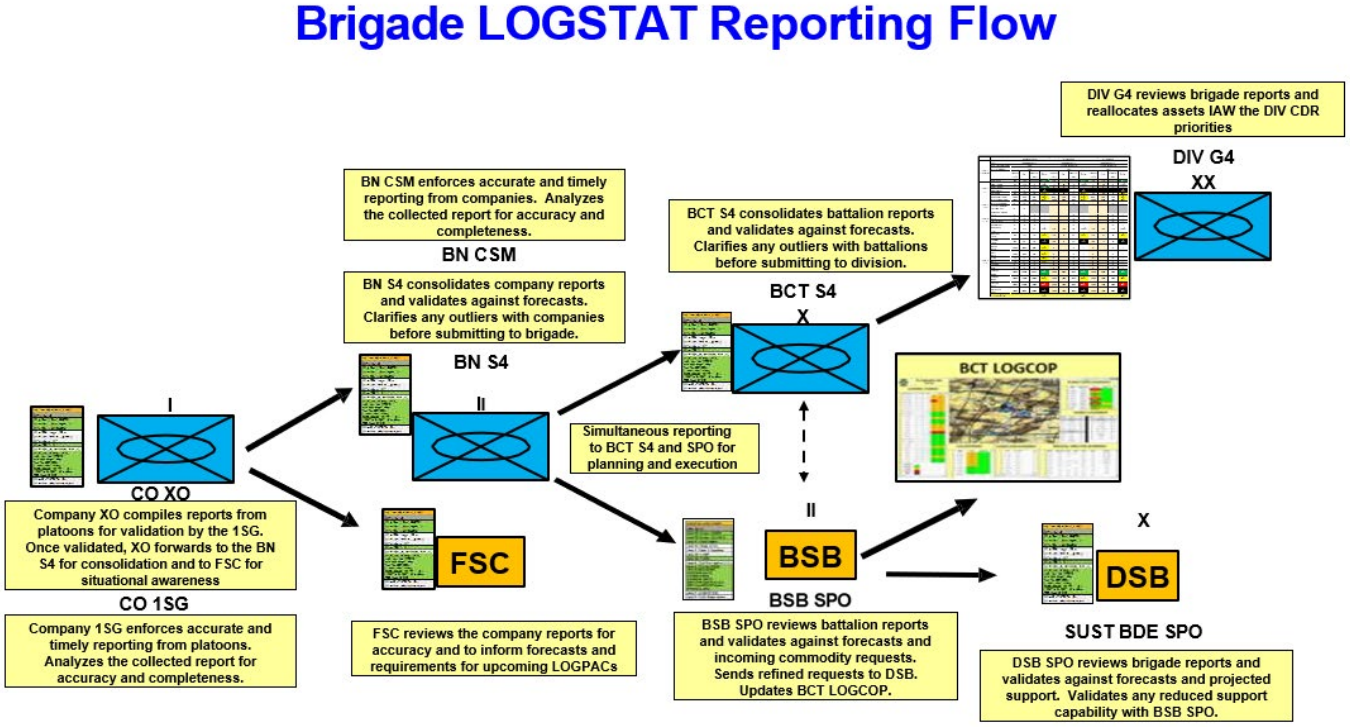

Figure 5. Brigade LOGSTAT reporting flow with brief descriptions of responsibilities at each echelon. *(Developed by MAJ Sarah Barron)*

U.S Tank Gunnery: Historical Ebb and Flow of Proficiency

by Robert S. Cameron, Ph.D.

A gap exists today between the capabilities of tank weapon systems and the ability of crews to employ them to maximum effectiveness. Current tank lethality reflects significant recent improvements to optics, fire control systems, networks, and ammunition. Tanks possess the ability to engage varied targets with precision at ever longer ranges whether stationary or moving. Yet many crews struggle with the basics of tank gunnery. The 2019 III Armored Corps Lethality Study and analysis of the most recent Sullivan Cup Best Tank Crew Gunnery Competition underscore this lack of proficiency. In the latter case, armor units sent representative crews to compete in a series of events designed to test foundational skills emphasized in doctrine. Crews struggled with boresight, target detection and identification, machine gun engagements, and target sensing.[1] These issues reflect the culmination of a lapse in tank gunnery spanning years and highlight the linkage between proficiency and broader, Army-wide developments and trends.

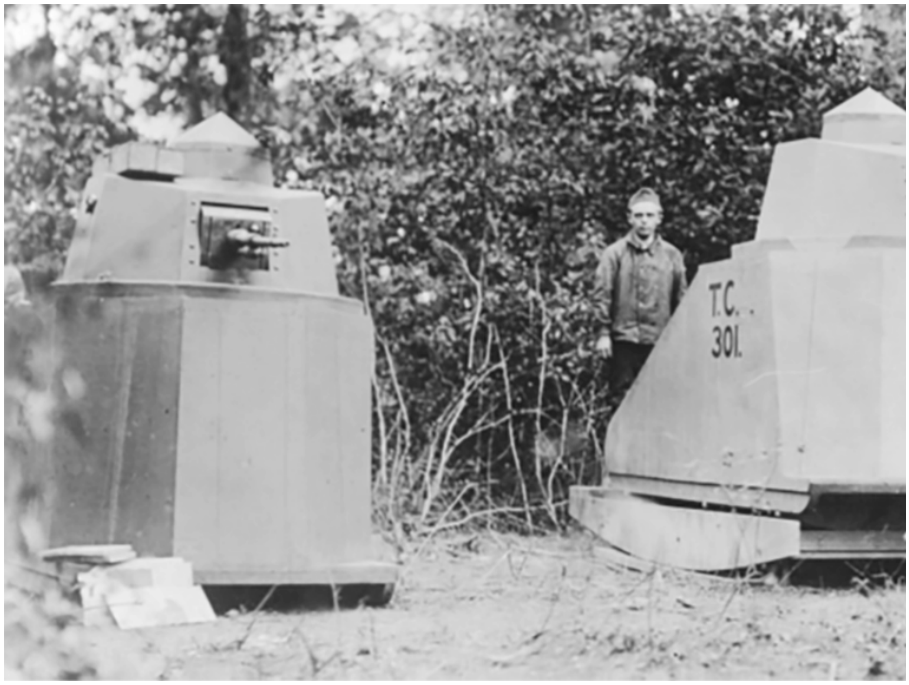

Figure 1. U.S. Tank Corps tank gunnery training devices of World War I. *(Photo by U.S. Army Signal Corps)*

World War I and interwar years

In World War I the creation of the first American tank force triggered generation of the Army's first tank gunnery training program. Its focus lay upon weapons operation and maintenance.[2] For crews reliant upon vision slits for situational awareness, subject to sudden vehicle breakdowns, and working in the confines of a steel beast that quickly filled with fumes, simply firing the weapon in the general direction of the enemy proved an accomplishment, particularly in those tanks in which the gunner also served as the loader and tank commander. In the 1920s tank gunnery training retained its focus upon the gunner's ability to operate and maintain his weapon, refined through the addition of checks on sight usage and target sensing. Live fire engagements constituted the culmination of this training, with a report card maintained for each individual soldier.[3]

In the 1930s tank gunnery constituted a series of sequential steps from weapons orientation to live fire qualification that entailed engaging a variety of simulated targets from a moving vehicle. Records of individual gunnery skills were maintained at the unit level, and special insignia and financial compensation existed as incentives to achieve high gunnery scores.[4] Although these measures marked improvements since the Great War, in practice they tended to result in better paid range marksmen rather than effective tank gunners. More complex gunnery training that involved platoon operations in a tactical environment suffered from the variety of different platforms in service. The small Army tank fleet included obsolescent World War I-era platforms, several variants of newer light tanks, and prototypes issued for testing and evaluation. Moreover, most units lacked a sufficient complement of personnel and platforms even for their peacetime authorization, while the Army's bifurcated mechanized development program meant still further doctrine and training variations between the Infantry's tank force and the 7th Cavalry Brigade (Mechanized).*

By decade's end modifications to tank gunnery training included crew and unit exercises, and a qualification process with more training steps and gateway evaluations prior to a live fire event for record. Reflective of the M2-series of light tanks and M1-series of combat cars, the focus lay upon machine gun engagements at relatively short ranges that did not require complex ballistic solutions. By 1939, however, some infantry tank leaders advocated the concentration of tanks in battalions to better manage and provide uniformity to gunnery training.[5] Such benefits were not viable among a tank force scattered across the country in small, understrength units with varied access to firing ranges.+ These ideas coincided with a shift from machine-gun armed tanks to ones equipped with a turret-mounted 37mm main gun, exemplified by the M2A4. This weapon required training changes to

reflect the need for accuracy from a stationary position rather than the delivery of suppressive machine gun fire from a moving platform commonplace for much of the decade.*

World War II

In 1940 the creation of the Armored Force in response to wartime developments in Europe marked a major expansion of the Army's tank component, resulting in the first armored divisions and separate tank battalions. The scale and pace of this expansion undermined tank gunnery proficiency. The emphasis given to training new personnel, organizing new units, and building cadres for the next wave of unit activations diluted the existing talent and eroded overall gunnery knowledge and skills. The first armored divisions and separate tank battalions therefore developed their own training programs, which included gunnery techniques. Reports on their activities were shared with the Armored Force headquarters, which in turn strove to incorporate best practices into its own training efforts. Nevertheless, the absence of a standard gunnery training program made unit and formation commanders the architects and evaluators of their own training. Hence early Armored Force gunnery instruction reflected a broad range of approaches shaped by materiel availability, range access, and unit commander experience. Moreover, commanders who considered maneuver more important to combat effectiveness than gunnery

Figure 3. A tank crew cleaning their tank's main gun after operations in Belgium, September 1944. *(U.S. Army Armor and Cavalry Collection)*

Figure 2. The M2A4 Light Tank with a turret-mounted 37mm gun. *(U.S. Army Armor and Cavalry Collection)*

reflected this bias in their training. The only common thread across the force lay in ensuring gunners understood the rudiments of how to fire and maintain their weapons.

The Armored Force sought a gunnery manual to streamline doctrine, reduce training complexity, and provide one standard to enable uniformity in training and employment. The first such manual published in April 1943 — long after the combat debut of American armored units. It provided combat techniques and the first set of principles to guide training. It was updated the following year to reflect combat lessons learned, but the value of these manuals and related doctrinal publications overseas proved limited, since they lagged behind the deployment of armored units to combat theaters and the fielding of newer tanks.

The 1943 manual was not distributed to units until the subsequent winter, while the 1944 manual published in July did not actually reach combat units overseas until December.[6] Therefore, many units continued to rely upon their own gunnery techniques, despite the uniformity and standardization now in published doctrine.

Officer ignorance posed another problem. The rapid expansion of the Armored Force placed officers in command positions despite minimal knowledge of gunnery. The Armored Force headquarters endeavored to address this problem by implementing a course in gunnery technique in the Armor School. The course began in March 1943 and included a detailed immersion into the techniques and nature of gunnery, starkly contrasting with previous classes that focused upon nomenclature and weapons operation. This course proved a boon to armor leaders — provided they attended it. By war's end, junior officers and NCOs proved unanimous in their recommendation that commanders of armored units be educated and actively engaged in all aspects of tank gunnery.[7]

Sustaining tank gunnery proficiency in deployed units proved difficult. Combat losses destabilized both crews and unit command arrangements. Trained replacements arrived, but often the excessive time lag between the completion of training and arrival in their assigned unit necessitated in-theater refresher training. Nor was the overall level of training, especially gunnery, considered sufficient for combat operations.

Newly arrived gunners in combat zones tended to lack confidence in their abilities, proved slow to lay the main gun on target, and on the battlefield struggled to make the range estimations so critical to an accurate ballistic solution.[8]

Postwar Era

Nevertheless, the war's end found the Armored Force with a uniform tank gunnery program, underpinned by doctrine that reflected wartime lessons learned and supplemented with effective schoolhouse instruction. Realizing the fruits of this positive development required stability across the force. Yet the postwar period was characterized by chronic instability. The rapid and precipitous demobilization resulted in largescale loss of armor talent and tsunamis of Army-wide personnel turbulence. Much of the remaining force was employed in occupation duties that required clerks and patrolmen rather than tank gunners. The Army's General Reserve, intended to address national emergencies, included only a single armor brigade equivalent whose shortages of personnel and equipment undermined training. Organizational changes to improve the combat effectiveness of infantry divisions with organic tank units occurred largely on paper.

In the Japan-based Eighth Army, for example, each of the four infantry divisions should have included a tank battalion and three regimental tank companies. In fact, they possessed only a single tank company.[9] Even so, personnel shortages, occupation duties, employment as an opposing force in field exercises, and limited access to appropriate maneuver areas and ranges undermined training effectiveness. While improvements to the Eighth Army's personnel and training situation occurred in 1949-1950, tank gunnery proficiency continued to suffer from inexperienced leaders, replacements lacking military occupational specialty (MOS) -specific training, and the regular diversion of senior NCOs and officers to assignments that removed them from troop leadership. Moreover, the tank units remained understrength and in deference to Japanese infrastructure equipped with light tanks instead of the heavier vehicles mandated by their tables of organization and equipment.[10] These factors ensured whatever gunnery training occurred bore little resemblance to actual combat.

In Europe demobilizing mechanized cavalry, tank, and tank destroyer units provided the resources to create the U.S. Constabulary, a light mechanized force oriented upon stability operations with little need for tank gunnery skills. With the onset of the Cold War, the U.S. Constabulary transitioned into the first armored cavalry regiments. Their creation spurred the development of tank training areas dedicated to gunnery and maneuver on sites once used by the *Wehrmacht*. Moreover, theater-specific training programs boosted the overall readiness of the small U.S. Army footprint in Europe. These developments reflected a renewed U.S. commitment to European security, underscored by the creation of the North Atlantic Treaty Organization.

Cold War

When the Korean War began in June 1950, tank gunnery proficiency sank further as the Army struggled to organize and deploy tank units at their wartime strength. Many of the tank battalions initially deployed to South Korea received influxes of new replacements and Soldiers drawn from across the Army.[*] The new units thus lacked cohesion at the crew and unit levels, aggravated by the inability to familiarize themselves with tanks issued on the eve of combat deployment. Thrust into the fighting in the Pusan Perimeter, they were unable once in Korea to train and develop gunnery skills in accordance with established policy and doctrine.[+] Tank gunnery proficiency developed via combat rather than through a deliberate training program. Similarly, the readiness levels of those units providing personnel to deploying units also fell until new replacements could be integrated into crews and cohesion rebuilt.

Over time and under the pressure of combat gunnery improved — and not just in the war zone. Increases in military funding and end strength enabled more realistic manning and equipping of armored units that in turn facilitated training to existing standards and doctrine. This upward trend continued throughout the 1950s, benefiting from combat experience and the lingering danger of an actual shooting war with the Soviet Union. Indeed, units began to transcend established doctrinal training measures, exemplified by the 1st Armored Division's creation of a special battle course to test crew and gunnery skills.[11] Tank gunnery proficiency also benefited from the attention given to crew, section, and platoon operations that included the regular use of crew proficiency tests, battle drills, and live fire battle runs in which tank platoons engaged targets from offensive and defensive postures.[12] The decade also marked improvements in the tools available to tank gunners. The emergence of a fire control system that linked the main armament, coincidence or stereoscopic rangefinder, and a mechanical

Figure 4. M48s on a gunnery range in Germany, 1959. *(U.S. Army Armor and Cavalry Collection)*

computer enhanced the ability to detect, identify, acquire, and engage targets at longer ranges. These qualities became manifest in the M48, and related crew training focused upon leveraging fully the technologically improved capabilities available to them.

In the 1960s and 1970s tank weapons, optics, ammunition, and fire control systems continued to improve with the fielding of the M60-series. Had tank gunnery proficiency kept pace, the result would have been ever more capable and lethal tank crews, platoons, companies, and battalions — but it did not. The large-scale commitment of ground combat forces to Vietnam generated personnel turbulence that eroded cohesion among non-deploying units. Armor units in West Germany, for example, became little more than replacement pools for forces in Vietnam. Even without the war in Southeast Asia the personnel management system then in place determined individual soldier assignments with no set tour lengths and without regard to unit commander needs. Most units experienced a 30-40 percent turnover every quarter, exacerbated by the tendency of higher headquarters to siphon Soldiers. Commanders who managed to stabilize their tank crews until qualification experienced even higher turnover afterward.[13]

Managing personnel turbulence within units proved difficult when many experienced Armor NCOs either left the Army or branch transferred in the wake of the Vietnam War. Their loss was offset by the transfer and reclassification of NCOs from other branches who, despite their responsibility for training junior enlisted Armor crewmen, received no familiarization training before their assignment to tank units. The Armor School trained NCOs in necessary leadership skills but not the related technical competency. This was either learned on the job or through improvised unit schools.[14] Hence new NCO tank commanders proved limited in their ability to supervise their crew members or fully utilize the capabilities of their tank. These problems were aggravated by the assignment of non-Armor command sergeant majors and first sergeants to tank units, where their lack of technical and tactical

Figure 5. The Canadian Army Trophy. *(Photo courtesy of the Royal Canadian Armoured Corps School)*

experience undermined their ability to mentor unit commanders and manage training.[15] Similarly, new platoon leaders possessed a minimal knowledge of their tank and its capabilities, since their schoolhouse training focused upon preparation for positions of higher responsibility in the event of a mass mobilization rather than their next duty assignment.[16]

Annual crew qualification served as the culminating event in gunnery training and an indication of unit readiness. Training remained a progressive development from individual to crew skills followed by live fire qualification. Yet while the platoon constituted the smallest maneuver unit and the backbone of an armored unit, collective training at the platoon or higher level faded along with the battle drills intended to hone unit muscle memory. Doctrine provided guidance for unit gunnery, but there was no corresponding gunnery table or evaluation requirement.[17]

Even with an emphasis only upon crew level training, unit commanders cited numerous challenges to achieving proficiency beyond personnel turbulence, including limited range access, funding shortfalls, the diversion of personnel to administrative tasks, and ammunition constraints.[18] These issues, however, proved far less significant than the way crew training and qualification occurred. Qualification generally occurred on pristine ranges in which tanks did not practice firing from hull defilade, targets proved exceptionally large and distinctive, and target arrays never varied. Unit self-evaluations and poor recordkeeping did little to identify training deficiencies for correction, and participating crews considered qualification a rote exercise with little relation to the battlefield. Hence, its execution was often characterized by sloppy gunnery techniques that generated results in the unrealistic qualification environment but did not demonstrate tactical proficiency. Hence, once tank battalion commander characterized the entire nature of gunnery training and qualification as "… a farce—an unreal, artificial, misleading indicator of a crew's ability to survive a tank-versus-tank battle. It's barely the beginning of true tank gunnery training. As currently performed, it is possibly marksmanship, but not gunnery."[19]

Such a condemnation boded ill for an armored force considered critical to the defense of Central Europe against the Warsaw Pact's numerically superior armored and mechanized forces. Moreover, the 1973 Arab - Israeli War highlighted the importance of tank gunnery proficiency on the modern battlefield. This conflict forced the Army to confront the realities of a potential no-notice conflict in which its units entered combat in their current readiness state without the benefit of weeks and months in which to hone skills to combat standards. For tank units in Central Europe this prospect

was frightening indeed, since popular forecasts of the life expectancy of a tanker in the event of war were measured in hours and days. The potential for a poor showing in combat found reinforcement in the lackluster performance of U.S. tank units in the Canadian Army Trophy in the late 1970s. This NATO competition was considered the "Olympics of tank gunnery," and it received considerable international and media attention. The substandard performance of American participants drew negative attention to training and readiness issues in American armored formations on the frontline of a potential war with the Warsaw Pact.*

In 1973 the newly created Training and Doctrine Command sought to transform Army training through emphasis upon raising combat readiness in preparation for a near-term large-scale conflict. The Arab - Israeli conflict of the same year spurred these efforts by demonstrating the cost of unpreparedness. Efforts to improve tank gunnery thus began within TRADOC's broader, Army-wide training reform. Lessons learned from the Middle East war were disseminated to tank units via training circulars, and the Armor Center developed a proficiency test for tank crew members.[20] Implementation of the tank master gunner program in 1975 generated subject matter experts to assist unit commanders with training, weapon operation and maintenance, and the correction of gunnery problems.[21] Tank gunnery doctrine also marked a renewed emphasis upon unit lethality with the introduction of a platoon gunnery table. Encouraged by the TRADOC's readiness emphasis, units undertook their own training initiatives, introducing timed engagements and long-range precision engagements while highlighting the import of first round hits and ammunition conservation.[22] The creation of the 19-series Career Management Field in 1978 enabled the identification of a specific skill set for armor crewmen to guide their selection and training.[23]

Figure 6. Tank from 2-64 Armor on Grafenwoehr's Range 109. *(U.S. Army photo by Ron Mihalko)*

In the 1980s gunnery doctrine expanded the tank tables used to guide and evaluate training to include crew, section, and platoon. A matching set of tactical tables emerged to permit the development of both the technical skills associated with placing steel on target and tactical maneuver. Reflecting the need for true proficiency to fight outnumbered and win, qualification standards rose. Tankers were expected to develop the skills necessary to achieve minimal kill ratios of 5:1.[24] These changes retained the progressive nature of training and evaluation but raised the bar for qualification and emphasized tasks and skills oriented upon the battlefield. Moreover, the deliberate linkage of new proficiency standards, soldier manuals, and Army Training and Evaluation Programs (ARTEP) resulted in clear training goals and strategies that included at least one battalion or brigade field training exercise per year. The opening of the National Training Center provided another training opportunity initially focused upon building maneuver and gunnery skills at platoon, company, and battalion levels. Laser based devices and simulators also broadened the array of training devices available to hone gunnery skills before a live fire event and sustain them afterward, with the Unit Conduct of Fire Trainer (UCOFT) becoming one of the most prominent tools.

The effectiveness of these changes lay in the active involvement of commanders and NCOs. The latter provided especially important due to their roles as tank gunners, tank commanders, and master gunners. Hence, Armor Branch worked to remove Armor NCOs from non-Armor duty assignments and return them to tank units. The master gunner program met its initial expectations, and these subject matter experts soon earned the esteem of their commanders. Unfortunately, many master gunners also served as platoon sergeants, and this dual responsibility discouraged master gunner candidates.[25] Moving the master gunner into the company headquarters helped to resolve this problem, while expanding the amount of gunnery training given to all Armor NCOs enabled master gunners to concentrate their expertise upon areas of greatest benefit to their unit. The Armor School sought to make the Basic NCO Course responsible for developing tank commanders, while the Advanced NCO Course focused upon the generation of platoon sergeants and incorporated some master gunner training. Officer training similarly began to include coverage of the technical aspects of tank platoon and company operations. The establishment of One Station Unit Training and its orientation upon graduating Soldiers qualified to serve as a driver, loader, or gunner helped commanders offset personnel turbulence by giving them greater flexibility in crew station assignments.[26]

The collective benefit of these changes to doctrine, training, and personnel lay in the increased focus upon tank gunnery in the field. Qualification ceased to be a check the block item and became a serious training event. This shift in attitude was further encouraged by competition among units, fueled by the publication of qualification scores.[27] Moreover, sustainment training via UCOFT and the generation of training schedules that embedded gunnery and tactical skills throughout the annual training cycle obviated the need for repetitive relearning of basic skills and enabled more advanced training.

The combination of higher crew and unit training standards, command emphasis, and increased training opportunities via training aids and simulators ensured that tank gunnery proficiency matched the capabilities of the M1/M1A1 Abrams. The resultant lethality became evident during Operation Desert Storm in 1991. Battlefield clashes between American armor and the Iraqi army ended with catastrophic consequences to the latter. The conflict served to validate the changes made in the 1980s to tank gunnery doctrine, training methodology, leader development, and master gunner employment. It marked an apex in tank gunnery proficiency even though the orientation of armor training lay in waging a conflict

against the Warsaw Pact in Central Europe rather than Iraq in the Middle East.

1990s

The end of the Cold War removed an external threat whose nature underscored the importance of a properly trained armored force. In the wake of superpower rivalry came a series of regional and humanitarian crises that involved the U.S. Army. Such operations other than war generally necessitated extensive training in non-warfighting activities, followed by deployment and then a period of retraining in warfighting skills. Army downsizing, the related loss of talent, and budget cuts amplified the disruptive effective of these deployments upon training in general. The decade also witnessed the emergence of an array of technological initiatives, collectively dubbed Force XXI, that strove to harness the emerging capabilities of information technology to tactical organizations and operations. By senior leader intent the initial focus of this technological development lay upon armored formations, whose leaders and Soldiers played key roles in related experimentation and testing.

Nevertheless, the aggregate effect of operations other than war, downsizing, fiscal retrenchment, and a flood of new technology lay in Army-wide disruptions to training. The absence of a peer threat further prompted some political leaders to question the need for a large tank force and the related expense. The resultant pressure to reduce training costs collided with efforts to sustain readiness, encouraging greater use of virtual and simulations-based training and the shortening of programs of instruction. Within the Armor School, the cumulative impacts lay in the removal of main gun live fire from the Tank Commander Certification Course, rollbacks in the rank and grade of instructor personnel, and a burgeoning unfunded requirement for tank tracks and parts.[28] Consequently, tank gunnery proficiency slumped, but it did not bottom out.

Tank gunnery standards remained high, and doctrine continued to evolve, incorporating lessons learned from Desert Storm. Moreover, the 1990s marked the emergence of the M1A2,

Figure 7. A tank platoon from 3rd Battalion, 64th Armor Regiment at Hohenfels, Germany. *(U.S. Army photo by Ron Mihalko)*

the Army's first digital tank. Its appearance marked another advance in materiel capabilities, since its digital systems provided significant improvements in communications and data sharing, and its commander's independent thermal viewer boosted the ability to detect, acquire, and engage targets more quickly over a broader area. The fielding of the new tank reinforced the continued emphasis in training and doctrine upon long-range precision fire. Long distance gunnery, however, necessitated crews who practiced precision in their gunnery training and technique, particularly during boresight, and understood what factors determined whether a round hit or missed its target. The effect of even small errors upon ballistic trajectory and accuracy increased with range. Hence, fire control and weapon system maintenance, ammunition condition, and boresight became critical actions prior to firing, while the ability to lay the reticle on a target's center mass, input barometric pressure, account for crosswinds, and offset peculiarities in a gun's performance marked a seasoned gunner.[29]

The start of Army Transformation in 1999 triggered the onset of a new wave of modernization initiatives heavily rooted in emerging technology. The focus lay upon the creation of the Objective Force with high tech, rapidly deployable organizations designed around information technology applications, unmanned aerial systems, robotic ground vehicles, and the Future Combat System. In this redesigned force, current armor units became part of the Legacy Force destined for replacement. Related funding streams diverted to Objective Force programs. A parallel effort generated the Initial Brigade Combat Team, renamed the Stryker Brigade Combat Team in 2002. Tank units were among the first billpayers for this new organization, while some armor crewmen suffered mandatory reclassification to MOS 19D.* Analysts feared that further involuntary reclassifications would "be bad for the morale of CMF 19. The perception will grow that 19K is no longer a viable career MOS."[30] Nevertheless, other tank units similarly reorganized into reconnaissance, surveillance and target acquisition (RSTA) squadrons and tankers were encouraged to become scouts. Hence, Transformation's high tech, futuristic slant at the expense of current capabilities coupled with the emphasis given to scouts generated uncertainty among tankers about their future not entirely relieved by the initial fielding of the M1A2 SEP with its improved optics, ballistic protection, and data sharing capabilities.

Global War on Terror

The Global War on Terror forced a rebalancing of the Army's budget and focus. While the Objective Force remained a work in progress, the Legacy

Force went to war. In Operation Iraqi Freedom, armored units played a central role in the rapid defeat of Iraqi conventional forces, the capture of Baghdad, and the collapse of Saddam Hussein's regime in 2003. The next year armored units again applied mobility, shock, and firepower to suppress the Easter Uprising. Collectively, these actions showcased the effectiveness of crews proficient in maneuver and sustainment while validating existing tank gunnery doctrine and standards. Moreover, in the training and development of crew effectiveness, unit commanders relied extensively upon their master gunners. Unsurprisingly, the execution of gunnery training that followed doctrine, pursued established standards, and reflected the active involvement of leaders and master gunners yielded success in battle. The established process of generating individual, crew, and unit gunnery proficiency honed over the years worked.[31]

Yet 2004 marked another turning of the tide in the ebb and flow of gunnery skills. The Army committed to a sustained period of counterinsurgency operations (COIN) in both Afghanistan and Iraq, and it undertook force structure changes to support the related deployment operational tempo. Brigades replaced divisions as the principal unit of action, enabled through the reorganization of division assets to facilitate the creation of more but smaller brigade combat teams. The resultant organizational reshuffling eliminated the tank battalion and replaced it with a combined arms battalion of tank and mechanized infantry companies. Battalion leadership was no longer restricted to Armor personnel, resulting in combined arms battalions led by officers and senior NCOs without training or service experience in tanks.[32] This knowledge deficit directly impacted the oversight, training, and mentorship of Armor personnel. Moreover, the elimination of tank battalions reduced the number of tank master gunners to support gunnery training, while the smaller size of the tank company — now the Army's largest armor unit — amplified the impact of personnel turbulence, skill deficits, or other issues that could not be offset at battalion level due to the reduced armor expertise resident in the combined arms battalion.

Institutional training changed to reflect the needs of the next deployment and current operational environment. While such modifications prepared individuals and units for overseas operations, the protracted nature of the Global War on Terror made such modification the norm rather than a temporary adjustment to address a singular deployment. Consequently, for nearly two decades training and doctrine skewed to reflect COIN rather than the broader range of military operations. This duration resulted in a generation of Soldiers and leaders whose primary military experience reflected only COIN and its comparatively narrow range of skills.

The impact upon tank gunnery proficiency proved wholly negative. Initial adjustments to gunnery training included a greater focus upon short range, urban engagements and increased attention to machine gun engagements.[33] Precision, long-range gunnery remained a staple of gunnery manuals, but in practice it became eclipsed by the need to hone those skills considered critical to the next deployment. Tank units that functioned as motorized infantry or deployed overseas as a provisional infantry brigade needed dismounted skill training and familiarity with HMMWVS and MRAPS more than tank gunnery.[34]

Moreover, the high deployment tempo and the need for COIN-related skills overshadowed preparation for other types of operations. In 2007, for example, active brigade combat teams spent 15 months deployed and 12 or less at home station between deployments, resulting in compressed training narrowly focused upon the next COIN deployment.[35] Vice Chief of Staff for the Army GEN Richard A. Cody noted in testimony before Congress that "We are only able to train them [Army units and personnel] … for counterinsurgency operations. They're not trained to full-spectrum operations." Consequently, skills critical to other types of operations atrophied.[36] The chart below shows the disposition of Career Management Field 19 personnel in 2007 with 81 percent either deployed or slated to do so. Indeed, the same year marked a shortening of the tank master gunner course and a sharp reduction in the time available for units to prepare for combat training center rotations. The latter increasingly reflected skills needed for counterinsurgency operations rather than the high intensity warfare of earlier years, once symbolized by the National Training Center's live fire event in which the manipulation of target arrays represented an attack by a hostile motorized rifle regiment.[37]

Armor brigade combat teams, faced with compressed training timelines and recurring deployments found little time for traditional gunnery and combined arms maneuver. The frequency of gunnery fell from semi-annually to perhaps once or twice over a

Figure 8. Using the in-bore muzzle boresight device. *(U.S. Army photo by Carl R. Johnson)*

Figure 9. An M1A1 of the 3rd Infantry Division during Operation Iraqi Freedom I. The extended bustle rack was fabricated before the invasion began when it became clear that division combat units would need more supplies than their trains could accommodate. *(U.S. Army Armor School Branch Archives)*

three-year period. Indeed, some units completed training cycles in preparation for deployment without executing any core gunnery or maneuver mission sets. Tank crews ceased to perform gunnery skill testing and crew qualification every six months as required, and some crews found their platform knowledge fading during deployments in which they did not serve on a tank. The 2011 chart below, based on data compiled over several years, indicates the frequency of tank gunnery training.[39] Given such circumstances, even master gunners could not stem the bleed out of platform-related skills and proficiencies, particularly when units experienced shortages of master gunners.

When the Armor School relocated from Fort Knox to Fort Benning (now Fort Moore) to become part of the Maneuver Center of Excellence (MCoE), NCO instruction changed. The integration of Armor and Infantry NCO training largely ended the Armor School's prior efforts to groom tank commanders and tank platoon sergeants through its branch specific NCOA and introduce at least some master gunner content into course curricula. Worse, units proved reluctant to send their NCOs to the master gunner course, and the Armor School found itself obliged to sell the tank master gunner program and its benefits to the force. Units that did send Soldiers to master gunner training too often failed to prepare them, tasked individuals who demonstrated little interest in attending, and expected master gunner students to address unit responsibilities while in school.[40]

Indeed, even in 2022 units demonstrated a reluctance to send Soldiers to attend master gunner training, despite the critical assistance these experts could provide to rebuilding gunnery proficiency. Soldiers selected to attend this instruction often did not satisfy the prerequisites for the tank master gunner course, and they could only attend with a waiver. The Armor School, acknowledging the need for more master gunners, responded by eliminating the prerequisites, accepting all candidates, and restructuring the course to permit students to repeat training in subjects whose evaluation they failed. A variety of products also became available online to prepare them for the course, but too many units did not send their best candidates or ensure their access to pretraining.[41]

Post Global War on Terror

When the U.S. withdrew its combat forces from Iraq and then began to reduce its footprint in Afghanistan prior to its complete withdrawal in 2021, the Army had begun to shift its focus from COIN to large-scale combat operations against a peer or near-peer threat. By then, however, it was clear that the atrophy of skills related to combined arms maneuver in general and gunnery in particular made the execution of actions across the range of military operations impossible without extensive retraining.[42] For armor brigade combat teams, the ability to concentrate upon rebuilding tactical competencies suffered disruptions from personnel turbulence and continued deployments that tended to increase after the Russian seizure and annexation of Crimea in 2014. Hence many armor units found themselves either preparing for an overseas tour or deployed, reducing their training time at home station. This tempo took a toll on morale and was considered a factor in higher-than-normal suicide rates in active duty armor units.[43]

Rebuilding armor tactical and technical competencies remained a work in progress. Gradual improvement occurred, though undermined by crew shortages that necessitated the improvised employment of infantry Soldiers as tank crew members in combined arms battalions. This solution provided manpower, but the lack of background training of these personnel as tankers complicated the development of crew cohesion and qualification. Readiness issues within armor brigade combat teams contributed to the Armor School's decision to focus its basic officer leadership course upon the tank platoon, removing all unrelated content from the curriculum. This revision enabled junior officers to be immersed in tank operations and related platform skills, resulting in some new platoon leaders arriving at their first duty assignment knowing more about their tank than the Soldiers they commanded.[44] This new dynamic upended the traditional reliance of new platoon leaders upon the technical expertise of their platoon sergeant.

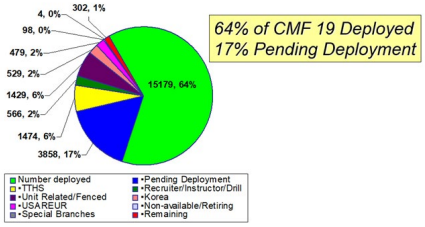

Figure 10. Armor personnel status in 2007. *(U.S. Army graphic)*[38]

The steady erosion of tank gunnery proficiency and related skills that occurred throughout the Global War on Terror was not matched by a parallel drop in materiel capability. The reverse occurred. The Abrams tank continued to evolve from the M1A2 SEP v1 to v3 with concomitant boosts in the fire control system, network capabilities, optics, and ammunition that collectively raised the platform's lethality and precision. Unfortunately, these improvements only widened the gap between technological capability and crew ability.

Corrective measures included changes to doctrine, most notably the adoption of the Integrated Weapons Training Strategy, which standardized the process of training and qualification for all weapons. It therefore marked a significant simplification of gunnery training management for unit commanders.[45] Gunnery doctrine also identified training objectives to be achieved in an annual training cycle but gave commanders flexibility in determining the sequencing and nature of engagements to achieve them.[*] Unfortunately, such flexibility resulted in wildly varied approaches and shortcuts that stymied efforts to track training efficacy and readiness. Consequently, the next gunnery manual scheduled for publication in 2024, Training Circular (TC) 3-20.31-120, ***Gunnery: Heavy Tank*** will remove this flexibility and raise training standards. These changes will align tank gunnery with the needs of large-scale combat operations against a peer or near-peer threat, and, through uniformity, simplify efforts to track and assess training progress.

Personnel turbulence remained a major factor undermining gunnery training and proficiency. Constant

personnel turnovers undermined efforts to stabilize crews and develop the cohesion necessary to progress through training, qualify, and then sustain their training level. Changes in crews too often resulted in frequent restarts on the path to crew qualification that eroded overall unit readiness. The Armor School sought to resolve this problem through an initiative known as Armor Standardization and Training Strategy 2030 that included a mechanism to track the skill and readiness of tank commanders and gunners. As they moved from unit to unit, visibility of their readiness level facilitated integration into crews without necessarily having to requalify each tank crew after its composition changed. Related actions included efforts to restore platform instruction to the NCO Advanced Leader Course and the redesign of master gunner instruction to focus entirely upon separate, platform specific courses. The Armor School also sought to stabilize master gunners in duty assignments that leveraged their expertise without jeopardizing career progression, and it considered creation of an Armor warrant officer to serve as master gunner at battalion and higher echelons.[46]

However, rebuilding tank gunnery proficiency across the force requires time — and there are no shortcuts. In the same manner that reps and sets are touted as the key to attaining physical fitness, so too for tank gunnery. It is a skill that must be learned through doing and sustained through recurring training events. The declination of gunnery proficiency occurred over more than a decade, and the skills and knowledge necessary to achieve and sustain the standards in current doctrine cannot be mastered on the fly. Achieving mastery of tank gunnery skills necessitates a dedicated and persistent effort by Soldiers and commanders employing the full array of talent, training aids, and doctrinal publications available, particularly given current challenges. The Army's recruiting problem and related difficulties attracting volunteers to combat arms directly links to the personnel shortages in armor units. Recent Army force structure changes, the pending fielding of new materiel, and ongoing efforts to integrate unmanned aerial systems, robotic combat vehicles, and artificial intelligence capabilities into units and formations will also have an initially disruptive effect. In the meantime, the daily depiction of relatively inexpensive first-person view drones destroying armored fighting vehicles in the war in Ukraine encourages a climate of skepticism concerning the continued battlefield relevance of the tank.

Such challenges are not new and can be managed. Historically, the key factors in achieving tank gunnery proficiency have been active and persistent command involvement, adherence to established training standards derived from an intimate knowledge of gunnery doctrine, and effective training management. External events have often served as a forcing function, but this influence has not proven consistently beneficial. Whereas the last decade of the Cold War tended to reinforce constructive changes in tank gunnery training, the Global War on Terror discouraged gunnery proficiency. Similarly, changes in technology, personnel factors, and budget constraints are persistent shaping influences to be treated as planning factors. Live fire still constitutes the most important gunnery training event, but its maximum benefit will only be realized by units that make full use of the range of training aids, simulators, and facilities available to them before arriving on the range and afterward for skill sustainment. Only then will crews gain the proficiency necessary to realize the full lethality potential of their tanks.

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Acronym Quick-Scan

ARTEP – Army Training and Evaluation Programs
COIN – counterinsurgency operations
FM – field manual
MCoE – Maneuver Center of Excellence
MOS – military occupational specialty
RSTA – reconnaissance, surveillance and target acquisition
TC – training circular
UCOFT – Unit Conduct of Fire Trainer

Figure 12. An M1A2 Abrams SEP V2 main battle tank of the 11th Armored Cavalry Regiment fires a M865 training round at the National Training Center and Fort Irwin training area, Dec. 9, 2021. *(U.S. Army photo)*

MONS, BELGIUM (Sept. 1, 2024) – Locals interact with U.S. Army Soldiers and an M2A3 Bradley Infantry Fighting Vehicle from 2nd Battalion, 5th Cavalry Regiment, 1st Armored Brigade Combat Team, 1st Cavalry Division, during the Tanks in Town commemoration event in Mons, Belgium, Sept. 1, 2024. V Corps regularly provides personnel and equipment to support community events in various countries across Europe. *(U.S. Army photo by PFC Richard Morgan)*

Organizing Light Cavalry in the Army of 2030

by CPT Charles Clouse

U.S. Army cavalry is about to undergo a massive restructuring. As the Army transitions to the division-centric Army of 2030 force structure, division cavalry (DIVCAV) formations are coming back from the dead to provide reconnaissance and security support to the newly empowered division formations.

The 1st Cavalry Division already has a test DIVCAV squadron to support its reorganization as a reinforced armored division, and additional DIVCAV formations throughout the force are planned to follow.[1] Based on publicly released planning materials, DIVCAV will be reserved for the armor division (Reinforced) and the air assault and airborne division structures; normal armor divisions and light divisions will likely lack DIVCAV.[2] Meanwhile, brigade combat teams' (BCTs) cavalry formations are planned to drop from a full cavalry squadron to a cavalry troop. In line with this model, the Army announced in February 2024 that U.S.-based Stryker and infantry brigade cavalry squadrons will be inactivated.[3]

Most public materials on the new DIVCAV formations focus on how the DIVCAV supporting the reinforced armored divisions will enable their parent formations to win decisively in large-scale combat operations (LSCO). The proposed force structure for these DIVCAV squadrons is a well-resourced and powerful formation capable of accomplishing the full spectrum of cavalry tasks for the division commander.[4] What light DIVCAV will look like is less clear. It seems likely there will ultimately be at least two light DIVCAVs, along with a light cavalry troop supporting each of the 34 infantry brigade combat teams (IBCTs).

The Army already has a model of what light DIVCAV squadrons and brigade-level cavalry troops may look like in the existing IBCT cavalry squadron and its subordinate mounted reconnaissance troop (MRT). Unfortunately, the IBCT cavalry squadron is a fatally flawed model and should serve planners mostly as a negative example. U.S. Army light cavalry needs significant changes to its force structure to enable success on the future battlefield.

What Not to Do: IBCT cavalry squadron

The IBCT cavalry squadron's structure is not fit for LSCO. The basic unsuitability of the IBCT Cavalry Squadron's modified table of organization and equipment (MTOE) for carrying out its doctrinal tactical tasks has been commented on numerous times in the last 10 years, including in the pages of ***ARMOR*** magazine.[5,6,7] In fact, the inadequacy of High Mobility Multipurpose Wheeled Vehicle (HMMWV also known as "Humvee") mounted scouts has been commented on as far back as the Gulf War.[8]

The root cause of the IBCT cavalry

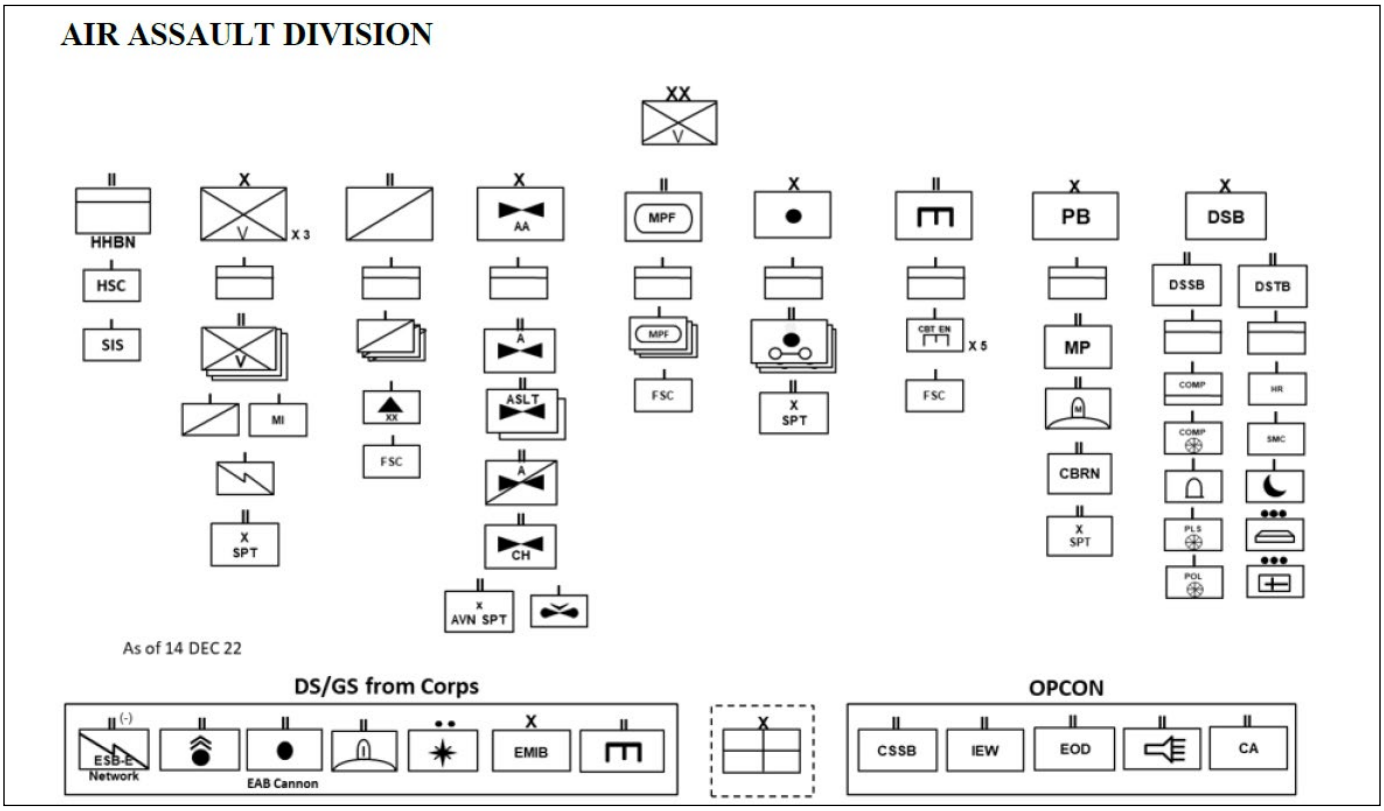

Figure 1. The proposed Army 2030 Air Assault Division force structure. The Light Division is almost identical, but lacks a DIVCAV and has a slightly differently configured aviation brigade. *(Reproduced from the "How the Army 2030 Divisions Fight" White Paper)*

squadron's inadequacies is the organizational choice to build the unit around an unsuitable mounted platform. The Humvee has been the vehicle of "choice" for the IBCT cavalry squadron for most of the period since the Army reorganized into a brigade-based structure. The Humvee is a terrible platform for reconnaissance, and for combat in general; it is not lethal, it is not survivable, and it is only stealthy when compared to high signature platforms like the Bradley Fighting Vehicle.[9]

The Joint Light Tactical Vehicle (JLTV) improves survivability somewhat, but only at the cost of further decreased stealth. Scouts equipped with Humvees or JLTVs have limited ability to fight for information, and in fact in previous LSCO conflicts commanders have often chosen to keep Humvee-mounted scouts away from the fighting entirely rather than condemn them to die fighting at a disadvantage against better-equipped opponents.[10, 11]

The Humvee does provide some compelling advantages, most notably increased firepower, movement speed, and use of sensors like the Long-Range Advanced Scout Surveillance System (LRAS3), however these advantages are mostly nullified by the environment in which an IBCT is expected to fight. By doctrine, "the IBCT optimizes for the offense against conventional, hybrid, and irregular threats in severely restrictive terrain."[12] In such conditions, the ability to see and shoot at long ranges is inhibited by ground clutter and short intervisibility (IV) lines, while terrain conditions tend to push mounted scouts onto limited mobility corridors where they can be easily destroyed by enemy forces due to their lack of firepower and survivability.

The dependence on the Humvee or JLTV creates a second critical problem, a lack of dismounted capability. The IBCT MRT has a greater need for dismounted troopers than its counterparts in the Stryker brigade combat team (SBCT) or the armored brigade combat team (ABCT) due to the terrain it is expected to operate in, yet perversely has the fewest dismounts. Stemming largely from the poor passenger carrying capacity of the Humvee and JLTV, each platoon is only able to generate six dismounts unless the vehicle commanders abandon the mission command systems in their vehicles and dismount as well. When the unit is under strength or attrited, the dismount position is often the first to go unfilled, further reducing the unit's ability to conduct dismounted reconnaissance. With so little dismounted capability, the MRT struggles to emplace an adequate number of long-term observation posts (OPs), reconnoiter and screen severely restrictive terrain between high-speed avenues of approach, and conduct effective push-pull maneuver between its mounted and dismounted elements. The lack of available dismounts is simply crippling for a formation intended to operate in severely restrictive terrain.

Figure 2. Cavalry scouts with B Troop, 2nd Squadron, 101st Cavalry maneuver at JRTC in July 2016. *(U.S. Army photo by SGT Harley Jelis)*

Beyond the limitations created by its platform, the IBCT Cavalry Squadron also lacks important organic enablers that will be required on the future battlefield. IBCT cavalry squadron's headquarters and headquarters troop (HHT) has few organic enablers and is typically only able to provide command and control (C2) and medical support to subordinate units. Additional support may be task-organized from other echelons; however, this causes the squadron to take combat power and enablers from the formations it is supposed to be supporting. Some of the most pressing capability gaps of the squadron include the following.

- **Inadequate organic unmanned aerial systems (UAS)**: The IBCT cavalry squadron as currently constituted has no organic UAS save the obsolete RQ-11 Raven held at the troop level. Effective use of UAS is critical to effective reconnaissance on the modern battlefield, as shown by recent combat in Ukraine, Nagorno-Karabakh and the Middle East. A lack of effective UAS systems fielded at the lower tactical levels remains a large capability gap in many Army units, especially in reconnaissance formations. It is no exaggeration to say than many non-state militant groups have access to more numerous, effective, and advanced UAS systems than a U.S. Army cavalry squadron.
- **Lack of counter-UAS**: The IBCT cavalry squadron has little ability to defend itself from observation or attack by tactical UAS. Given the proliferation of UAS worldwide, and the fact that cavalry formations are likely to be the first ground troops encountering enemy UAS, the lack of organic counter-UAS capability leaves the formation extremely vulnerable on the future battlefield.
- **Lack of indirect fires**: Unlike a typical maneuver battalion, the IBCT cavalry squadron lacks any indirect fires capability at the squadron level. As a result, the squadron must rely on higher echelon fire support to support its subordinate troops should the two mortar tubes possessed by

each prove inadequate.

- **Headquarters' lack of ability to self-secure**: The only gun trucks within the HHT are those of the commander and the S-3. The net effect is that the HHT cannot secure itself while moving, and can barely do so while stationary, forcing the commander to either steal combat power from the subordinate reconnaissance troops or accept a high degree of risk to combat support (CS) and combat service support (CSS) elements. This also leaves the squadron with no combat power with which to support subordinate troops if they become decisively engaged.[13] The MRT Headquarters Section has the same problem, with little ability for the command post (CP) or the mortar section to self-secure, which creates the same tactical dilemma at the troop level.

The Army would be making a mistake to retain the organizational structures associated with current light cavalry formations. The IBCT cavalry MTOE is already not suited to its current mission, and asking the same unit structure to support an even larger parent echelon in a higher tempo combat environment is setting the cavalry up for failure. While it would be easy for planners to simply repurpose existing formations, Army planners need to upgrade the capabilities of light cavalry before expecting it to support the divisions and brigades of the Army of 2030 in LSCO.

Ways forward: Light cavalry in Army of 2030

Given the inadequacy of current light cavalry structures, the Army should re-equip cavalry supporting infantry formations. The doctrinal compromises that planners are willing to accept should drive the most important choice in structuring the new formations, the selection of their mounted platform. Depending on the capabilities that planners feel are most important, there are two broad options to improve the performance of the cavalry: go light or go heavy.

- **Go light**: For very light cavalry, troopers should be mounted on an extremely light platform with the capability to transport numerous dismounts, perhaps a variant of the newly fielded Infantry Squad Vehicle (ISV) with a crew-served weapon and a sensor like the LRAS3. This would make cavalry formations significantly stealthier and provide much better off-road mobility and dismounted capability than the current IBCT cavalry formations. These formations would be relatively cheap to field, would be easy to support logistically, and would possess a high level of tactical, operational and strategic mobility. These platforms would also be suitable for airdrop and sling load, especially important for the DIVCAV tasked to support joint forcible entry (JFE) capable divisions. The main drawback of this design is the inherent lack of firepower and survivability in such a platform. These scouts would have limited ability to fight for information against well-armed opponents and would likely be unable to perform some traditional cavalry tasks such as a guard.
- **Go heavy**: For more robust light cavalry, troopers should be mounted on an armored platform with a stabilized autocannon, such as the M1296 "Dragoon" Stryker variant. These formations would be able to able to aggressively fight for information and perform the full range of traditional cavalry tasks in support of their parent divisions and brigades. With additional capacity for dismounts, these formations would still be able to effectively accomplish their missions in severely restrictive terrain far better than current Humvee-mounted scouts. These cavalry formations would trade these greatly increased capabilities for reduced stealth, a larger logistical tail, more difficult off-road mounted maneuver, and worse strategic mobility.[14]

Figure 3. Paratroopers assigned to the Airborne and Special Operations Test Directorate prepare to depart for a 50-kilometer road test in a fully loaded Infantry Squad Vehicle (ISV). *(U.S. Army photo by Michael Zigmond)*

Shared features for LSCO

Regardless of the platform chosen, light cavalry organizations will need to share several critical features and enabling capabilities to successfully execute reconnaissance and security operations in a LSCO environment. Any light cavalry force designed for the Army of 2030 should do the following:

- **Generate an adequate number of dismounts**: Infantry formations are intended to operate in severely restrictive or complex terrain, and the design of the supporting cavalry formations must reflect that. Having an adequate number of dismounts is critical for successful reconnaissance in the environments light cavalry units are likely to fight in. Whatever platform light cavalry uses should support at least a 6x36 structure (six vehicles with six troopers each, for a 36-Soldier platoon) to allow each vehicle to generate its own dismounted team.
- **Have nested UAS at all levels from section through squadron**: UAS will be ubiquitous on future battlefields, and current force structure does not provide enough UAS capability. The Army must field UAS of increasing size and capability at the section, platoon, troop and squadron levels in its reconnaissance formations.

- **Have access to necessary enablers at both squadron and troop level**: The DIVCAV squadron will need additional enabling capabilities to properly support its subordinate troops, including fires, intelligence, and protection assets such as counter-UAS. These capabilities can be split between the HHT and the planned cross-domain troop as needed. Some of these enabling capabilities will not be organic to the squadron and must come from habitual direct support (DS) relationships between the DIVCAV and various division assets. Where templated force structure does not support these relationships, the Army should consider adding additional batteries and companies to the division artillery (DIVARTY) and protection brigades to support them. Cavalry troops within IBCTs will also need many of the same enablers, and must be assigned them or have habitual DS relationships that provide those capabilities.
- **Include extra combat power**: The proposed armored division (reinforced) includes tanks in both the DIVCAV and brigade-level cavalry troops to give these formations the combat power needed to win on the battlefield.[15] Light cavalry similarly needs augmented combat power if it is to fight for information without pulling reconnaissance assets away from critical information collection tasks. This additional combat power need not be organic; Mobile Protected Firepower (MPF) assets from the division's MPF battalion could provide a powerful reserve for a maneuvering DIVCAV. Whether organic, attached, or DS, DIVCAV and brigade-level cavalry troops need enough additional combat power to secure command and logistics nodes, and to provide an adequate reserve to support the maneuver of their scouts.
- **Have realistic doctrine for employment**: Leaders need to understand that light DIVCAV will be required to be able to fight or infiltrate through an enemy's disruption zone to reach their reconnaissance objectives. Where formerly Army cavalry supported an organization one echelon larger than itself, now it will be supporting an organization two echelons larger than itself. Chinese and Russian units still have a reconnaissance battalion per brigade, and both expect their reconnaissance elements to fight aggressively on both offense and defense.[16, 17] Cavalry will potentially fight outnumbered, and will require significant combat power or external support to accomplish their mission against a peer threat. BCTs also need to accept that their cavalry troops, however organized, simply will not be able to provide the same level of reconnaissance and security support as the entire squadron they had previously, and plan accordingly.

Figure 4. U.S. Soldiers with 4th Squadron, 2nd Cavalry Regiment prepare to conduct a live fire exercise using the 30mm Stryker Infantry Carrier Vehicle-Dragoon at the 7th Army Training Command's Grafenwoehr Training Area, Germany, Feb. 20, 2018. *(U.S. Army photo by Sgt. Sara Stalvey)*

Conclusion

The Army of 2030 initiative gives the Army the chance to revitalize its cavalry formations for LSCO. The Army should not accept the status quo in its light cavalry formations and lock in the mistakes in structure and equipment that have hamstrung the cavalry for years. The IBCT cavalry squadron is a model that should best be retired and replaced with a force structure that will be able to win in the battlefield environment of the future.

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Acronym Quick-Scan

ABCT – armored brigade combat team
BCT – brigade combat team
C2 – command and control
CP – Command Post
CS – Combat Support
CSS – Combat Service Support
DIVCAV – division cavalry
DIVARTY – division artillery
DS – direct support
FM – field manual
HHT – headquarters and headquarters troop
HMMWV – high mobility multipurpose wheeled vehicle; colloquial: Humvee
MPF – Mobile Protected Firepower
MRT – mounted reconnaissance troop
HQ – headquarters
IBCT – infantry brigade combat team
ISV – Infantry Squad Vehicle
IV – Intervisibility
JFE – Joint Forcible Entry
JLTV – Joint Light Tactical Vehicle
LRAS3 – Long Range Advanced Scout Surveillance System
LSCO – large-scale combat operations
MCOE – Maneuver Center of Excellence
MRT – mounted reconnaissance troop
MTOE – modified table of organization and equipment
OP – observation post
SBCT – Stryker brigade combat team
UAS – unmanned aerial system

From the *ARMOR* art archive: "The Raid"

From the *ARMOR* art archive: An M1IP

Applying Patrolling Principles to Large-Scale Combat Operations at National Training Center

by CPT Frum and SFC Jared Stallone

All patrols are governed by five principles: planning, reconnaissance, security, control, and common sense (Training Circular (TC) 3-21.76, ***Ranger Handbook***). While each principle in concept is basic, and each one is codified within existing Army publications, not enough Soldiers and leaders use them in training for large-scale combat operations (LSCO) at the National Training Center (NTC). It is the perspective of the authors that if our crews, squads, platoons and companies are to be successful in the future warfare for which we are training, the five principles of patrolling must be reinvigorated.

Citations from both TC 3-21.76, and Army Techniques Publication (ATP) 3-21.15, ***Tank Platoon,*** are useful for translating the observations of more than 30 Stryker infantry, mechanized infantry, and armored tank companies during their respective rotations at NTC into lessons learned. It is remarkable how principles derived from some of the nation's earliest Rangers facilitate the understanding and application of tactics and techniques found within ***Tank Platoon*** and ATP 3-21.8, ***Infantry Platoon & Squad***. In this article, each principle is accompanied by a tactic or technique for practical application and a vignette observed during force-on-force operations at the NTC. Units that plan, prepare, and execute using the five principles of patrolling tend to succeed, and those that don't tend to suffer defeat to varying extents.

Planning

"Quickly make a simple plan and effectively communicate it to the lowest level. A great plan that takes forever to complete and is poorly disseminated isn't a great plan. Plan and prepare to a realistic standard and rehearse everything." (TC 3-21.76).

"Planning is the art and science of understanding a situation, envisioning a desired future, and laying out effective ways of bringing that future about (Army Doctrine Reference Publication (ADRP) 5-0, ***The Operations Process****). A platoon leader receives a task and purpose from the company commander as a warning order or operation order and begins the planning process." (ATP 3-20.15,* ***Tank Platoon*** *[earlier version]).*

Successful units plan and rehearse using a quality terrain model. A terrain model is a graphic depiction of the area of operations that displays the routes, key terrain, and critical graphic control measures for the operation. Both the Tank Platoon publication and the Ranger handbook list elements to be included when building a terrain model. The terrain model should be large enough and detailed enough for the unit to rehearse (ATP 3-21.8) by either physically walking or moving icons amidst the depicted terrain and graphic control measures. Gathering materials in a terrain model kit is paramount to ensuring a large, clear, usable terrain model can be built at all echelons, including the company and platoon levels. The quality of the terrain model positively correlates to the depth of each Soldier's understanding of the plan.

A tank company from Fort Bliss, TX provided maximum situational awareness to its individual tank commanders by using a detailed company terrain model. As a result, a single tank crew was able to engage and destroy the single enemy main battle tank that had halted an entire brigade's worth of reconnaissance elements from a well-covered and concealed position, restoring momentum for its brigade.

Conversely, unit's that do not rehearse using a terrain model suffer from a lack of detailed understanding of the plan at the lowest level. While the company commander or platoon leader may be able to visualize the order he or she received, the tank commanders and dismounted squad leaders have no such context with which to visualize. Despite receiving a clear task, purpose, and end state, NTC observer/coach/trainers (O/C/Ts) observed a different infantry company advance beyond its limit of advance and lose the entire company's worth of Bradley Fighting Vehicles to two enemy anti-tank trucks. If vehicle commanders had been visually exposed to their area of operations through a terrain model, their situational awareness of the boundaries associated with their movement and maneuver would have increased, mitigating significant risk. Successful units plan and rehearse using a terrain model to maximize situational awareness to the lowest level.

Reconnaissance

*"Your responsibility as a Ranger leader is to confirm what you think you know, and to learn that which you do not already know." (****Ranger Handbook****).*

Successful units conduct leader's reconnaissance with whatever means available. There are three types of reconnaissance capabilities available to every armored brigade combat team (ABCT) or Stryker brigade combat team (SBCT) company formation: organic leaders, organic sensors, and adjacent units.

The leader's reconnaissance is a significantly underutilized method of information gathering available to the ground force. Platoons and companies have strayed away from conducting ground reconnaissance organically due to the increase in technologically advanced sensors available. Oftentimes, units conduct missions without any confirmation of the assumptions they have made in planning with respect to templated obstacles, enemy forces, or objective composition. This makes lethality a much more significant challenge.

The composition of the leader's reconnaissance element, reconnaissance party, or quartering party varies based on the unit's progress within the troop leading procedures and leaders available to conduct the reconnaissance. In both the ***Infantry Platoon & Squad*** and the ***Tank Platoon*** publication, all echelons of leaders are suitable to conduct reconnaissance, if they are provided with sufficient reconnaissance guidance and a timeline within which to operate.

The ***Tank Platoon*** publication advises the use of leader's reconnaissance at several points in the operation (Ch.3 &

7, ATP 3-20.15), and the Infantry Platoon manual lists the objectives of the reconnaissance (Ch. 6, ATP 3-21.8). Leaders should conduct reconnaissance of routes to and from assembly areas, start points and release points along routes; difficult or disorienting terrain; intervisibility lines, and last covered and concealed positions within the area of operations. When able, leaders should mark positions, check points, or danger areas using predetermined marking techniques (considering daytime and limited visibility marking solutions) to ensure efficient movement in to and out of pre-planned positions.

All ABCTs and SBCTs possess several organic sensors available to assist in reconnaissance, beginning with the company fire support element (FSE). BFISTs and FSVs are equipped with an FS3 or LRAS capable of providing accurate MGRS locations at a range of over ten kilometers. Company FSEs can also employ various models of dismounted laser target locator modules effective at comparable accuracy and range to their mounted systems. These tools make the company FSE the furthest ranging organic sensor in the Company and should be deliberately employed at all phases of the operation. Additionally, the commander's independent target viewer onboard the M1 Abrams and the remote weapon system onboard the Stryker can observe out to six kilometers. The employment of any of these sensors in concealed observation posts or battle positions can effectively answer information requirements the commander needs to succeed, all while positioned safely outside the enemy's maximum engagement line.

Coordination with adjacent units is a third reconnaissance capability available to the ABCT and SBCT platoon and company. By utilizing unit icons on the Joint Battle Command Platform and a brigade communications card, any element can coordinate with an adjacent unit in their area of operations (AO) to better understand the environment.

Recently, O/C/Ts observed two tank companies prepare to attack the Iron Triangle from West to East, through the Sawtooth / Pass Complex. Both commanders conducted a leader's reconnaissance of their passage routes through the complex terrain. The first commander (Company A) took his tank and a wing tank slowly through his passage route (the Goat Trail) and marked a handrail with chem lights for his platoons that would traverse the route later that evening. The second, less prepared commander (Company B) conducted solely a map reconnaissance with his platoon leaders to identify his passage route (Brown Pass).

Company A, facilitated by their marked route, efficiently passed through the complex terrain and into their attack by fire positions on the far side in under 10 minutes and engaged the enemy before he could react. Conversely, Company B received several catastrophic kills from enemy BRDMs (*Boyevaya Razvedyvatelnaya Dozornaya Mashina* [Russian scout vehicles]) hidden in an unaccounted urban area immediately upon traversing the pass. This ultimately resulted in 80 percent combat power loss enroute to preplanned positions.

Successful units conduct reconnaissance using organic leaders and sensors to preserve their combat power out of contact for as long as possible, before concentrating on the decisive point (7-66, ATP 3-20.15).

Security

"Preserve your force as a whole. Every Ranger and every rifle counts; anyone could be the difference between victory and defeat." (7-3, TC 3-21.76).

Successful units achieve and maintain security throughout all types of operations by effectively utilizing hide sites to conceal their combat power until the pre-determined trigger to apply it. Hide sites, or hide positions, are naturally covered and concealed positions away from primary positions, intended to protect equipment from enemy contact while allowing employment of small arms and sensors for observation (4-72, ATP 3-20.15).

Leaders plan for the use of hide sites throughout all phases of the operation, including but not limited to assault positions in the offense or hide sites during the defense. Intelligence preparation of the battlefield (IPB), specifically with respect to enemy maximum engagement lines and observation capabilities, is critical to proper hide site selection.

The Tank Platoon publication discusses the use of cover and concealment, particularly with respect to vehicle characteristics and terrain backdrop to effectively hide. Crew members should consider the color of their vehicle and its contrast to what is directly behind them and below them, as seen from an observer on and above the ground. The prevalence of small unmanned aerial systems has expanded enemy observation capabilities from solely ground-based sensors. Vehicle crews should use all available operations security measures to reduce their ability to be seen by the enemy while occupying hide positions.

Recently, O/C/Ts observed a mounted Infantry company conduct operations solely during periods of darkness in a "reverse-cycle" battle rhythm. Under concealment of darkness and terrain, the Infantry company utilized multiple dispersed, platoon-sized, hide sites to cache vehicles outside of enemy battle positions prior to actions on the objective. The Company culminated all actions on the objective before morning nautical twilight, remounted their vehicles, and occupied preplanned, platoon-sized hide sites to conceal under camouflage nets nestled into complex terrain in wait for follow-on operations.

Units that employ effective camouflage and dispersion relevant to their operating environment tend to preserve their force longer during large scale combat operations.

Control

"Clarify the concept of the operation and commander's intent, coupled with disciplined communications, to bring every man and weapon available to overwhelm the enemy at the decisive point." (7-4, TC 3-21.76).

Successful units plan and execute operations using thorough but flexible graphic control measures (GCMs). Granular detail in planning is how we maximize safety and lethality simultaneously. Units must maneuver all forces on the battlefield using GCMs from the assembly area to hasty battle position (BP) at the limit of advance (LOA), and everything in between.

Since unit staffs plan two levels down (FM 3-0, ***Operations***), GCMs should account for that level of detail throughout all phases of the operation. That is, control measures should provide the

requisite space to maneuver while maximizing safe adjacent unit influence against that terrain and enemy.

As time allows, GCMs can be published and disseminated in accordance with discussed branch plans, sequels, and other contingency plans. These GCMs can be published in a fragmentary order later but should be as conclusive as possible. Higher headquarters and adjacent unit graphics are critical, as units could find themselves operating outside their intended AO and utilize them to quickly achieve situational awareness and coordinate for support.

Effective GCM technique

One technique for effective GCMs O/C/Ts have recently observed is a mapboard overlay of terrain-based target reference points (TRPs) covering the entirety of the NTC. This technique enabled flexibility by allowing the company commander to quickly and accurately orient movement, fires, and other actions to precise locations on the ground by referencing the TRPs distributed to his entire element via this overlay.

When units do not employ effective GCMs, they severely limit their ability to mass direct fires against the enemy. OC/Ts all too frequently observe self-inflicted confinement of movement and maneuver to roads and trails, often maintaining a column formation into direct fire contact. By not employing flexible GCMs such as an axis of advance or direction of attack, the unit is unable to safely engage the enemy due to the masking of every vehicle weapon system in trail. This often results in overwhelming losses to combat power and a lack-luster live fire exercise due to surface danger zone and gun-target-line violations from the trail vehicles.

Leaders who can trace their finger along a GCM from the assault position to the hasty BP past the LOA are consistently able to maintain tempo, situational awareness, and safety as opposed to their counterparts who employ incomplete GCMs. There is also a positive correlation between mission success and the dissemination of planned GCMs to leaders at the Fire Team and Crew Level. A well thought out plan that is not shared limits flexibility and tempo the unit could have had if GCMs were disseminated further down into the formation.

Common Sense

Use all available information and good judgment to make sound, timely decisions. (7-5, TC 3-21.76).

Common sense is the only principle of patrolling that must be effectively taught and implemented prior to a rotation to the NTC as it takes significant time and mentorship to develop. "Each leader-subordinate interaction is a development opportunity and inseparable from training, enforcing standards, and setting a personal example." (Field Manual (FM) 6-22, ***Leader Development***). The tenet of "supportive relationships and a culture of learning" are critical to "providing, accepting, and acting on candid assessment and feedback for self-awareness" (FM 6-22). It is through this support that leaders develop the ability to make common sense decisions.

Successful units have developed prepared leaders. A prepared leader is disciplined, confident, mentally agile, and expresses good judgement — the example to follow.

Prepared leaders

From our observations, prepared leaders are developed by focusing on the following competencies (Leadership Requirements model in Army Doctrine Publication 6-22, ***Army Leadership and the Profession***).

1. **Physical Fitness (**achieving goals through disciplined adherence to good fitness plans).
2. **Mental and Emotional Resilience** (cultivating the ability to maintain focus while experiencing and recovering from adversity, tactical or otherwise).
3. **Communication** (giving and receiving of feedback — message sent, received, and confirmed).
4. **Farsightedness (**ability to anticipate, plan, execute, and adapt. Leaders must be visionaries).
5. **Military Bearing (**technical and tactical competence of your craft that inspires others to emulate your competence).

Prepared leaders who have been developed in these five attributes and competencies, will find themselves able to apply common sense in training for LSCO. Common sense and good judgement allow future combat leaders to succeed in the complexity of LSCO.

Conclusion

Maneuver Leaders must refocus crews, squads, platoons and companies at the point of contact on the basics of warfighting during this time of transition back to large scale combat operations. While planning and preparation efforts at the Battalion and above are extensive, winning the first battle of the next war is wholly dependent on the Soldiers clearing, seizing, and holding the terrain deemed to be operationally and strategically important. The five principles of patrolling have existed through decades of all types of conflict and combat in various environments. They establish the fundamental skills and abilities that our warfighters must be proficient in to enable successful multi-domain operations in LSCO.

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FM 6-22, ***Leader Development*** (June 30, 2015)

TC 3-21.76, ***Ranger Handbook*** (April 26, 2017)

Acronym Quick-Scan

ABCT – armored brigade combat team
ADRP – army doctrine reference publication
AO – area of operation
ATP – Army techniques publication
BP – battle position
FM – field manual
FSE – fire support element
GCM – graphic control measures
LOA – limit of advance
LSCO – large-scale combat operations
NTC – National Training Center
O/C/T – observer/coach/trainer
SBCT – Stryker brigade combat team
TC – training circular
TRP – target reference point

BCT Armor Reserve: An Approach to Large-Scale Combat Operations

by CPT Leo E. Li

As the U.S. Army continues its transition back to large-scale combat operations, it must also place emphasis on reserve operations, which will be critical in high-intensity, high-casualty fights against near peer military threats. In 2023, 3rd Armored Brigade Combat Team (ABCT), 4th Infantry Division ("Iron Brigade") participated in National Training Center (NTC) Decisive Action Rotation 24-02, in which Crazy Horse Company of 1st Battalion, 8th Infantry Regiment ("Fighting Eagles") served as the BCT's armor reserve during force-on-force (FoF) operations.

The purpose of this article is to capture tactics, techniques, and procedures (TTPs) used and considered by Crazy Horse Company to supplement existing literature on reserve unit operations. The intent is to offer armor companies serving as a BCT's reserve component a doctrinal starting point, from which units can develop or revise their own standing operating procedures (SOPs) to match the mission sets the role requires.

As recent conflicts such as the Russo-Ukrainian War have shown, attrition remains widespread; initial attacks or operations by even well-armed, well-trained units can reach culmination and even defeat without exercising or maneuvering reserve forces to sustain and support those operations.[1] Therefore, how the reserve trains, fights, and wins decisively on the battlefield must be given appropriate consideration when a BCT plans, resources and executes its missions.

Very little of U.S. Army armor doctrine focuses on the reserve element itself. Additionally, recent U.S. Army Training and Doctrine Command and Center for Army Lessons Learned (CALL) literature does not offer specific TTPs or SOPs for how the reserve unit should operate in the wider context of BCT operations. This article lays out just one possible approach to serving as a BCT's armor company reserve; the recommendations of this article are based both on Crazy Horse's SOPs and on after-action reviews conducted with the NTC Operation Group's Tarantula Team observer/coach/trainers.

This article will focus more on the micro-elements and minutiae of operating the armor company as a reserve – how to plan, maneuver, sustain

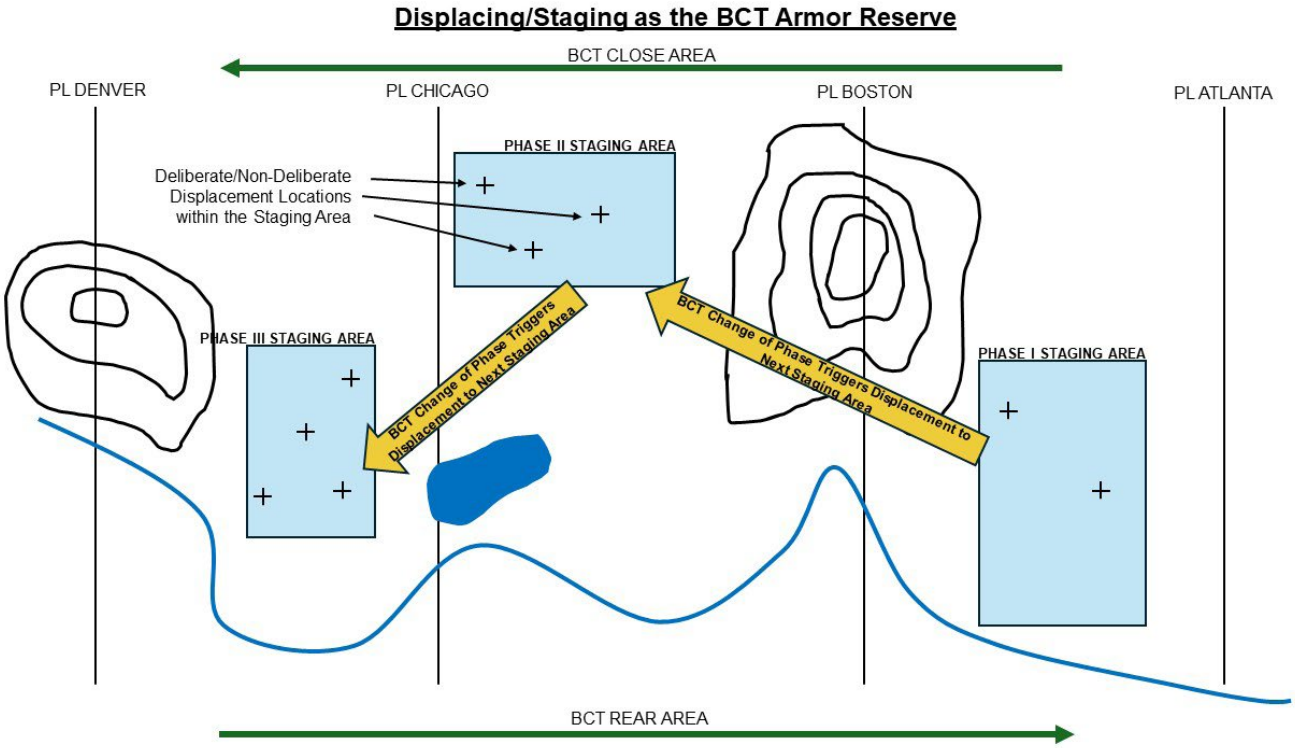

Figure 1: Like the conduct of Position Areas of Artillery (PAAs), an armor BCT reserve can have pre-planned areas where sister and higher echelons know where they will stage and operate during a specific phase of the BCT operation. If the unit takes contact, it can displace to any location within the pseudo-PAA, increasing survivability, providing deconfliction, and maintaining predictability for higher echelons. As the BCT transitions between phases, it can move towards/away from the close area or FLOT into another staging area to better posture for activation. If communicated beforehand, this also provides higher echelons additional predictability across phases in case mobilizing the reserve is required. *(U.S. Army graphic)*

itself, and coordinate with higher or neighboring echelons – rather than on more macro-elements about how the reserve element should be employed. Furthermore, while Crazy Horse Company served as a reserve armor company in its organic ABCT, the hope is that some of the TTPs presented in this article might also apply and be useful to Stryker brigade combat teams (SBCTs) that receive armor company attachments, and potentially infantry brigade combat teams (IBCTs) that receive M1 Abrams or M10 Booker companies in support of their combat operations.

Command and control

Army Doctrine Publication (ADP) 3-90, ***Offense and Defense***, defines a reserve as "that portion of a body of troops that is withheld from action at the beginning of an engagement, to be available for a decisive movement."[2] Field Manual (FM) 3-96, ***Brigade Combat Team***, assumes that a BCT reserve is usually a company or battalion-minus sized element, while battalions serve as the key decisive units for the brigade commander.[3] During its NTC rotation, Crazy Horse Company, its fire-support team (FST), and its field maintenance team (FMT) served as that reserve.

Using an organic company as the BCT reserve, rather than a company team or other task organization, allowed the commander to employ long-developed relationships with subordinate leaders and their knowledge of their own assets, without the friction of developing new relationships, company-specific SOPs, or other kinds of coordination that would be necessary if the commander's subordinate units included those not usually their own. While Crazy Horse Company received additional attachments during the rotation, such as engineer support during area defense operations, these were usually short-term relationships meant for specific mission sets.

During the entirety of force-on-force operations, Crazy Horse was placed either under operational command (OPCOM) or operational control (OPCON) of the BCT headquarters. The BCT command team and staff were primarily responsible for planning, assigning, and coordinating missions, tasks, and operational plans for the company. The organic battalion, although not possessing operational command or control of the armor company, remained administratively responsible for it. This responsibility by the battalion included sustainment and logistical support. The operational status of Crazy Horse flipped between OPCOM and OPCON depending on whether a need existed to further detach tank platoons from the reserve element and who would make that decision. Usually, this decision-making took the form of a conversation the battalion and BCT commander and their staffs.

Maintaining administrative, logistical, and sustainment responsibility with the organic battalion proved a critical decision in the reserve company's readiness. This allowed the company to leverage existing, organic relationships within the battalion – relationships that could be leaned on to resolve friction and problems as they arose. This also allowed the reserve company to take advantage of existing logistical infrastructure (combat-trains command post (CTCP), unit maintenance collection point (UMCP), contingency command post (CCPs), logistical resupply point (LRPs)) instead of having to build its own or rely on last-minute, provisional command and control (C2) relationships heavily dependent on time and space for both the reserve element and the battalion ordered to provide resources. Predictability built into command and support relationships, for both the reserve unit and higher echelons, ensures smoother operations and reduces risk of either echelon being unprepared as operations continue to face stressful operations tempo (OPTEMPO) and increasing friction.

For SBCT and IBCTs, this course of action is not immediately translatable. Any attached armor company may not have any organic or long-term relationship with a battalion it can leverage. Therefore, the armor company's administrative and logistical responsibilities should be placed with a battalion with strong and adaptive sustainment capabilities. Stryker and light infantry leaders may not always comprehend or be able to manage the significant differences in logistical support an armor company needs, particularly when it comes to frequency or scope of its Class III (petroleum, oil, and lubricants) and Class V (ammunition) requirements.[4] The armor company should therefore be placed with a battalion that has an extremely capable forward support company (FSC) that can sustain both its organic fleet and a company of M1 Abrams.

Alternatively, a brigade support battalion (BSB) may have the assets and supplies to directly support an armor company. However, that BSB must then be able to conduct resupply and other sustainment operations closer to the forward line of own troops, where the company may find itself engaged. Ultimately, a predictable and well-established command and administrative structure with a singular battalion and brigade headquarters, instead of a relationship that requires potential coordination with several battalions and companies across time and space, ensured the stability required for effective planning and operations for the reserve armor company.

Communications

Based on the command and support relationships described above, Crazy Horse Company used the following communication SOP when dealing with higher echelons:

- **BCT Command and Operations/ Intelligence (O/I)**: The company commander was primarily responsible for monitoring these FM nets and Joint Battle Command-Platform (JBC-P) chat rooms, allowing the reserve element to receive intelligence and operational updates for the entirety of the rotation. When expecting activation by the BCT commander, the company commander focused on the BCT command channels. Otherwise, the BCT S-3 or S-2 would provide updates to the reserve company commander.
- **Battalion Command and O/I**: the Crazy Horse command team monitored these nets for general situational awareness but used these primarily to coordinate logistical and sustainment operations. The company executive officer (XO) and first sergeant (1SG) were responsible for submitting logistics statistics (LOGSTATs) at least twice daily to the appropriate battalion-level stakeholders. As necessary, the

company XO also participated in any maintenance or logistical syncs with the FSC, maintenance control section (MCS), and the battalion staff.

- **Company command post (CP)**: the company CP monitored both the battalion and brigade net, focusing on the channel related to the most critical operation at a given time.

The company also attempted to keep at least two working radios in each tank. Currently, an armor company modified table of organization and equipment (MTOE) includes six radios per platoon. One issue that arose was following attrition by the enemy. Wing tanks struggled to simultaneously monitor a higher echelon net; without one radio required hopping off its platoon net. Even if the section was simply degraded or separated from the platoon or company, having multiple systems in every tank would have alleviated coordination issues that arose as the company spread out and was eventually degraded across space and sometimes multiple terrain features. A potential quick fix to this issue is to borrow additional radios from a battalion or BCT S-6 section if the unit is unable to increase its organic amount on hand.

Additionally, communications security (COMSEC) remains critical. To ensure minimum friction COMSEC and equipment, M1 loaders were sent to a COMSEC custodian course prior to the rotation and trained on loading, filling and dropping COMSEC. This allowed most platoons to self-diagnose and troubleshoot a majority of COMSEC issues and maintain a Simple Key Loader (SKL) at the platoon level. This alleviated much of the demand for the company communications representative and outside assistance from a battalion or BCT S-6 section, allowing the reserve armor force to operate as independently as possible on this front without major restraints and requirements from higher echelons.

Maintenance continues to be vital to effective communications. Home station units should constantly be using their BCT's communications & electronics (C&E) shops to fix their FM radios and JBC-P equipment. Waiting until the last-minute to use C&E following 10-level operator preventive-maintenance checks and services (PMCS) and troubleshooting is a recipe for failure. C&E shops will cease operations early to pack for deployment and then take time to establish themselves forward. Problems are therefore best identified and resolved earlier rather than later.

Planning Priorities

Because of its OPCOM/OPCON relationship with the BCT headquarters, the armor reserve force should receive its planning guidance from the brigade level. Reliance on the battalion to provide BCT-level graphics and overlays, commander's intent, and potential objectives can both divert the battalion staff's attention away from their own objectives and planning priorities, while potentially limiting the reserve commander's situational awareness and understanding by receiving information only pertinent to the battalion's piece of the area of operation (AO).

During NTC Rotation 24-02, Crazy

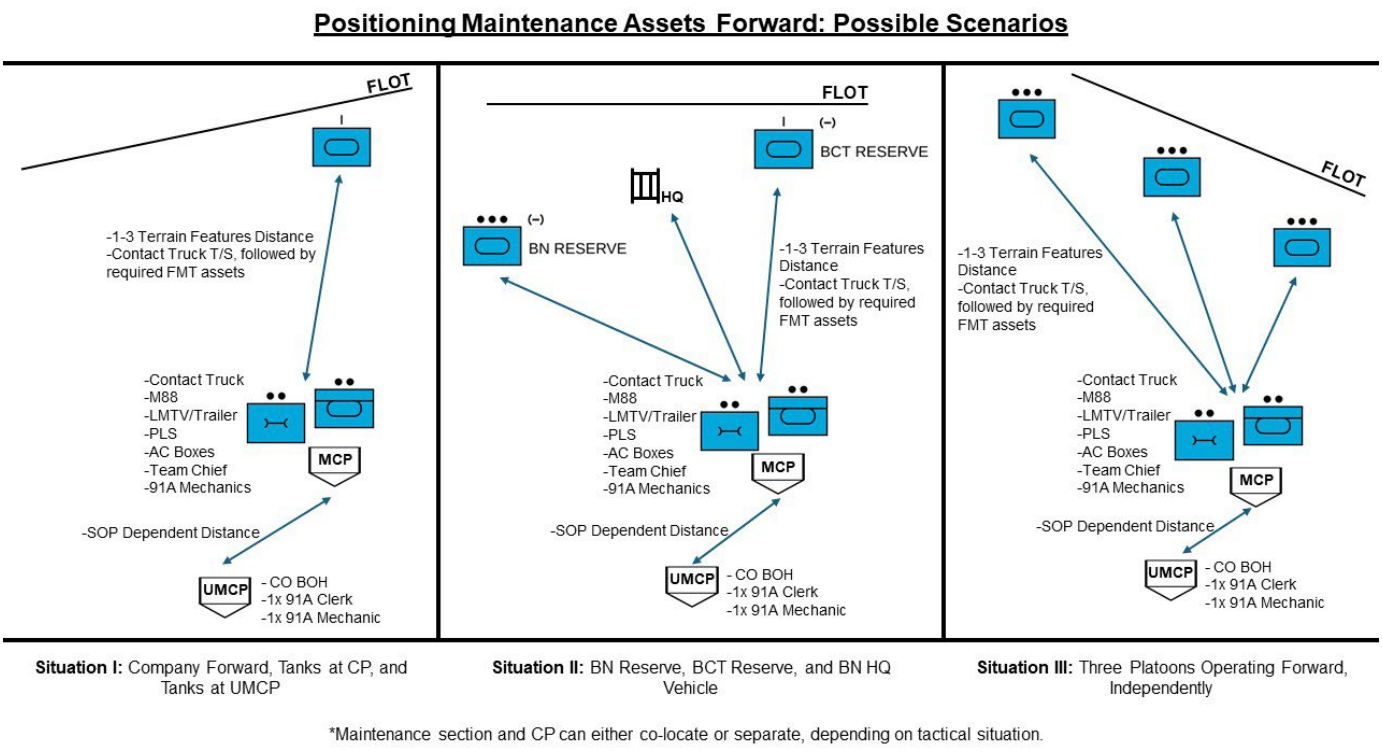

Figure 2: The field maintenance section (FMT) should be able to support up to three distinct units or nodes forward, while maintaining lines of communication or support with the UMCP. The FMT should therefore be positioned to minimize likelihood of contact, receive adequate protection, and still be postured to support forward assets or recover assets back to the MCP or UMCP. *(U.S. Army graphic)*

Horse attended BCT OPORD briefs and rehearsals. The company commander and 1SG could learn the entire BCT's AO and operational intent, since the reserve force could be activated to support any number of possible contingencies. Consequently, this made attendance at battalion-level rehearsals repetitive from an operational standpoint. However, attendance at battalion-level OPORDs was still useful to monitor and advise on sustainment operations, since the company was still reliant on the battalion for sustainment and maintenance operations. Therefore, whenever possible, the company commander focused on BCT OPORD briefs and rehearsals, often attending alongside battalion commanders, while the XO and 1SG attended battalion briefs and rehearsals, when possible, to maintain an updated logistical picture for the company.

Due to the number of contingencies for which a reserve company could be activated to support its BCT's operations, company and platoon-level troop leading procedures and planning adapted accordingly. At the company level, OPORDs focused heavily on paragraphs one and two over paragraph three's scheme of maneuver. Because the company could be activated to support any battalion objective, or even a new objective created by circumstance, situational awareness of the entirety of the AO and its operations was more critical than any specific plan of action by the company itself. While the company commander could predict where activation was most likely due to the levels of risk and priorities at the BCT level, focusing on a singular objective would make it ill-prepared to conduct an alternative operation.

To adapt, all tank commanders and above attended the company OPORD, allowing more time for platoons to concentrate on back-briefs and rehearsals. Compacting parts of the company's troop-leading procedures freed more time for company and platoon rehearsals of multiple contingencies over one specific course of action. Tactically agile and adaptive platoon leaders and sergeants are essential – those who understand company SOPs and battle drills deftly enough to be able to apply them to constantly changing circumstances.

Fires and Survivability

The FST attached to the reserve force should establish, prior to combat operations, a special priority of fires due to the nature of the operations it is attempting to support. The reserve's FST can and should not be treated as another line company's fires targets. If activated, the BCT commander is deliberately devoting additional firepower to a specific operation, either to avoid failure or to exploit a decisive point on the battlefield. When activated, the reserve company's FST should "jump" the priority of fires for a short period of time, superseding perhaps all but the company or battalion conducting the decisive operation of the BCT. For Crazy Horse Company, not having this priority of fires, even when deployed to prevent enemy armored envelopments or supplementing an area defense at risk of enemy breakthrough, allowed numerous targets of opportunity, including enemy breaching elements to move and maneuver freely when operating just outside the M1's main gun range.

Conversely, the reserve force must react quickly and decisively to enemy indirect fires, whether that involves artillery or drones and loitering munitions. While opposing forces will use these assets to target command posts, logistical nodes, and other high-signature and key targets, armor companies were also subject to attacks, especially when supporting operations at decisive points on the battlefield. While not in combat, armor reserves would do well to have preplanned displacement locations, like how artillery units use Position Areas for Artillery. This would reduce last-minute identification of new displacement locations, while still providing both the unit and higher echelons some predictability of where the reserve is staged at a given point in an operation.

Armor companies will also do well to conduct anti-unmanned aerial vehicle (UAV) training at home station and attempt to acquire drone buster assets whenever possible, especially when conducting operations like a defense where contact with UAVs could force the unit to displace from tactically advantageous or key positions. Camouflage of vehicles and CPs can also minimize risk of detection or reduce the information obtained by the enemy. For instance, camo netting covering a tank's identifiers can prevent enemy forces from determining whether it belongs to the commander or another key leader.

Figure 3: M1A2 crew from 3rd PLT, Company C, 1-8 Infantry moves to a secondary CP location during force-on-force operations as part of NTC Decisive Action Rotation 24-02. *(U.S. Army photo by Operations Group/Fort Irwin Public Affairs Office)*

Sustainment

While an armor company is OPCOM/OPCON to an ABCT headquarters, the reserve armor company should rely on its organic battalion for sustainment and support. This leverages long-term relationships; the battalion's FSC is likely practiced in

accounting for its logistical requirements. For armor companies augmenting SBCTs and IBCTs, it is critical that the company is supported by a strong battalion staff and agile FSC that understands and can support the relatively immense sustainment requirements that a company of M1A2s requires to remain in the fight.

Crazy Horse therefore relied on the Fighting Eagles for its sustainment infrastructure. LRPs, for instance, were either co-located with the CTCP or placed at a pre-determined location communicated to the 1SG for conducting resupply operations. LOGSTAT requirements were sent twice a day by the XO to the battalion S-4, FSC command team, battalion maintenance officer, and battalion XO.

The exact times of these LOGSTATs and LRPs depended on battalion and the FSC: their ability to process requests and move assets to and back from the LRPs on time to support the next resupply.

The most critical sustainment to consider for the armor reserve force was Class III. An idle M1A2SEPv2 Abrams tank consumes 3,600 gallons of fuel per day.[5] To maintain a steady OPTEMPO and readiness status as the reserve, the unit required refuel multiple times in a 24-hour period. Whether or not multiple LRPs are conducted for Class III(B) or whether fuelers remain attached is a tactical decision; both options sustain the company, but one leaves a fueler asset forward longer and increases risk of becoming a target for the opposing force, but with the benefit of being able to conduct refuel at any time.

As part of the battalion SOP, an emergency fueler was held at the CTCP. The purpose of this fueler was for the battalion commander to authorize and conduct an emergency resupply at any time for any line company to exploit new developments or conduct extended operations that required another 12 hours of combat effectiveness. Twice during force-on-force operations, the emergency fueler was released to the reserve force so it could mobilize and operate quickly against targets of opportunity that were at least 12 kilometers forward without waiting for the twice-daily resupply prior to movement.

Class III(P) should also be precisely monitored by platoons and the XO, so that needs are anticipated long-term in LOGSTATs to higher echelons. SOPs should require that M1 crews enter combat operations with at least three days of supply (3DOS) of Class III. LOGSTATs should anticipate requirements out to 72 hours of operations.[6] Loads and resupplies should interpret "3DOS" based on the unique requirements of the tanks. For instance, one of Crazy Horse's tracks had a long-term issue which consumed turboshaft at higher-than-normal rates. As a result, that tank and the platoon carried more turboshaft compared to the rest of the company to meet the 3DOS standard. Crazy Horse found that 3DOS allowed the vehicles to

Figure 5: Elements from 2nd PLT, Company C, 1-8 Infantry and fire support assets prepare to displace to their next staging area. *(U.S. Army photo by SGT James Drettwan, Company C, 1st Battalion, 8th Infantry Regiment)*

conduct operations and maintenance for consistently more than three days. For instance, not all vehicles required grease at the same rates, based on each tank's specific track tension and health. Infrequent but more complex maintenance, like draining engines, could generally be accomplished with the petroleum, oil and lubricants (POL) on hand, although the unit found early on that risk to mission caused by limited Class III could be further mitigated if the FMT carried its own reserve supply of POL, with exact quantities of specific Class III(B) based on long-term trends and needs of the fleet.

Maintenance, ESR, and parts flow

A robust maintenance program and system is the key to success for an armor company to conduct and maintain combat operations over the long-term. Failure to anticipate, prevent, and resolve maintenance issues efficiently increases reliance on other echelons and outside systems, reducing a reserve force's readiness and ability to operate independently.

All maintenance assets are mission essential. Therefore, FMTs should attempt to man and bring all its equipment forward, staging it either at a company maintenance control point (MCP) or at the battalion UMCP. For Crazy Horse's FMT assets, all vehicles and trailers, AC boxes, and the Forward Repair System were brought forward in the company trains, while the company BOH container was left with the UMCP. No maintenance assets were left in the rear.

Successful maintenance begins long before the start of combat operations. First, service schedules for the unit's equipment must be prioritized and protected. Well-planned and executed services, prior to training and operations, are undoubtedly the most important means of maintaining or improving the readiness of the fleet. Second, strong maintenance and command teams should anticipate demands and build up load plans and bench stocks months in advance. For instance, Class II supplies such as batteries (AAA, FM radios, etc.) can be ordered and stockpiled before; attempting to acquire these during operations becomes immensely more difficult. Similarly, Class IX overaged, repairable-Item lists (ORILs) are stockpiles meant to sustain the company without additional support from higher echelons for at least 72 hours. This stockpile is critical during the first few days of combat operations, when the Supply Support Activity (SSA) may still need time to establish and resume operations. Furthermore, the SSA's location jumps require a pause in processing Class II/IX requests and distributing them to lower echelons. Therefore, maintenance teams should work to restock Class IX ORILs prior to deployment. Additionally, the company should work with its battalion MCS section to adjust the company's command-directed lines to add additional, specific Class IX equipment to its ORILs that the maintenance team predicts may be necessary based on the personality and long-term trends of the fleet.

Once deployed forward, a BCT armor reserve may have to effectively operate independently from higher headquarters or other maintenance assets. Especially when attached to an SBCT or IBCT, other maintenance expertise on M1s and their associated equipment outside the company itself may prove extremely limited. Therefore, the armor reserve force must be able to operate as independently as possible. For Crazy Horse, the command team positioned the FMT to support as many as three distinct nodes of M1 tanks. Military operational specialty (MOS) 91A tank mechanics assigned to the battalion service & recovery (S&R) section of the FSC remained at the UMCP to augment battalion maintenance and recovery efforts, while always keeping a minimum tank mechanic presence at the UMCP. Vehicles that could be fixed on the spot had parts and mechanics brought forward. Otherwise, the tank would be recovered to the MCP or UMCP for additional troubleshooting. The MCP was either co-located with the company train or left with an FMC tank to provide protection. When displacing, the CP and MCP can separate to maintain as low of an electronic signature as possible.

When conducting maintenance operations, an up-to-date and accurate equipment-status report (ESR) remains critical to the unit's ability to maintain or return to the fight. If a maintenance issue requires an 02 code priority designator deadline on the ESR, the unit should do so as soon as possible, having the XO communicate immediately to the battalion MCS. It's important to ensure the FMT is equipped with all necessary equipment to conduct major maintenance operations, including protective coverings and tarps to conduct engine pulls in the field if necessary. The XO should also enter the field with three to five spare sets of 2404s or 5988s. While these documents may be blank or old, having them on hand allows crews and mechanics to conduct PMCS and compile faults easily. If conducting PMCS and fault verification every 72 hours, three to five sets of 2404s allow for 9 to 15 days of coverage, allowing the company to conduct documentation of its PMCS for nearly two weeks if printer, UMCP, or SSA capabilities are limited or degraded during operations.

FMT should verify faults and submit the form 5988s to the UMCP at the end of the 72 hours. Critical parts required for continued operations should be added to LOGSTATs and sent to the UMCP immediately after verification. This double tapping generally ensured battalion MCS was tracking parts requirements, so long as the MCS ensured these requests were not duplicated because they came from separate channels. XOs and platoon leaders would also do well to bring quick-reference guides that list National Stock Numbers (NSNs) for high-risk and high-demand parts. For parts like these, being able to immediately identify the NSN without needing to conduct research by clerks further truncated the time required to process these parts.

Maintain relationships

Even when trying to operate independently, maintaining relationships across the BCT are critical, especially when operating in an ABCT. Team chiefs and XOs can work with counterparts in other companies to obtain parts and increase the BCT's overall readiness if the opportunity exists. Coordinated efforts at the lowest level are low-risk opportunities that can increase the health of fleets, especially if the SSA is indisposed or requires long lead-times for specific Class IX parts that are on hand else-

where.

Finally, a strong culture of operator ownership of their vehicles is critical to a unit's maintenance success and can be a force multiplier when attempting to operate independently for as long as possible. Issues like track tension and POL issues can be identified and fixed during PMCS and following every major movement. Swapping roadwheels, checking fluids, can all be conducted at the crew level often and should be done in anticipation of faults, not after. Command teams should enable this by encouraging ownership but also providing time and space between operations to conduct these activities effectively.

Conclusion

Crazy Horse Company's operations as the BCT reserve proved critical at key junctures in the Iron Brigade's operations against Blackhorse during FoF operations. While much credit can go to the decision-making processes by senior leaders on when, where, and how to utilize the company in support of ongoing missions, reserve units can only accomplish these missions if working SOPs and TTPs are put in place before and during operations that enable readiness and success. Commanders and their teams ultimately have little say in how they are employed by higher echelons. Their focus instead should emphasize ensuring a lethal and ready force, prepared to mobilize and execute for any potential contingency.

A single but fully functional armor company possesses extraordinary capabilities that it can deploy on behalf of higher echelons. The effects it brings to the battlefield in terms of lethality are still unmatched. Aversion towards aggressively and proficiently employing such a force in combat risks self-inducing stalemate and even defeat when courses of action are still potentially available. BCTs would do well to ensure reserve elements, especially mechanized assets, are effectively implemented in operational planning to ensure success.

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Notes

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[4] Department of the Army, "Tank Companies: Considerations and References for Task Organization, 22-735," ***Center for Army Lessons Learned (CALL)***, (Fort Leavenworth, KS); 2022.

[5] ***CALL***, 2.

Acronym Quick-Scan

1SG – first sergeant
3DOS – three days of supply
ABCT – armored brigade combat team
AO – area of operation
BCT – brigade combat team
BSB – brigade support battalion
C&E – communications & electronics
COMSEC – communications security
CP – command post
CTCP – combat-trains command post
ESR – equipment-status report
FoF – force-on-force
FM – field manual
FMT – field maintenance team
FSC – forward support company
FST – fire-support team
IBCT – infantry brigade combat team
JBC-P – Joint Battle Command-Platform
LOGSTAT – logistics statistics
LRP – logistical resupply point
MCP – maintenance control point
MCS – maintenance control section
NSN – National Stock Number
NTC – National Training Center
OPCOM – operational command
OPCON – operational control
OPORD – operations order
OPTEMPO – operations tempo
ORIL – overaged, repairable-Item list
PMCS – preventive-maintenance checks and services
POL – petroleum, oil and lubricants
SOP – standing operating procedure
SSA – Supply Support Activity
SBCT – Stryker brigade combat team
TTP – tactics, techniques, and procedures
UAV – unmanned aerial vehicle
UMCP – unit maintenance collection point
XO – executive officer

Strike Swiftly: Developing Sustainable Maintenance Strategy in Combined Arms Battalion

by LTC Mike Kim, MAJ Nate Bennett, CW3 Jason Amsdell and 1LT Collette Benavidez

The mission of the combined arms battalion (CAB) is to close with and destroy enemy forces using fire, maneuver, and shock effect or to repel their assault by fire and counterattack (Army Techniques Publication 3-90.5, ***Combined Arms Battalion***). Although this is the singular mission of the CAB, the demands and requirements put on the organization are great, and personnel challenges [both military occupational specialty (MOS) and experience shortages] exacerbate the ability to effectively meet mission. While the Regionally Aligned Readiness and Modernization Model (ReARMM) provides a framework with clear delineation between train, modernization, and mission windows, in practice, there is overlap where mission sets bleed into each other creating great demand on battalion formations.

Given this environment, it is paramount that leaders provide a clear and detailed vision that prioritizes and manages both training and maintenance lines of effort, while clearly articulating areas where risk can be assumed.

There are many ways to approach this problem set. The purpose of this paper is to convey a way to define the CAB fight, develop a framework to guide the maintenance enterprise, and provide recommendations to equip battalions in executing their mission set.

Defining CAB fight

It is commonly said that maintenance builds lethality. In a constrained environment, it is more apropos to state that lethality requirements drive maintenance. It is the responsibility of the Battalion Commander to clearly define what lethality means to the formation. The following utilizes an approach used by the 2nd Battalion, 70th Armor Regiment, 2nd Armored Brigade Combat Team (ABCT), 1st Infantry Division. The overachieving goal of the 2-70 Armor is the following: Thunder Battalion coordinates and synchronizes warfighting functions to mass two companies at the decisive point.

It is a singular statement that guides all battalion efforts. The commander is responsible to define this guidance based on a clear and defined construct. The CAB construct can be broken down as dipicted in Figure 1 below.

For each of these elements, the lethality capability requirements can be summarized as dipicted in Table 1.

Having listed all the required lethality capabilities, it is important to clearly describe the equipment/platform needed to meet each capability. This category, which is called the Fight category, is the baseline of equipment / platforms needed to deliver the requirement. Although based on the modified tables and organization equipment, the number requirements are based on a realistic evaluation of the fleet. Leaders who expect every piece of equipment and platform to be fully mission capable are detached

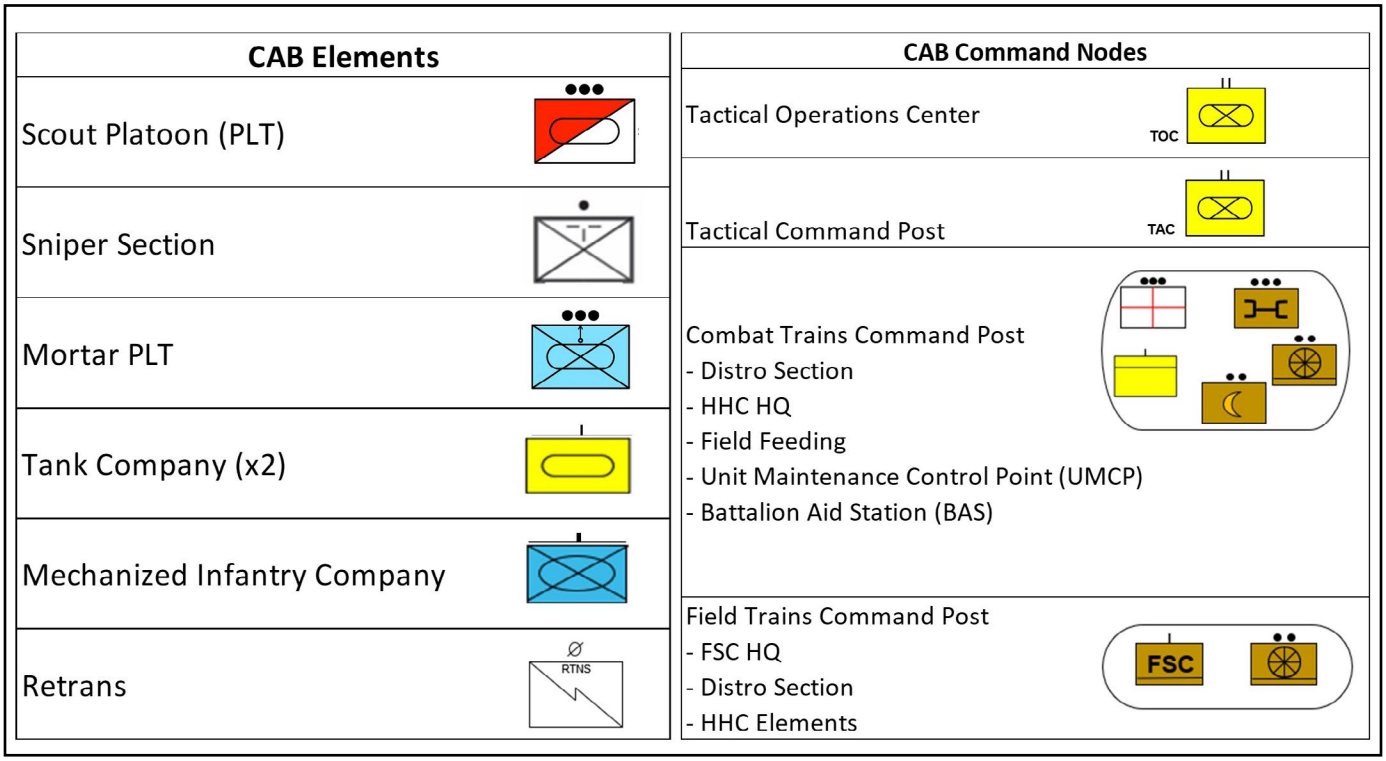

Figure 1. Identification of CAB elements and command nodes. *(U.S. Army)*

from reality or are being lied to. Using the Scout PLT as an example, the baseline list of equipment / platforms needed to deliver the capability is depicted in Table 2. The full list is depicted in Table 3. The overall vision is encompassed in the following compilation of the figures depicted in Figure 2. This single framework (Figure 2. The Thunder Fight) focuses the battalion on both training and maintenance lines of effort.

Where formations fit

Each formation at echelon has a clear idea of how it fits into the overall fight and the equipment/platforms required to deliver their capabilities. The next logical step is to take the fight equipment/platform requirements and compare them to the current mission capable status of those items.

The O/H column is based off the modified table of organization and equipment list, the Fight column is the requirement defined by the battalion commander, and the company column is the current slant of the item. If the company fully mission capable (FMC) equals or is greater than the Fight column, the status box remains blank. If the company FMC is less than the Fight column, the status box turns red. The final column Manned encompasses personnel readiness. It is a seemingly innocuous column but one that conveys significant information. If the platform is manned (denoted by Y), it means that the crew is deployable, qualified and meets all rank requirements (particularly if an NCO vehicle commander is required). If a platform is not manned due to personnel shortages, the team can assume risk and not devote maintenance energy to that platform or request support from higher.

Provide clear snapshot

Once done throughout each element and command node, the gaps in readiness (maintenance + personnel) become readily clear. This provides the battalion a clear snapshot of where their maintenance and personnel readiness gaps exist based on lethality requirements. Leadership can then develop a maintenance strategy over time, applying the maintenance enterprise against a prioritized list. The battalion maintenance officer then coordinates with the S-3 Operations Shop and puts the maintenance strategy (unscheduled maintenance, services and leadership professional development) on the training calendar. This is a way to synchronize training and maintenance lines of effort based on required lethality capabilities. It is a holistic strategy to streamline efforts, provide clear guidance and prioritization, and identify areas where the battalion can assume risk. The overall assessment maintenance and personnel readiness status is captured in Table 5.

Scout PLT Capability
Recon & Security: 3xSections
Observe NAIs / Anticipate BN Decisions / Report
Reduce Fog of War for COs / Sync with Squadron / RPOL / FPOL
Soak Up Enemy Combat Power
Sustain for 72 hrs. / Go to Ground - Seize next terrain feature
Sniper Section Capability
Long range precision fires
Answer CDR PIR
Surveillance and Observation
Mortar PLT Capability
Suppress / Disrupt the Enemy: 2xSections
Retrans Capability
Retransmit Comms
Tank CO Capability
Close-in with and Destroy the Enemy / Seize Terrain
Command and Control
Call for Fire
Logistic Release Point Ops
EVAC (personnel & platforms)
MECH IN CO Capability
Close-in with and Destroy the Enemy / Seize Terrain
Clear the High Ground
Command and Control
Call for Fire
Logistic Release Point Ops
EVAC (personnel & platforms)

TOC Capability
Control OPs
Plan Future OPs
Report Flow
Fight ISR
Sync Sustainment
Fight Fires
Role 1: Triage, Treat, Evac
TAC Capability
Control Specific Operation
Control Fight (TOC Jump)
Facilitate Timely Decision Making
CTCP Capability
Serve as Alt CP
Manage A&L Net
Maintenance Collection Point - Repair + Evac
Controls Sustainment Traffic
Runs 2xLRPs Daily
Resupply Scouts and Mortars
Personnel Services
FTCP Capability
Coordinate Log w/ BSB
Configure LOGPAC
Coord Replacements
Legal Services
Postal Services
Coord Evac of Equipment and Personnel

Table 1. List of capability requirements. *(U.S. Army)*

Scout PLT Capability	Equipment / Platform
Recon & Security: 3xSections	M2A3: 2 JLTV: 4 LRAS: 1x per section Raven: 1
Observe NAIs / Anticipate BN Decisions / Report	
Reduce Fog of War for COs / Sync with Squadron / RPOL / FPOL	LRAS: 1x per section Raven: 1
Soak Up Enemy Combat Power	JBCP: 1xper section
Sustain for 72 hrs. / Go to Ground - Seize next terrain feature	

Table 2. Scout capability and equipment/platform requirements. *(U.S. Army)*

Scout PLT Capability	Equipment / Platform
Recon & Security: 3xSections	M2A3: 2 JLTV: 4 LRAS: 1x per section Raven: 1 LRAS: 1x per section Raven: 1 JBCP: 1xper section
Observe NAIs / Anticipate BN Decisions / Report	
Reduce Fog of War for COs / Sync with Squadron / RPOL / FPOL	
Soak Up Enemy Combat Power	
Sustain for 72 hrs. / Go to Ground - Seize next terrain feature	

Sniper Section Capability	Equipment / Platform
Long range precision fires	Sniper Section 3xPSR 9xSDMR
Answer CDR PIR	
Surveillance and Observation	

Mortar PLT Capability	Equipment / Platform
Suppress / Disrupt the Enemy: 2xSections	M1064A3: 4 M577A3: 1 Gun Tubes: 4 Bipods: 4

Retrans Capability	Equipment / Platform
Retransmit Comms	JLTV & JBCP

Tank CO Capability	Equipment / Platform
Close-in with and Destroy the Enemy / Seize Terrain	M1A2: 10 (3 M1A2 x 3 PLTs; 1xC2) JBCP: 1xPLT ; 1xC2 FIST: 1 LMTV: 1 M113: 1 M88: 1 CNT TRK: 1 BOH: 1 Plow: 2 Roller: 1
Command and Control	
Call for Fire	
Logistic Release Point Ops	
EVAC (personnel & platforms)	

MECH IN CO Capability	Equipment / Platform
Close-in with and Destroy the Enemy / Seize Terrain	M2A3: 10 JBCP: 1xPLT ; 1xC2 FIST: 1 LMTV: 1 3x SQDs per PLT (2x Rifle and 1x WPNS SQD) M88: 1 M113: 1
Clear the High Ground	
Command and Control	
Call for Fire	
Logistic Release Point Ops	
EVAC (personnel & platforms)	

TOC Capability	Equipment (How)
Control OPs	JBCP: 2 FM: 6 STT: 1 OSVRT: 1 JLTV + Trailer: 1 1068: 1 GBD: 1 CD1: 1 JLTV: 1 1068: 1 AFATDS: 1 FM (Fires): 1
Plan Future OPs	
Report Flow	
Fight ISR	
Sync Sustainment	
Fight Fires	

TAC Capability	Equipment (How)
Control Specific Operation	M1A2: 1 M2A3: 1 JLTV: 2 JBCP: 2
Control Fight (TOC Jump)	
Facilitate Timely Decision Making	

CTCP Capability	Equipment (How)
Serve as Alt CP	JLTV (JBCP/FM): 1 JLTV (JBCP/FM): 1 LMTV + Trailer: 1 1068 (JBCP/FM): 1 Shop Van: 1 Expando Van: 1 VSAT: 1 88s: 1 Wrecker: 1 FRS: 1 SAT: 1 LMTV: 1 BOH: 5 Maint Enc: 1 Gen: 1 Flat Racks: 2 LHS/Trailer: 3 JBCP: 1 FM: 1 Fuelers/TRM: 2 JBCP: 1 FM: 1 Cache** (3 crops / LMTV+Trailer) LMTV + Trailer: 1
Manage A&L Net	
Maintenance Collection Point - Repair + Evac	
Controls Sustainment Traffic	
Runs 2xLRPs Daily	
Resupply Scouts and Mortars	
Personnel Services	

FTCP Capability	Equipment (How)
Coordinate Log w/ BSB	JLTV: 1 JBCP: 1 FM: 2 LHS/Trailer: (3) (1) JBCP/(1)FM Fuelers/TRM: (2) (1) JBCP/(1) FM
Configure LOGPAC	
Coord Replacements	
Legal Services	
Postal Services	
Coord Evac of Equipment and Personnel	

Table 3. Consolidated list of capability and equipment/platform requirements. *(U.S. Army)*

Tank Company							
Item	**O/H**	**Fight**	**A CO**	**Status**	**B CO**	**Status**	**Manned**
M1A2	14	10	8		11		Y
JBCP	16	4	0		0		
FIST	2	1	1		1		Y
LMTV	2	1	1		1		Y
M113	2	1	1		1		N
M88	2	1	0		0		Y
Contact TRK	2	1	1		1		N
BOH	2	1	1		1		
Plow	6	2	0		0		
Roller	2	1	0		0		

Table 4. Tank company maintenance and personnel readiness status. *(U.S. Army)*

Based on this assessment, the battalion can clearly identify priorities and friction points, and the commander can provide Training Week (TW)+8 guidance. Furthermore, this dashboard (comprised of Figure 2 and Table 5) provides a tangible output (status update) for CAB meetings. The battalion training meeting must entail the development of capabilities required by the CAB to accomplish its mission while maintenance and personnel readiness (non-deployable scrubs, etc.) meetings must feed Table 5. Commanders are responsible, with input from their first sergeants and executive officers (XOs), to update the battalion commander on the dashboard. While this is a way to organize and assess capabilities and personnel, there are several doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) efforts that can better equip the CAB in building readiness.

Recommendations to support CAB maintenance

Even with clear guidance and a detailed maintenance strategy, CABs will continually face challenges in execution. Below are several DOTMLPF recommendations that would support and streamline maintenance operations.

Recommendation #1 (Organization/ Personnel): Radio Equipment Repairers (MOS 94E) and Computer/Detection Systems Repairers (MOS 94F) Organic to the CAB.

Due to the sheer amount and complexity of communication systems and equipment, it would benefit the CAB to have one NCO and two 10-level Soldiers organic to the CAB for internal communication and electronics (C&E) and electronic maintenance (ELM) repairs. Currently, all night vision devices and communication devices are evacuated to the brigade support battalion for repair/service.

Centralized repair naturally creates a backlog, which prioritizes units executing training for repairs. This inhibits units preparing for training to conduct proper repairs and services prior to execution. Having organic C&E and ELM capabilities will decrease overall turnaround time, create shop stock for common repairs, and provide flexibility in garrison/field environments to build equipment readiness.

Recommendation #2 (Education): Training Deficiencies for MOS 91F (M242 25mm) and MOS 91A (M1 Abrams Schematics).

Small Arms Repairers (MOS 91F) and Tank Mechanics (MOS 91A) do not receive sufficient training through Army schools to prepare them for operations. The 91F is responsible for servicing the M242 25mm Bushmaster. They do not receive adequate training during advanced individual training (AIT) to properly service and repair the weapon system. While master gunners are present to assist in repairs and services, they are only capable of executing 10/20 level tasks and repairs. The 91F is responsible for 30 level tasks, but they are not provided the education needed to complete these repairs. The Army must increase training time during AIT for 91F Soldiers, so they are equipped to execute repairs once they get to their unit. An alternate solution is to make the repair/services of the M242 a critical task for Bradley mechanics (MOS 91M).

91A Soldiers must receive tank

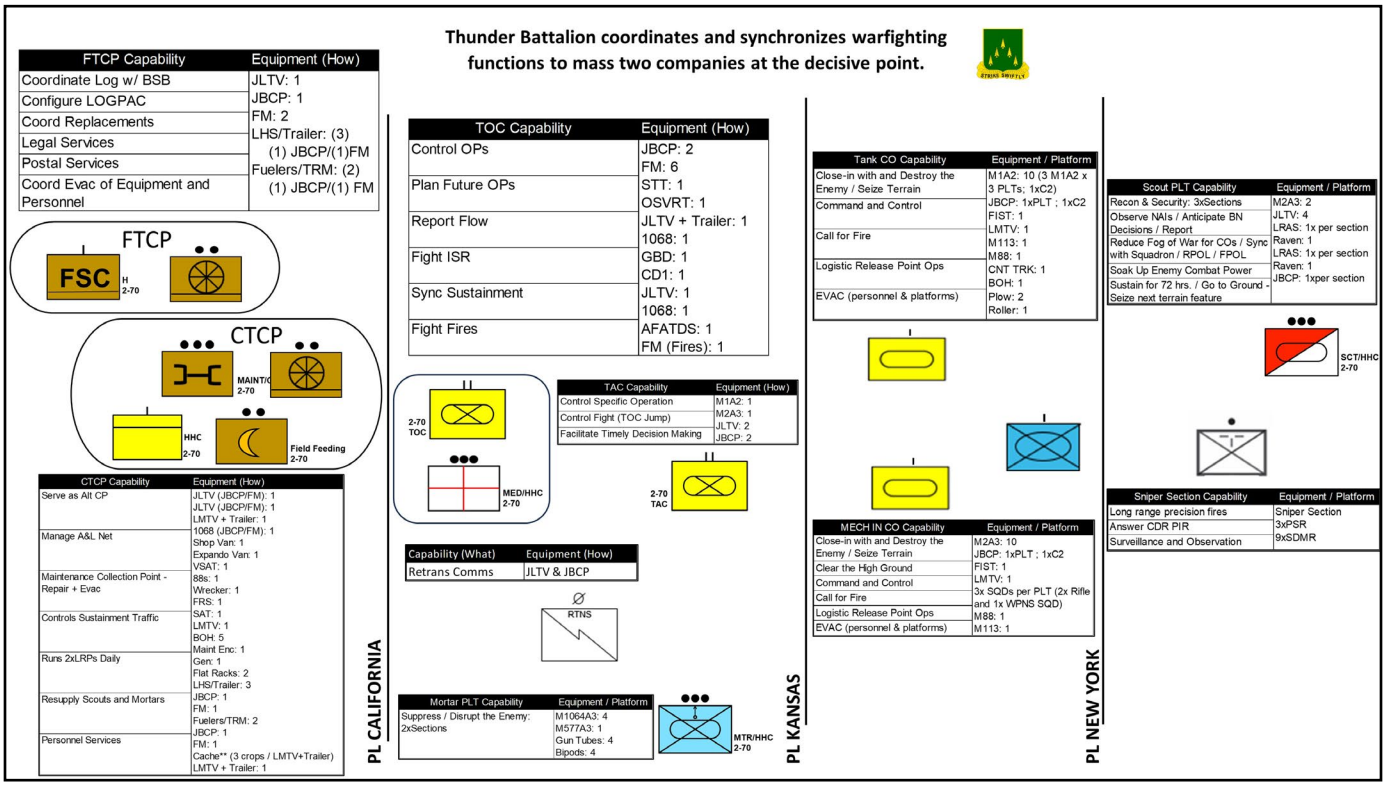

Figure 1. Thunder Battalion coordinates and synchronizes warfighting functions to mass two companies at the decisive point. *(U.S. Army)*

FTCP

Item	O/H	Fight	Current	Status	Manned
JLTV	2	1	1		Y
JBCP	1	1	0		
FM	2	2	1		
LMTV	1	1	1		Y
LHS/Trailer	4	3	3		Y
JBCP	3	1	0		
FM	4	1	2		
Fuelers/TRM	3	2	2		Y
JBCP	3	1	0		
FM	3	1	2		

CTCP

Item	O/H	Fight	Current	Status	Manned
C2					
JLTV (HHC)	2	2	2		Y
JBCP	2	1	0		
FM	2	2	2		
S1					
LMTV + Trailer	1	1	1		Y
S4					
1068	1	1	0		Y
JBCP	1	1	0		
FM	1	1	1		
UMCP					
Shop Van	1	1	1		Y
Expando Van	1	1	1		Y
VSAT	1	1	1		
M88	1	1	1		Y
Wrecker	1	1	1		Y
FRS	1	1	1		
SAT	1	1	1		Y
LMTV	1	1	1		Y
BOH	5	5	5		
Maint Enc	1	1	1		Y
Gen	1	1	1		
Flat Racks	2	2	2		
Distro Section					
LHS + Trailer	3	3	3		N
JBCP	1	1	0		
FM	1	1	1		
Fueler + TRM	3	2	2		N
JBCP	1	1	0		
FM	1	1	1		
Crops	3	3	3		
LMTV + Trailer	1	1	1		Y

TOC

Item	O/H	Fight	Current	Status	Manned
JBCP	2	2	1		
FM	6	6	6		
STT	1	1	0		
OSRVT	5	1	1		
JTLV + Trailer	1	1	1		Y
1068	2	1	1		Y
GBD	1	1	1		
CD1	2	1	1		
JLTV	1	1	1		Y
1068 w/	1	1	1		Y
AFATDS	1	1	1		
FM	1	1	1		
M113 (Medics)	6	3	1		N
LMTV	1	1	1		Y
DRASH	1	1	1		
Generator	1	1	0		
577 w/ APU	1	1	0		Y
JLTV 2/ JBCP	1	1	1		Y

TAC

Item	O/H	Fight	Current	Status	Manned
M1A2	1	1	1		N
M2A3	1	1	1		Y
JLTV w/	2	2	2		Y
JBCP	4	2	0		

RETRANS

Item	O/H	Fight	Current	Status	Manned
JLTV w/	1	1	1		Y
JBCP	1	1	0		

FAS

Item	O/H	Fight	Current	Status	Manned
1068 w/		1			N
JBCP		1			
FM		1			

MORTARS

Item	O/H	Fight	Current	Status	Manned
M1064A3	4	4	1		Y
M577A3	1	1	0		Y
Gun Tubes	4	4	4		
Bipods	4	4	0		

Tank Company

Item	O/H	Fight	A CO	Status	B CO	Status	Manned
M1A2	14	10	8		11		Y
JBCP	16	4	0		0		
FIST	2	1	1		1		Y
LMTV	2	1	1		1		Y
M113	2	1	1		1		N
M88	2	1	0		0		Y
Contact TRK	2	1	1		1		N
BOH	2	1	1		1		
Plow	6	2	0		0		
Roller	2	1	0		0		

Infantry Company

Item	O/H	Fight	Current	Status	Manned
M2A3	14	10	8		Y
JBCP	16	4	0		
FIST	1	1	1		Y
LMTV	1	1	1		Y
M113	1	1	1		Y
M88	1	1	1		Y
Squads	9	3	1		N

Scout Platoon

Item	O/H	Fight	Current	Status	Manned
M2A3	3	2	3		Y
JLTV	5	4	5		N
LRAS	5	3	3		
JBCP	8	3	0		
Raven	2	1	0		

Sniper Squad

Item	O/H	Fight	Current	Status	Manned
Sniper Section	1	1	0		N

Table 5. Consolidated list of maintenance and personnel readiness status by element and command node. *(U.S. Army)*

schematic training during AIT. This is increasingly significant as the CAB fights through personnel challenges and many mechanics fulfill positions of greater responsibility than their rank. In a CAB, junior 91As frequently are faced with tank schematic faults. There is a knowledge deficiency in tank schematics for junior 91A Soldiers. These tank mechanics do not receive training on tank schematics until the Advanced Leader Course. Tank mechanics, like their Bradley mechanic counterparts, should receive training on schematics during AIT.

The Maintenance Process and Friction Points. Soldiers conduct preventative maintenance checks and services (PMCS) and manually annotate faults on a Form 5988. Mechanics, with a senior mechanic and team chief, then verify the faults and either dismiss (wrong annotation), repair, or request parts to be ordered. Once this process is complete, the equipment records parts specialist (ERPS) clerk manually inputs this information into Global Combat Support System – Army (GCSS-Army). There are two points of friction in this process. The first is the transition from a manual process (Form 5988) to a digital process (manual input of the 5988 information by the ERPS clerk into GCSS-Army) and the second is the manual search of parts by National Item Identification Number (NIIN). To alleviate these frictions points, the following recommendations are presented.

Recommendation #3 (Material): Digital 5988: The amount of error that exists in the current manual process can be reduced through a digitized system. Additionally, the workload for clerks to manually input 5988 information into GCSS-Army can also be reduced. A software application with a simple user interface that can be accessed by all users is advantageous. Table 6 below

USER	STEP	USER ACTION	FUNCTIONAL REQUIREMENTS	NON-FUNCTIONAL REQUIREMENT
Soldier	1A	Soldier indicates that they would like to begin the PMCS process	System provides an application that serves as the primary user interace	System application must be accessible off of Soldier's device through Army Mobile Connect
	1B	Soldier selects the type of user, selects the Bumper Number of the platform/equipment on which they will be conducting the PMCS and selects the type of PMCS they will be conducting (before, during, after, weekly, monthly)	o System provides a list of user type from which an individual can select: Soldier, Maintainer, or Enterprise User o System provides a list of bumper numbers or equipment identifying feature which the Soldier can select from; search function provided; filterable function provided o Based on bumper number, system provides the PMCS checklist for that piece of equipment o Based on Soldier selection, system provides PMCS checklist for before, during, after, weekly, or monthly	
	1C	Soldier conducts PMCS checks line by line; if fault is found, Soldier indicates the fault	o System provides a method to indicate faults; for each PMCS line, the "Equipment Not Ready / Available If:" statement is available to click if true; If soldier clicks, it annotates the fault on the Digital 5988 o As faults are selected, the System saves them to a Digital 5988 that consolidates all faults during the PMCS process	
	1D	Once complete, Soldier views the consolidated faults on a Digital 5988 and sends forward	o System provides a Digital 5988, with consolidated faults, for the Soldier to review o Once reviewed, the Soldier confirms completion and sends Digital 5988 forward o Once complete, System alerts the maintenance enterprise that a Digital 5988 is ready for verification	
Maintainer	2A	Maintainer indicates that they would like to verify the Digital 5988	System provides an application that serves as the primary user interace	System application must be accessible off of Maintainer's device through Army Mobile Connect
	2B	Maintainer selects their user type and selects the Bumper Number of the platform/equipment on which they will be conducting the PMCS	o System provides a list of user type from which an individual can select: "Soldier," "Maintainer," or "Enterprise" o System provides a list of Bumper Numbers from which the maintainer can choose from; search function provided; filterable function provided	
	2C	Maintenance Soldier verifies the fault on the Digital 5988: Dismiss, Repairs Fault, or Requests Order of Parts.	o System provides a method to indicate verification of faults: o Dismiss = System provides option for maintainer to dismiss fault (wrongful entry by Soldier) o Repair = System provides option for maintainer to confirm repair of fault o Request Order of Parts = System provides option for maintainer to request for the order of parts o System provides NIIN Recommendation (based on item type) o System provides NIIN search option (searches EMS NG, IADS, and AESIP TMs)	
	2D	Once complete, Maintainer views the consolidated verified faults and parts request on a Digital 5988 and sends forward	o System displays the Digital 5988, with verified faults and parts request, for the maintainer to review o Once reviewed, the Maintainer confirms completion and sends Digital 5988 forward o Once complete, System alerts the Enterprise that a Digital 5988 has been verified	
Enterprise User (Senior Mechanic, Team Chief, ERPS Clerk, Maint Tech, MCS, MCO, BMO)	3A	Enterprise indicates that they would like to view the verified Digital 5988	System provides an application that serves as the primary user interace	System application must be accessible off of Enterprise's device through Army Mobile Connect
		Enterprise selects their user type and selects the Bumper Number of the platform/equipment on which they will view the Digital 5988	o System provides a list of user type from which an individual can select: "Soldier," "Maintainer," or "Enterprise User" o System provides a list of Bumper Numbers from which the Enterprise can choose from; search function provided; filterable function provided	
		Enterprise views the verified faults on the Digital 5988, confirms the parts request, and places parts on order	o System displays the Digital 5988, with verified faults and parts request, for the Enterprise User to review o System provides ability for enterprise user to edit verification options: Dismiss, Repair, Parts Requested o System provides ability for enterprise user to confirm parts request and place order	

Table 6. Use Case and Functional Requirements for Digital 5988 Software. *(U.S. Army)*

annotates the use case and functional requirement for this software application.

Recommendation #4 (Material): Artificial Intelligence Chatbot for NIIN Search

The current process to find correct NIINs for parts is inefficient and desynchronized. Currently, users have three disparate and delinked locations to look for NIINs: Electronic Management System-Next Generation; technical manuals through the Army Enterprise System Integration Program; and Interactive Authoring and Display Software. Additionally, there are numerous NIINs for similar parts or like items which induces error.

It is not uncommon for a unit to receive a part only to find that it is the wrong item. An artificial intelligence (AI) Chatbot that an enterprise user can interact with to search through all three systems simultaneously would save inordinate amounts of time and reduce human error. The advent of AI software that can assist in the creation of datasets, train AI, and automate workflows, makes this a reasonable endeavor. Companies like Palm AI through their Endobyte Software as a Service allows users to customize datasets, execute AI training and implement AI Chatbots. Below is the use case and functional requirements for this software.

Conclusion

Combined arms battalions are faced with challenges as the Army modernizes and transforms during an inter-war period. In a time and resource constrained environment, it is imperative that the CAB commander provides a clear and detailed fighting strategy to coordinate and synchronize training and maintenance lines of efforts. By defining lethality at echelon, a CAB can prioritize maintenance requirements and develop a coherent strategy over time and space. The operational tempo for armored brigade combat teams has been significant and does not look to slow down. It is important that CAB leadership find efficiencies in the Re-ARMM framework to increase warfighting capabilities throughout the formation.

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USER	STEP	USER ACTION	FUNCTIONAL REQUIREMENTS	NON-FUNCTIONAL REQUIREMENT
Enterprise User	1A	User indicates that they would like to search for a NIIN	System provides an application that serves as the primary user interace	System application must be accessible off of User's device through Army Mobile Connect
	1B	User inputs their desired part in the chat	o System identifies the requested part o System requests any clarification or additional information needed to identify specific part o System searches for the NIIN	
	1C	User inputs any additional questions to confirm the part is correct	o System provides clarification of why NIIN is correct o System provides options of different NIINs to clarify correct part	
	1D	Once complete, user reviews the NIIN , confirms correct part, and sends forward to Digital 5988	o System provides final NIIN for part in question o Once confirmed, System sends NIIN from chat box to Digital 5988	

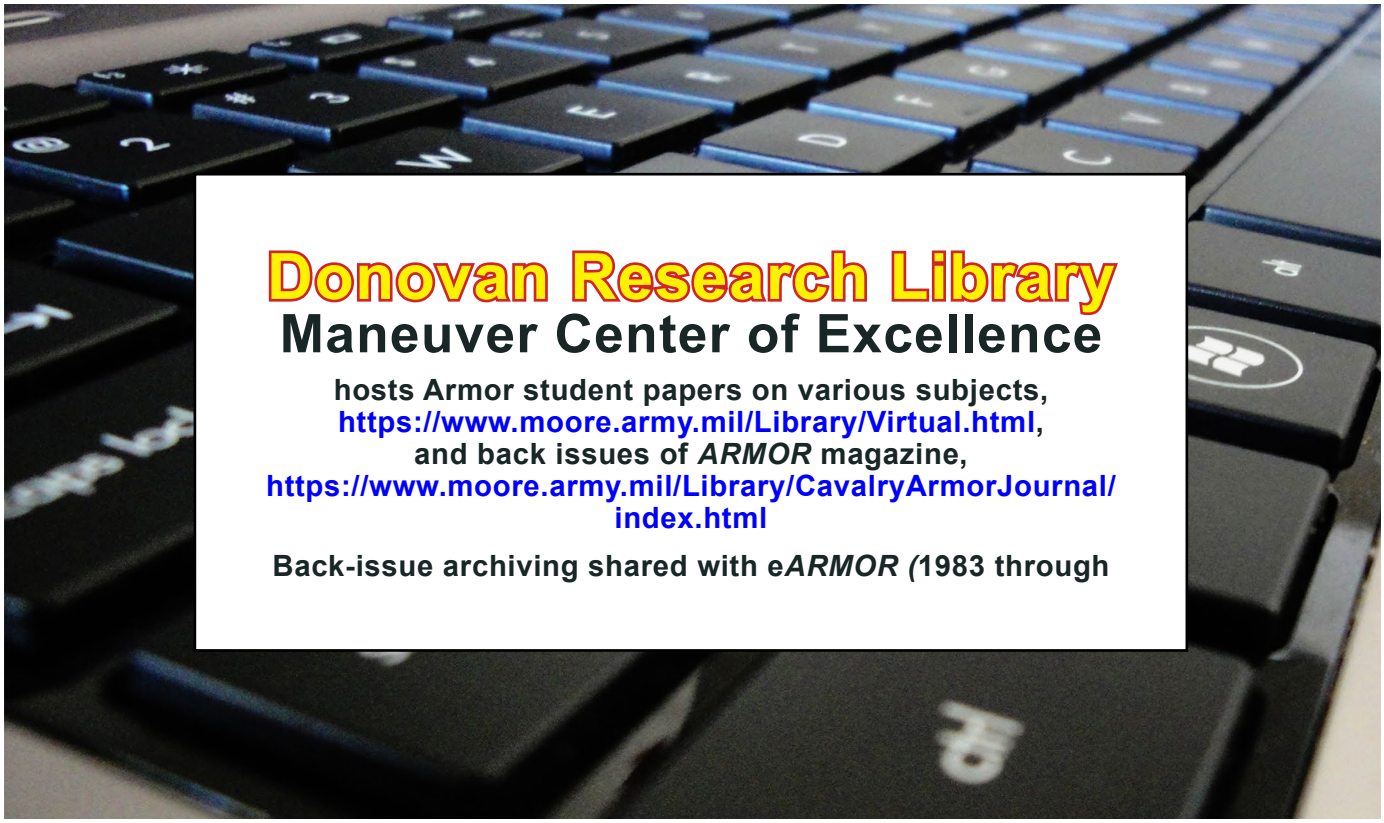
Table 7. Use Case and Functional Requirements for AI Chatbot NIIN Search Software. *(U.S. Army)*

(SAMS-1E) Course, Fort Richardson; Standard Army Retail Supply System - Level 1 (SAARS1) Course, Bagram, Afghanistan; Advanced Leaders Course; Senior Leaders Course; Warrant Officer Basic Course; and Warrant Officer Advanced Course, Fort Gregg-Adams, VA. CW3 Amsdell completed Lean Six Sigma - Army Business Management. His awards include the Bronze Star Medal, Meritorious Service Medal and the Combat Action Badge.

***1LT Collette Benavidez** is the battalion maintenance officer, 2-70 Armor Regiment, 2nd ABCT, 1st Infantry Division, Fort Riley, KS. Her previous assignments include maintenance control officer, H Forward-Support Company (FSC), 2-70 Armor, 2nd ABCT; maintenance platoon leader, D FSC, 5th Squadron, 4th Cavalry Regiment, 2nd ABCT, 1st Infantry Division; maintenance control officer, D FSC, 5-4 Cavalry, 2nd ABCT; and S-3 Overstrength, HHC, 299th Brigade Support Battalion, 2nd ABCT. 1LT Benavidez completed the Quartermaster Basic Officer Leader Course, Fort Gregg-Adams, VA. She has a bachelor's of arts degree in international relations from American University.*

Acronym Quick-Scan

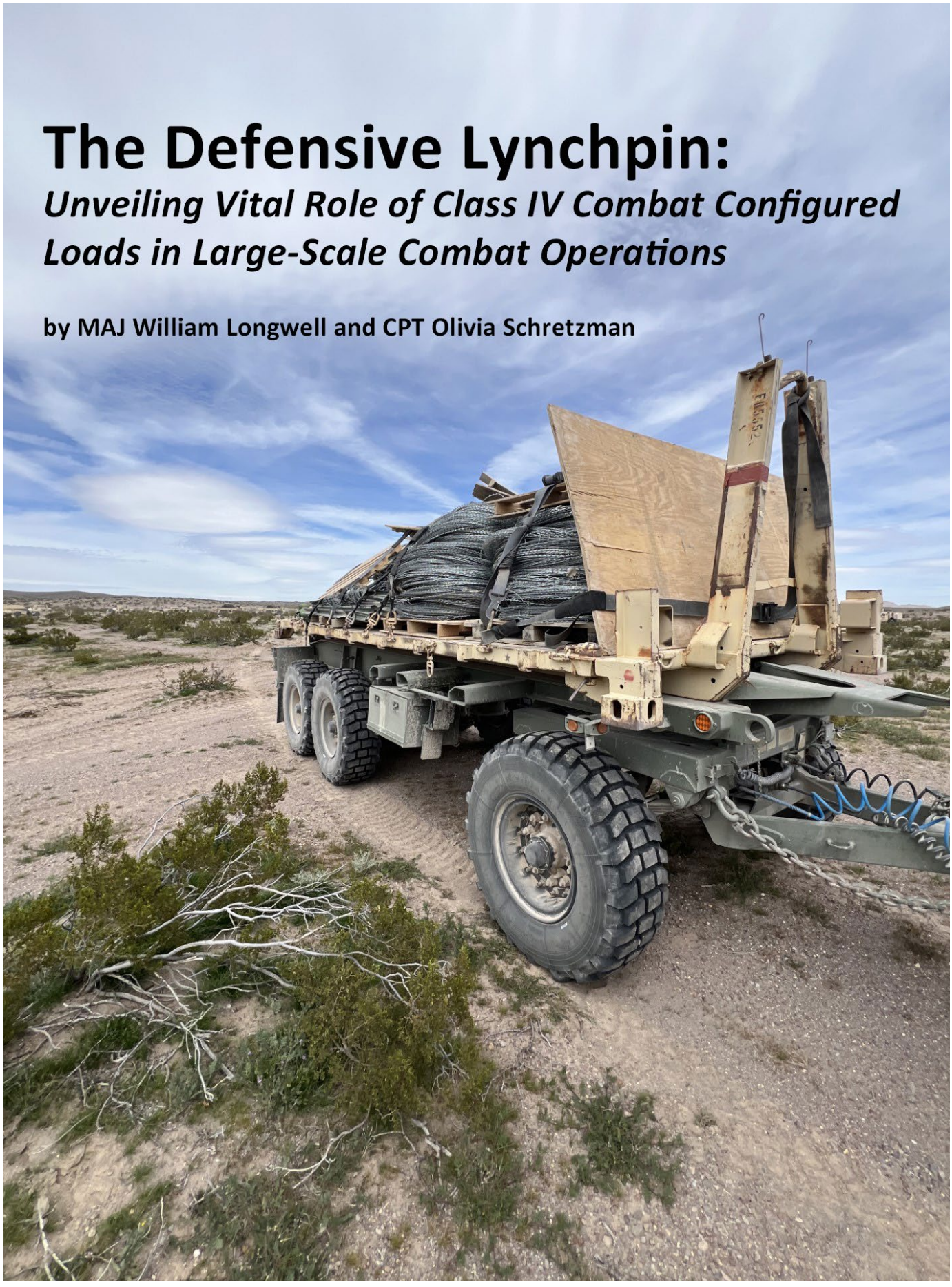
ABCT – armored brigade combat team
AESIP – Army Enterprise Systems Integration Program
AFATDS – Advanced Field Artillery Tactical Data System
AFB – air force base
AI – artificial intelligence
AIT – advanced individual training
BAS – battalion aid station
BCT – brigade combat team
BMO – battalion maintenance officer
C&E – communication and electronics
CAB – combined arms battalion
CGSC – Command and General Staff College
CTCP – combat-trains command post
DOTMLPF – doctrine, organization, training, materiel, leadership and education, personnel, and facilities
DRASH – Deployable Rapid Assembly Shelter
ELM – electronic maintenance
EMS – Electronic Management System
ERPS – equipment records parts specialist
EVAC – evacuate
FiST – fire-support team
FMC – fully mission capable
FPOL – forward passage of lines
FSC – forward-support company
FTCP – field-trains command post
GCSS-Army – Global Combat Support System-Army
HHC – headquarters and headquarters company
JBC-P – Joint Battle Command-Platform
JLTV – Joint Light Tactical Vehicle
LMTV – Light Medium Tactical Vehicle
LOGPAC – logistics package
LRAS – Long-Range Acquisition System
MCO – maintenance control officer
MCS – mission-command system
MOS – military occupational specialty
NAI – named area of interest
NG – National Guard
NIIN – National Item Identification Number
OSRVT – One System Remote Video Terminal
PMCS – preventive-maintenance checks and services
PIR – priority intelligence requirement
ReARMM – Regionally Aligned Readiness and Modernization Model
RPOL – rearward passage of lines
RETRANS – retransmission
STT – Satellite Transportable Terminal
TAC – tactical command post
TOC – tactical operations center
TM – technical manual
UMCP – unit maintenance collection point



The Defensive Lynchpin:

Unveiling Vital Role of Class IV Combat Configured Loads in Large-Scale Combat Operations

by MAJ William Longwell and CPT Olivia Schretzman



As the sun sets over the Central Corridor, following a long day of combined arms breaching, a common story and phrase is echoed from leaders at all echelons to their subordinates as they prepare for the transition to the defense. Bracing for the imminent transition, the commander immediately asks those nearby, "Where are the CCLs (combat configured loads)?" In this pivotal moment, the question underscores the strategic foresight and meticulous preparation essential for success in modern warfare.

Imagine your unit has been fighting through the day for key terrain, and the sun is quickly going down past the horizon. You receive the order to establish a hasty defense and begin engagement area development (Army Doctrine Publication (ADP) 3-90, ***Offense and Defense***, Chapter 4, paragraph 4-29). You call forward your Class IV CCLs, which are dropped off just as the sun sets and the Soldiers on the line begin to pull everything off the flat rack. When they remove the ratchet straps or cut the bands, concertina wire (c-wire) and stakes start getting tangled and stacks fall over. Conducting this disassembly in the dark under night optical devices, making it that much harder.

The scene set above is a common trend at the National Training Center (NTC) and is the lynchpin for a successful transition to the defense. Every minute is important and a commander's determination to build survivability and counter mobility obstacle effects grows stronger throughout the operation. To build a robust defense, it is imperative that construction materiel (concertina wire, pickets, barbed wire, etc.) and equipment, ammunition, and manpower is in the right place at the right time. Following a successful offensive operation, leaders are already thinking about minimizing risk in the defense. One of the most important ways to mitigate risk to mission and risk to force during the defense is the strategic emplacement of obstacles in specified engagement areas using Class IV CCLs. Class IV CCLs are one of the most vital resources a maneuver commander can use during defensive operations.

This paper explains how properly built CCLs can increase lethality protection, while mitigating risk to mission and risk to force. The authors provide examples of integrating Class IV CCL preparations into unit standing operating procedures (SOPs). It emphasizes the need for streamlined processes and a comprehensive understanding of resource allocation across all levels of command synchronization matrix (SYNCMAT) and execution checklist (EXCHECK) integration. The following paper can help units enhance their defensive capabilities and prepare leaders with the tools to plan for contingencies with greater efficiency and readiness in defensive operations and large-scale combat scenarios.

Figure 1. Poorly built CCL loaded with concertina wire, pickets, and barbed wire. Note the Concertina Wire falling over and randomly placed ratchet straps. *(U.S. Army photo by CPT Olivia Schretzman and MAJ William Longwell)*

Background

According to Army Techniques Publication (ATP) 3-90.8, ***Combined Arms Countermobility***, Paragraph 3-79, "obstacle resource planning, delivery, and emplacement are facilitated by CCLs." In a brigade combat team (BCT) large-scale combat operations (LSCO) fight, CCLs are mostly referred to as Class IV (construction and barrier materials) and Class V (ammunition) packages, prepared ahead of an operation to be moved forward to units (in need of those supplies) on an M3 Container Roll-in/Out Platform flat rack.

The term "CCL" can be used for any pre-configured load package of any class of supply; however, this article will focus on Class IV CCLs for defensive preparations. CCLs can be configured in any method to best enable forward elements to quickly receive the supplies they need to prepare to continue fighting or defending against an enemy. Additionally, CCLs of Class IV should be developed given the identified terrain, and the most likely type of obstacles or fighting positions a unit expects to emplace. CCLs cannot solely be a logistics officer or an engineer planner's priority. The management of CCLs is a leader priority across all warfighting functions.

There are hundreds of Class IV CCL configurations a BCT may use in LSCO operations. For example, Class IV CCLs include construction material to build marking or "fratricide" fences, 300-meter Triple Strand Concertina Wire obstacles, and include concertina wire, pickets (long and short), barbed wire, and even plywood. Class IV CCLs optimize resource utilization by providing standardized sets of construction materials tailored to specific defensive requirements. This standardization reduces logistical complexity, minimizes waste, and ensures units have the necessary resources to execute defensive operations effectively. A unit's tactical SOPs (TACSOPs) outline its desired CCL configurations and is vital for shared understanding at echelon.

Engagement areas use multiple Class IV CCLs and need to be strategically emplaced close to the desired obstacle location to maximize emplacement time for the emplacing unit. While it may seem simple to have the Class IV CCLs on hand before the transition to the defense, moving CCLs through

specified breach points or restricted terrain can take many hours. Additionally, having the CCLs on hand is not always the most significant factor in CCL management. Instead, the way that CCLs are managed and configured can impact mission success the most. At the NTC, it is a common trend that CCLs are not always built or maintained in accordance with the unit SOPs. These poorly assembled CCLs can significantly slow down defensive operations and prevent obstacle effects (block, fix, disrupt, turn) from being accomplished in the mission timeframe.

While it might not be the main effort, planning for CCL movement is still an enabling operation (movement of CCLs to the forward line of troops) and is vital in maintaining tempo and flexibility. To transition successfully to the defense during LSCO, planners need to focus on the efficient handling and deployment of Class IV construction materials, contained within CCLs and this represents a pivotal yet often overlooked aspect of defensive planning. At venues like the NTC, the hurried preparation and poorly built resource packages during reception, staging and onward integration (RSOI) can significantly impact defensive operations in LSCO.

During rotations at the NTC, units often use CCLs of concertina wire and pickets to build disruption obstacles of double or triple strand concertina wire integrated with direct and indirect fires. Building a 300-meter-long obstacle of triple-strand concertina requires 160 long pickets, eight rolls of barbed wire and 60 rolls of concertina wire. Observer/coach/trainers (O/C/Ts) witness that if not properly packaged and secured, removing one picket from the stack can cause the entire package to fall apart during transportation. If not labeled properly, the forward receiving unit likely will be unable to identify what obstacle can be built with the supplied Class IV.

During a previous rotation, a brigade's (BDE's) protection SOP specified how CCLs should be built, but not one CCL was built to that standard. This became a larger issue when the battalion (BN) protection officer assumed there was enough wire to prepare 300 meters of triple strand concertina wire, when there was only 200 meters in the delivered CCL.

Create, train, validate SOPs for CCL assembly

A simple way for BCTs and their downtrace battalions and companies to be more effective while preparing for a defense, and save valuable time is to spend the time up front creating an SOP for how CCLs are assembled, marked and managed. The unit must then train on this SOP to validate it. At the NTC, rotational units usually train on at least two defenses. Most rotations include a hasty defense and a deliberate defense. Despite knowing they will train on defenses up front, we often see CCL preparation and management take a back seat to other tasks the rotational training unit must do during RSOI.

How Class IV CCLs are built, labeled and disassembled to build wire obstacles and fighting positions, should be understood across a BCT formation. These points should be included in the brigade and battalion TACSOPs. The following is an example of a CCL standardization in a protection SOP.

When preparing for the defense, it is imperative that the composition and location of CCLs are integrated into unit planning and rehearsals. All leaders need to understand the unit's CCL disposition; however, it is particularly important for brigade S-4s and brigade engineers to thoroughly understand and brief this aspect during orders production and rehearsals. At the battalion level, leveraging the expertise of S-4s and Battalion Engineers or Battle Captains to brief CCL locations and composition during rehearsals, can significantly enhance operational readiness. Tracking the movement of CCLs throughout defensive preparations is equally important as it ensures seamless coordination across the battlefield.

Figure 2. Consequences of a poorly built CCL, Concertina Wire falling off and into an axle. *(U.S. Army photo by CPT Olivia Schretzman and MAJ William Longwell)*

Shared awareness

Incorporating CCL transfers into SYNCMATs or EXCHECKs can foster shared situational awareness within the formation. Including CCLs in friendly force information requirements, specifying their location, current ownership, and disposition, enhances battlefield transparency for all subordinates. Additionally, a critical decision point for commanders arises in determining when to deploy CCLs to facilitate obstacle emplacement. To aid staff members and leaders in risk mitigation, a risk mitigation strategy example is provided (Figure 5. Risk Mitigation if Class IV CCLs are limited) and identifies how you can mitigate risk using other assets for a defense, such as blade assets or using explosive measures. Recognizing the pivotal role of Class IV in defensive

planning, strategies utilizing target reference points and vehicle fighting positions are recommended to mitigate shortages. However, insufficient Class IV resources can significantly constrain engagement area development and increase the risk of minefield fratricide, underscoring the importance of adequate logistical support.

Ultimately, the responsibility for CCLs falls on maneuver and sustainment leaders at both battalion and company levels. By integrating CCL management into operational rehearsals and decision-making processes, units can ensure the effective use of vital logistical assets, which will lead to mission success and increased lethality in LSCO.

Conclusion

To streamline efficiency and enhance readiness for future operations and training at the NTC, we propose the following recommendations.

1. Establish an SOP for Class IV CCLs at the brigade level and disseminate it down to the platoon level.
2. Specify stacking and securing procedures for Class IV CCL materials to ensure consistency, stability, ease of access and disassembly.
3. Clearly label each Class IV CCL with its contents and indicate the type of obstacle that can be constructed using the materials provided. This could be on a Meals Ready to Eat box, "100mph" tape, or other available material that is weatherproof.
4. During planning, designate responsibilities for transporting and receiving Class IV CCLs to ensure smooth and timely coordination and execution.
5. During rehearsals, the BDE/BN S-4 and BDE/BN engineer should brief the composition and locations of CCLs for planned defenses. Individuals who own the CCL at each phase and position should also brief during the rehearsal.

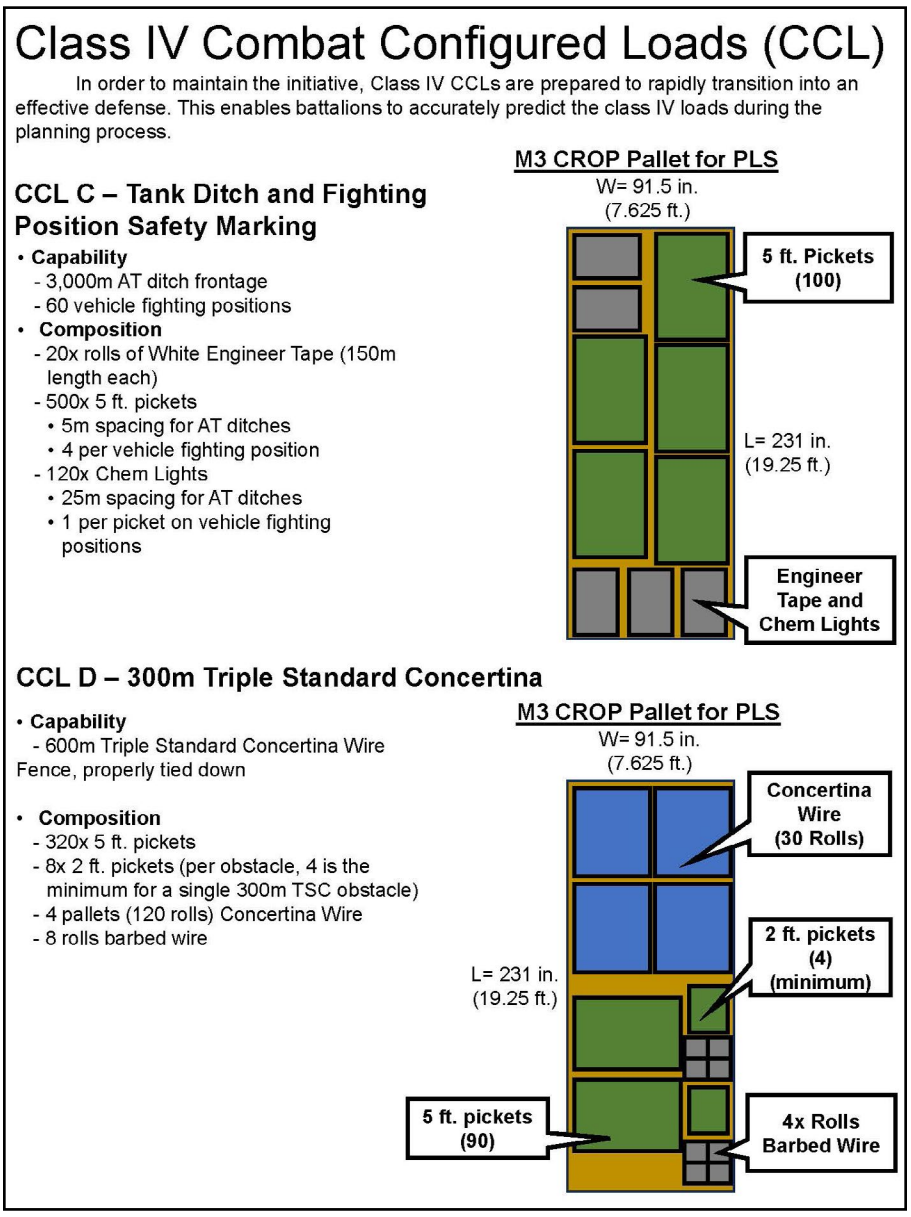


Figure 3. CCL C and CCL D include Class IV examples from a brigade TACSOP (36th Engineer BDE). *(U.S. Army table by CPT Olivia Schretzman and MAJ William Longwell)*

By implementing these measures, leaders at all echelons will have a clear understanding of the contents and purpose of Class IV CCLs. This will enable units to efficiently plan, prepare, and employ obstacles for both hasty and deliberate defensive operations. The adoption of these practices will undoubtedly yield significant dividends in terms of operational effectiveness and preparedness for challenges encountered in LSCO.

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Acronym Quick-Scan

BCT – brigade combat team
BDE – brigade
BN – battalion
CCL – combat configured load
EXCHECK – execution checklist
LSCO – large-scale combat operations
NTC – National Training Center
O/C/T – observer/coach/trainer
RSOI – reception, staging, and onward integration
SOP – standing operating procedure
SYNCMAT – synchronization matrix
TACSOP – tactical standing operating procedure

Figure 4. Marking examples using materials available. Key is shared understanding of what these markings denote. *(U.S. Army photo by CPT Olivia Schretzman and MAJ William Longwell)*

Leader Conduct in Training: Rebooting retired LTG Hal Moore's 'Four Principles

by COL Esli Pitts

In recognition of the renaming of Fort Benning as Fort Moore, I provide the following thoughts on adapting retired LTG Moore's four principles of conduct in battle for armored leaders.

November 1996. There I was — in the box at the National Training Center (NTC) — with my mortar platoon: two fire direction centers (FDCs), six mortar tracks, two cargo trucks, and more than 1,500 rounds of 120mm ammunition. We had limited redundancy in computing mortar missions due to some shortages, but after a frank conversation with the observer/coach/trainers (O/C/Ts), we did what we could to mitigate the issue.

During the next battalion attack, we quickly lost the primary FDC with the two mortar ballistic computers. Not so fast, O/C/Ts! — we continued to fight from the second FDC, with two serviceable plotting boards. No doubt, the O/C/Ts thought we were finished when the second FDC was also destroyed, but my senior squad leader — formerly a cavalry troop's mortar section sergeant — pulled out a plotting board and ran the FDC from his track. Then he was assessed as a casualty (wow, the enemy artillery sure was selective). Somebody called that we were combat ineffective, but we still had five operational gun tracks and a lot of ammunition. A squad leader dug a charge book out of a dusty helmet bag and we were back in business! Although seriously degraded, we continued firing until the end of the attack. Lesson learned.

Unbeknownst to me, I had just validated LTG Moore's second principle of leader conduct in battle: "There is always one more thing you can do to influence any situation in your favor – and after that one more thing…."

Years later, I had the privilege of hearing LTG Moore speak at a squadron ball. Then, I found a video that captured Moore's "four principles of leader conduct in battle," and I was hooked.[1] I took the video into battalion command and continued to use it as a battalion/task force maneuver trainer, where I found it was an excellent way to stimulate discussion in after action reviews (AARs).

LTG Moore's "Four Principles on Leader Conduct in Battle" follow [in italics]. His words are not a polished staff product, but they are a stand-alone leadership lesson written by a proven combat leader.[2]

[Excerpt] *B. Next, Conduct in battle, Four principles:*

1. The first is: "THREE STRIKES AND YOU ARE NOT OUT!" Two things a Leader can do. Either contaminate his environment and his unit with his attitude and actions, OR he can inspire confidence."

Must be visible on the battlefield. Must be IN the battle; Bn Cdr on down - Bde and Div Cdr on occasion. Self-confident. Positive attitude. Must exhibit his determination to prevail no matter what the odds or how desperate the situation. Must have and display the WILL TO WIN by his actions, his words, his tone of voice on the radio and face to face, his appearance, his demeanor, his countenance, the look in his eyes. He must remain calm and cool. NO FEAR. Must ignore the noise, dust, smoke, thirst, explosions, screams of wounded, the yells, the dead lying around him. That's all NORMAL!

Must never give off any hint or evidence that he is uncertain about a positive outcome, even in the most desperate of situations. Again, the principle which must be driven into your own head, and the heads of your men is: "THREE STRIKES AND YOU'RE NOT OUT!"

2. And the corollary principle interreactive with that one is:

"THERE'S ALWAYS ONE MORE THING YOU CAN DO TO INFLUENCE ANY SITUATION IN YOUR FAVOR – AND AFTER THAT ONE MORE THING – AND AFTER THAT ONE MORE THING, ETC. ETC." In battle, I periodically detached myself mentally for a few seconds from the noise, the screams of the wounded, the explosions, the yelling, the smoke and dust, the intensity of it all, and asked myself: WHAT AM I DOING THAT I SHOULD NOT BE DOING? AND WHAT AM I NOT DOING THAT I SHOULD BE DOING TO INFLUENCE THE SITUATION IN MY FAVOR?"

Figure 1. Task Force Power, 3rd Battalion, 69th Armor Regiment mortar tracks in action at NTC, 1996. *(U.S. Army photo by 1LT Esli Pitts in November 1996)*

3. The third principle is "WHEN THERE'S NOTHING WRONG – THERE'S NOTHING WRONG EXCEPT – THERE'S NOTHING WRONG!" That's exactly when a leader must be most alert.

4. And finally, #4 "TRUST YOUR INSTINCTS." In a critical, fast-moving battlefield situation, instincts and intuition amount to an instant Estimate of the Situation. Your instincts are the product of your education, training, reading, personality, and experience.

"TRUST YOUR INSTINCTS"

When seconds count, instinct and decisiveness come into play. In quick-developing Situations, the leader must act fast, impart confidence to all around him, must not second guess a decision-MAKE IT HAPPEN! In the process, he cannot stand around slack-jawed when he's hit with the unexpected. He must face up the facts, deal with them, and MOVE ON.

Harold G. Moore

LTG, U.S. Army (Retired)

(Commander, 1st Battalion, 7th Cavalry Regiment, LZ X-Ray, Ia Drang Valley, Vietnam, 1965)

Moore's words alone are incomparable; however, I would like to offer some thoughts on how the armor community could inculcate these principles in training.

Three Strikes

A leader either contaminates the environment or inspires confidence. This is all about our demeanor, our presence, how we act as leaders and how our leadership influences those around us.

Particularly at higher echelons, there are few opportunities in the field to provide face-to-face leadership to the entire team (think plans, briefs, rehearsals, and AARs). How you present yourself at those points will influence the team for better or worse.

As a battalion senior maneuver trainer at the Joint Multinational Readiness Center, Hohenfels, Germany, I generally saw the battalion's leaders convey three different attitudes to their units during training rotations. Their style was clear to us (the observers) even if it was not always clear to them.

First, some focused on the negative. They pointed out the artificialities or gaps, insisting that "we would never..." or otherwise emphasized problems, whether coming from higher, lower, or the opposing force. As LTG Moore described, this attitude directly "contaminated the environment" as subordinate staff and commanders' briefings quickly focused on workarounds, highlighted "issues," and found reasons why they could not train as they would fight (often expressed in snide comments during briefings). These units might do well, but they rarely learned.

The second type involved an unhealthy focus on winning at all costs, which led to expressed or implied pressures on subordinates, an unwillingness to receive, or report, bad news, a reliance on gamesmanship such as "MILES berms" and contention between rotational and opposing forces on the battlefield (and the O/C/Ts). These units also tended to learn little.

The third type involved leaders that came with an emphasis on learning. They tended to utilize their systems, improve on them, tolerate acceptable risks, lead through mission command, and grow both individually and as organizations. No matter what level they arrived at, *they improved*.

These leader attitudes stem from the tone of the senior leader. Listen to the tone of your subordinates during planning, briefings, and rehearsals — whether positive or negative, they might be mirroring you.

Once across the line of departure, we mainly lead via the radio, a medium that is frequently garbled, stepped on, and "hot mic'd." It is then that, as Moore says, the "tone of our voice" is all we have to convey everything: guidance, clarity, vision, and the will to win. The first rule is to keep calm. You don't have to yell over the noise of the battle for others to hear. Keep calm; just speak. The second rule is to be precise. At NTC, referring to "the big rock over there" is useless; likewise, for "that tree" in Germany, so find precise words. The third rule is to be brief. It might be your net, but if you are always talking, others cannot. The last rule, especially when things are going wrong — or you just got jumped on by your higher — is to refer to the first rule: keep calm. Getting angry on the net simply translates down to the lower echelons as stress.

You are the leader. When things are going wrong, you owe the organization calm, measured leadership. Make it a habit for yourself and an expectation of your team when you are monitoring their nets during collective training. Just as important, even if your own higher leaders cannot provide calm leadership to you, do not pass their anger down on your own net.

Leaders can project this calm demeanor and a will to win because they know…

There is always one more thing you can do. Moore asks, "what am I doing that I should not be, and what am I not doing that I should be?" The answer to this second question is contingent upon actually having options, whether from equipment or depth of training readiness. Having one more thing you can do ("and after that, one more") provides you with flexibility and options. This mindset is a commitment to having the necessary equipment, skills, and training proficiency to enable going to the well one more time.

As an O/C/T, I covered a particular airborne infantry battalion that jumped into their rotation, but deliberately left their medium and heavy anti-armor systems' thermal optics at home, despite knowing there was an armored threat. By the commander's choice, as they hit the ground and rolled up their parachutes, they were already past "one more thing you can do," and "after that, one more thing" and reliant on light weapons at best. They chose to have no options.

I'm a believer that it is better to have and not need than to need and not have. This means train with all your equipment and then bring it to the field. As a mortar platoon leader, that meant bringing not only our new mortar ballistic computers but also the old, cracked plotting boards and even the charge books. As a tank company commander, it meant bringing out my five decoy tanks and fixing and mounting the broken mine plows I inherited. It also meant training with the dusty M71 Remote Control Units and the Modular Pack Mine Systems and bringing my

own scatterable mine capability to the field. It meant bringing all our individual and crew chemical protective gear and anything else I could think of. Bottom line, all our gear is designed to help us make it past "one more thing" and "after that, one more thing" and all the way to "etc." If we don't train with it, and then leave it behind, it's useless.

In addition to the gear, our training proficiency comes into play. I once participated in a night attack in Hohenfels, during which the battalion executed eleven breaches. This only worked because of the battalion commander's emphasis on flexibility and a depth of training and resources. Do all our crews know required battle drills or only the designated crews? Can all four tanks in the platoon conduct a manual breach (and have a breach kit?) or just the plow tank? Do we have redundancy in drills across the tank sections? Platoons? Companies? Or did we simply designate 1st Platoon as the breach force and not train the others?

Surviving to the third "one more thing" doesn't just mean equipment and battle drills, but also the deliberate planning that enables it. Did planning stop when your exhausted planner finished writing the base order? Or are you now building a course of action for the most likely branch plan? Do your graphics enable flexibility in the operation or only rigidity? Do your graphics support deviating from the plan? Do you have subsequent or supplementary battle positions planned in case your defenses are penetrated? Do you have additional checkpoints designated to support a new attack by fire position or counter-attack route?

Does your battalion staff have sufficient reps at planning and orders production? Do they have additional tools in their kit bag, such as the Rapid Decision-making Synchronization Process and staff battle drills? Do they have an adaptive mindset? Or are they rigid and focused on THIS plan? Is your combat trains command post prepared to take over in the event of the loss of the tactical operations center? Can the field trains command post step up to serve as the combat trains command post? Can they do so right now? Do they know you expect that?

Maybe you are just one new staff officer. Are you waiting for guidance? Or are you already ensuring the depth of planning that offers the commander "one more thing" in your lane? As the S-4, is it sufficient that "everybody topped off this morning?" Or is the standard that, not only did everybody top off, but there is a dedicated refuel and re-arm asset, associated planning priorities, primary and alternate logistics release points, and a plan to reconstitute it — and rehearse it? Do our communications, intelligence collection and fire support plans also have redundancy?

When there's nothing wrong, there's nothing wrong. Except that there's nothing wrong. As a junior captain, I had the pleasure of three combat training center rotations as the brigade's day battle captain. During two of them, the battalions had a bad habit of not reporting when they were in contact — not even "Contact, tanks, east, out." Afterward, they would come up on the net and report themselves as "Black" on combat power. As a staff of jaded pre-command captains, we gleefully chanted "'Green, Green, Black' is the (insert brigade combat team name) motto," but the brigade was routinely in contact while being unaware of it, denying the commander the ability to do anything about it. "There's nothing wrong, except that there's nothing wrong."

How do we, as armor leaders, confirm that there really is nothing wrong, rather than we just don't know? First off, we must actively look for the wrong. At the crew or platoon levels, that might be through preventive maintenance, detailed pre-combat checks and inspections and thorough rehearsals.

A great place to start (at any echelon) is to be in the habit of constantly comparing your actual reality to the reality as stated in the plan. If the lead battalion should have cleared the passage points by 0700 hours and it is now 0745, something's wrong. You thought the breach would take 45 minutes, and it's been 60? Definitely something wrong! Haven't heard from the main effort for a while? Maybe there is nothing wrong, but maybe you are in a "Green, Green, Black" situation. Let's key the mic and find out. Better: let's instill in our subordinates the habit of reporting problems.

Is radio silence okay during an operation? Or do you mandate "negative reporting" when necessary? Imagine you are a battalion executive officer (XO), and you haven't heard from Company for 30 minutes. Would you rather hear 1) "Sir, Battle is here" (points at a screen) "and they haven't reported any contact;" or, "Sir, Battle is here" (points at screen, and then reads from the log) "and they reported clearing Phase Line RED 5 minutes ago with no contact." One report relies on assumptions ("Well, I guess nothing is wrong"), while the other option provides clarity and evidence that nothing is wrong.

Remember: "wrong" is not just enemy contact. It can be anything that impacts timelines, combat power or mission accomplishment. Your lead tank threw a track while staging in a tight assembly area, but the commander didn't tell anybody because they're trying to just "walk it back on." Now the track and road wheels are chewed up, and he is blocking the route. But nothing is "wrong."

Leaders must come up on the net and report. As they say, bad news does not get better with time. The faster we identify and share when something is wrong, the more time we must deal with the fallout from these things because they WILL occur. Remember our demeanor on the radio? If we berate our subordinates every time something is wrong, they will stop reporting, hoping for a fix just in time.

What enables us to quickly recover when something truly is wrong is skill and experience. That's what LTG Moore was referring to when he said to "trust your instinct."

Trust your instinct

Not counting actual deployments, I averaged about 96 days per year in the field as a company-grade officer. That's a lot of time to build instinct. Fast forward to battalion command, we barely got 53 days per year in the field. Every one of those "lost" training days translated to lost "instinct" in my battalion's leaders. We offset it in other ways, such as simulations or professional

development, but the question remains: how do you build instinct? Think about where you train, what lessons you are learning and what instincts you are building. What you learn in the open, rocky terrain of NTC or the desert will be very different from the rolling hills and wooded terrain of Europe and you must recognize the differences between them.

Learn vicariously. That old-timer's story probably has a useful lesson in it — maybe one you won't have to learn the hard way. Professional development programs are also a great way to do this.

Read. I once read a report from NTC in which a contributor said he knew rotational leaders had reached exhaustion when pencils fell from their fingers. When I saw that indicator in others, I recognized it for what it was. Even lacking a successful unit professional reading program, it's easy to maintain a personal program appropriate to your position. Whether it is the Combat Studies Institute, biography, history, or ***ARMOR*** magazine, the choices are infinite. Something will stick with you if you just read.

Professional Military Education. As someone who has read almost everything I was assigned at all levels of military education, I'm going to tell the ugly truth. The old joke that "It's only a lot of reading if you do it" is a disservice to the Army and to the Soldiers we lead. We should read … most of it.

Learn by doing. Instinct is the mental equivalent of muscle memory. Fight to get as many training reps as you can in a variety of conditions including terrain, weather, visibility, and chemical contamination so that instinct takes root.

Good instincts come from a solid grounding in time-distance analysis with lots of repetitions in a variety of situations.

How long will the alpha section have to cover the entire platoon sector while bravo section backs down and cross-levels five rounds from the semi-ready to the ready rack? Unless you train it, the answer is "a long time." (Hint: it can be done in less than four minutes.)

How long does it take to uncoil from an assembly area in the dark or refuel a tank company on the move? How long does it take to conduct a passage of lines? Breach two lanes? How long to dig in a company? Tear down the tactical operations center? Emplace five hundred meters of triple-strand concertina wire? Complete pre-combat inspections to standard? Move dismounted in wooded terrain? How long…?

The answers to these, and a hundred other questions, form a baseline of knowledge that enables you to plan *this* fight more effectively and builds instinct for the next fight. This familiarity also lets you recognize when you have exceeded those planning thresholds and recognize that something is wrong, even though nothing seems to be.

Capture it all and build it in your standing operating procedures. By the time you are a mid-grade leader, you should have a bedrock understanding of planning factors that enables you to plan and fight from an instinctual basis.

I periodically detached myself: Though this line comes under his second point, I want to highlight this separately. LTG Moore makes an important point when he said he would periodically step away to think. The armor community does a good job of empowering our executive officers and platoon sergeants to report upwards. Not only does this allow commanders to fight their organizations, but it also allows them to "periodically detach" to think about what comes next. However, we have two other challenges. First, we should also give our battalions' executive officers and battle captains the ability to "detach" and orchestrate the whole of the staff's efforts by handing most routine traffic to staff or radio-telephone operators except when absolutely necessary. Unfortunately, they frequently grab a handset and get consumed in lengthy point-to-point conversations with a resultant loss of their situational awareness. Second, some commanders hesitate to leave the tactical-operations center (TOC), sacrificing mission command with their own main effort to ensure they personally remain in contact with higher headquarters through better connectivity at the TOC than on their vehicle. Commanders must also physically detach!

January 2013. There I was — in the defense at NTC — with my battalion: two tank companies, two infantry companies, and the first planning priority for the brigade reserve. We were well into the counter-recon fight and had destroyed the first battalion (-) of the main body.

I expected to be in contact with the rest of the enemy's main body soon, but, except for one stale spot report from the cavalry squadron, nobody had contact with the enemy regiment. I assessed this lack of contact, not as "nothing was wrong," but that "something was wrong." My estimate was that if the enemy was attacking but was currently invisible, he must be "about here" [points at the map]. Therefore, what I was not doing, but should be, was re-orienting my defense. My instinct was that if the enemy was where I thought he was, then my companies were sufficiently trained to move quickly and could be established in new battle positions before the enemy could close the distance if I gave quick, calm, clear guidance and used my staff to synchronize it. We made the move and set in the new positions shortly before the enemy showed up. It was a long, hard-fought defense, and we did "one more thing" at least three more times as we adjusted another battle position, re-armed tank companies, and then requested the release of the brigade reserve, but we ultimately stopped a regimental attack in our engagement area. I wasn't asking myself what LTG Moore would do, but I like to think that he would have approved.

The sum of all these thoughts is that we must train as we fight. I'll just leave you with one telling statistic: utilization of vehicle smoke grenades across U.S. Army Forces Command was 9.85 percent in fiscal year 2023. Did you train your tank commanders to salvo smoke and displace to an alternate position?

So, what can YOU do? Regardless of your position, you can do a lot.

The first thing is having the right mindset — a willingness to continue learning and an absolute determination to

prevail. Let's assume that you already have these.

My challenge: Steal LTG Moore's principles. Who could blame you? Model them in your own behavior, manifest it in your plans and training, encourage them in your teams, and then use them to facilitate open-ended questions in your after-action reviews. Please consider the following points.

- **Three strikes**: This is tough; you may need to coach your leaders on the side if you need to adjust their demeanor. You also need to be alert for cues that your own behavior needs to change.
- **There's always one more thing**: Did we effectively use all our tools? What else could we have done? Why didn't we complete our planned turning obstacle? What else could we have done to disrupt the enemy? Did we have redundancy in …? Why did mission command fail after the tactical operations center jumped? Why couldn't the dismounts employ Javelins? What else could they have done? Why didn't we bring ...?
- **Nothing wrong**: Did the TOC know that Company A hadn't …? What was the first indicator that something was wrong? When did we realize that the enemy was in sector?
- **Trust your instinct**: How did you know the enemy was going to …? Why did you take that risk? If you *thought* X, then why did you *do* Y? Would that "lesson" you just learned at NTC work in a wooded — or littoral — environment? What did you learn in this mission that you can take forward to your next mission or next job?

Adopt any or all these points and make them your own. Demonstrate it in your own behavior and reinforce it across the unit, and watch performance improve.

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Notes

U.S. Army, "Leadership by LTG Harold Moore," ***YouTube.com***, https://www.youtube.com/watch?v=wGNxHMFjigA

[2] Author's note about ***LTG Moore's Four Principles of Conduct in Battle***: I retained the original words, punctuation, and capitalization; however, I cleaned up some typographical errors because I am not sure if they were LTG Moore's errors.

Acronym Quick-Scan

AAR – after action review
FDC – fire direction center
NTC – National Training Center
O/C/T – observer/coach/trainer
TOC – tactical-operations center
XO – executive officer

FORT IRWIN, CA – The last days of the training rotation begin at the National Training Center (NTC), Fort Irwin, CA. All Soldiers wake up before dawn to prepare for live-fire missions. This training supports the 116th Cavalry Brigade Combat Team during its a month-long NTC rotation that provides more than 4,000 service members from 31 states, including units from 13 National Guard states and territories, with realistic training to enhance their combat, support and sustainment capabilities. *(Photo by: Cpl. Alisha Grezlik, 115th Mobile Public Affairs Detachment)*

Future of Cavalry: Multi-Domain Effects Battalions as New Theater Reconnaissance

by LTC Aaron Ritzema and LTC Thomas Burns

Since the dawn of warfare, commanders have looked for ways to increase the speed and range of their ability to find enemy forces, determine their location and develop an appropriate response. First with the horse, then through the air, commanders have depended on cavalry operations to provide time and space for decision making and inform their understanding of the battlefield faster than the adversary.

As technology has advanced, so have the means and methods for conducting reconnaissance, surveillance and security operations. The increased prevalence and reliance on multi-domain sensors and growth in importance of the electromagnetic spectrum have forced a re-assessment of how Army formations conduct these cavalry functions.[1, 2] While most of this analysis is focused on the division and below, the formation of the multi-domain task forces, and their multi-domain effects battalion (MDEB) represents the future of cavalry as it performs integrated reconnaissance, security and surveillance in support of targeting at the theater level.

To further explore this, we will review the role and purpose of cavalry, review the current doctrinal perspective on reconnaissance, surveillance, and security in cyberspace operations and electromagnetic warfare. We will also discuss the task organization and employment concept of the MDEB, and then demonstrate how the MDEBs perform the traditional cavalry roles and functions in a new and innovative way.

Role, purpose of cavalry

Field Manual (FM) 3-98, ***Reconnaissance and Security Operations***, describes the fundamental purpose of cavalry as "set(ting) conditions for successful operations of their higher headquarters."[3]

To do this, cavalry units perform seven roles that directly enable the commander to visualize, understand, describe, and direct:

1. enable combat operations,
2. provide Accurate and Timely Information to the Operations process,
3. operate as combined arms air-ground teams,
4. provide reaction time and maneuver space,
5. preserve combat power,
6. facilitate movement and transitions, and
7. fight for information.

Historically, this has translated into three specific mission sets that fall under the information collection umbrella: reconnaissance, surveillance, and security operations.[4] Ultimately, these three roles facilitate the commander's ability to maneuver their forces and concentrate superior combat power at the decisive time and place.[5]

The following paragraphs summarize Joint and Army doctrine on these mission sets to set the stage for demonstrating how the MDEB performs these tasks as the new face of cavalry.

Reconnaissance

According to Joint Publication (JP) 2-0, ***Reconnaissance,*** is a mission undertaken to obtain information about the activities and resources of an enemy or adversary, or to secure data concerning the meteorological, hydrographic, geographic, or other characteristics of a particular area, by visual observation or other detection methods.[6] In the case of the MDEBs, this primarily takes the form of electromagnetic reconnaissance which JP 3-85, ***Joint Electromagnetic Spectrum Operations*** defines as "the detection, location, identification, and evaluation of foreign electromagnetic radiations using assigned electromagnetic warfare personnel and capabilities. Electromagnetic reconnaissance may result in electromagnetic protection modifications or lead to an electromagnetic attack against enemy capabilities."[7] There are seven fundamentals of reconnaissance.

1. Ensure continuous reconnaissance.
2. Do not keep reconnaissance assets in reserve.
3. Orient on the reconnaissance objective.
4. Report all required information rapidly and accurately.
5. Retain freedom of maneuver.
6. Gain and maintain enemy contact.
7. Develop the situation rapidly.

There are five forms of reconnaissance:

1. Zone,
2. Area,
3. Route,
4. Reconnaissance in force, and
5. Special Reconnaissance.

Surveillance

FM 3-90 defines ***Surveillance*** as "the systematic observation of aerospace, cyberspace, surface or subsurface areas, places, persons, or things by visual, aerial, electronic, photographic, or other means."[8] Similar to reconnaissance in its purpose, surveillance is typically more passive, persistent, and feeds the targeting and target development processes in support of Intelligence Preparation of the Battlefield.

Security Operations

Army Doctrine Publication (ADP) 3-90, ***Offense and Defense***, defines security operations as those operations performed by commanders to provide early and accurate warning of enemy operations, to provide the forces being protected with time and maneuver space within which to react to the enemy and to develop the situation to allow commanders to effectively use their protected forces.[9]

Like reconnaissance, security operations are a means to determine enemy activity, disposition and intent. The primary difference is that security operations are oriented on the protected force or area rather than on the enemy or terrain.

There are five fundamentals of security operations:

1. provide early and accurate warning,
2. provide reaction time and maneuver space,
3. orient on the protected force, area or facility to be secured,
4. perform continuous reconnaissance, and
5. maintain enemy contact.

There are four types of security operations that provide increasing levels of

security for the protected force:

1. screen,
2. guard,
3. cover, and
4. area security.

Support to the operations process. Ultimately, the role and goal of reconnaissance, security operations, and surveillance is to provide the commander with accurate and timely information. This information helps the commander better understand and visualize the operating environment and further describe, direct, lead, and assess combat operations.[10] The primary source of information for the commander during battle is the reconnaissance and security organization, which at the theater level, is the MDEB.

Support to targeting. Targeting is the process of selecting and prioritizing targets and matching an appropriate response.[11] Targeting is an extenuation of the operations process and one of the three integrating processes for reconnaissance and security operations.[12] Cavalry organizations support targeting through timely and accurate reporting allowing for further refinement of target identification and location enabling the application of capabilities or weapons systems to achieve a desired effect.

Cyber domain, electromagnetic warfare

Recon, surveillance, and security in cyberspace and electromagnetic warfare. The emergence of the cyber domain and prevalence of electromagnetic warfare (EW) has driven the Joint Force and Army to further expand the definition of these roles.

Like cavalry, cyberspace forces and EW organizations' primary purpose is to enable situational understanding, protect friendly personnel and capabilities, and to deliver effects.[13] Additionally, commanders use cyberspace and EW capabilities in the same three roles as cavalry: reconnaissance, surveillance and security activities.

Electromagnetic reconnaissance is the detection, location, identification and evaluation of foreign electromagnetic radiations (energy) (JP 3-85). Commanders use electromagnetic reconnaissance assets to collect information in the electromagnetic spectrum (EMS), identify enemy attempts to regain the initiative and request offensive cyber operations support to conduct cyberspace exploitation in cyberspace.[14] Commanders and staff can also readjust targeting priorities and fire support plans, including cyberspace attacks and electromagnetic attack (EA), to keep adversaries on the defensive.[15] Further, ES missions conduct electromagnetic reconnaissance to attain information about the disposition of enemy threats in the EMS and modify security efforts.

Network surveillance is the collection of information in cyberspace and the EMS. It is the observation of organizational, social, communications, cyberspace, or infrastructure connections and relationships (FM 2-0, ***Intelligence***). Surveillance can also include detailed information on connections and relationships among individuals, groups, and organizations, and the role and importance of aspects of physical or virtual infrastructure.

The electromagnetic support task of *direction finding* is a relevant surveillance task. Direction finding obtains bearings of radio frequency emitters. Using electromagnetic support (ES) platforms with direction finding capabilities deployed in various formations to create a coverage area can locate enemy forces, akin to surveillance of a named area of interest.

Cyberspace defense, cyberspace security, and EP include security actions that allow early detection and mitigation of threats in cyberspace and the EMS. During security operations, information collected on an enemy's course of action in cyberspace and the EMS allows units to take preemptive measures that prevent enemy intelligence, surveillance, and reconnaissance assets from determining friendly locations, strengths, and weaknesses. Security operations also present opportunities to identify high value targets for future cyberspace attacks or EA. Akin to the counter-reconnaissance fight, Threat warning enables the commander and staff to quickly identify immediate threats to friendly forces and implement electronic attack and electronic protection countermeasures.

A common observation of units primarily operating in cyberspace and the electromagnetic spectrum is they are not maneuver units because they cannot hold terrain or fight for information. This view, in the authors' opinion, takes a dated and narrow view which focuses only on the dirt of the ground domain. FM 3-12, ***Cyberspace Operations and Electromagnetic Warfare*** is clear though, the electromagnetic spectrum is a maneuver space. Similarly, cyberspace operations require units to maneuver. These are both contested environments that require identifying key terrain and fighting for information.

Key terrain in both domains is just as critical to mission success as a hilltop may be to ground maneuver. Retaining it provides a marked advantage to whoever holds it. However, a change in traditional thinking is required as friendly and enemy forces may be occupying the same terrain, even without knowing each other is operating in the same space. EMS key terrain includes frequencies, devices, and infrastructure. Cyberspace key terrain includes locations to gather intelligence, locations that support network connectivity, entry points to friendly networks that require defending, and locations friendly forces requires access to. EMS and cyberspace have their own obstacles, avenues of approach, cover and concealment, and observation/fields of fire to identify for both friendly forces and the adversary. In this fight, step 1 of engagement area development is still, "identify likely enemy avenues of approach."

MDEB

Primarily envisioned as a counter anti-area access denial organization,[16] the MDEB is equipped to function as multi-domain cavalry through the employment of a combination of terrestrial, air launched, and spaced based capabilities that operate primarily in the EMS.[17] In alignment with FM 3-12's electromagnetic warfare taxonomy, these platforms and capabilities can conduct the full spectrum of Electromagnetic Warfare helping the commander to see themselves (electromagnetic protection (EP)), the enemy (electromagnetic support) and deliver effects (electromagnetic attack).[18]

In the full objective build, an MDEB will consist of the following: a signal company and a military intelligence company that are in direct support to the task force; an extended range sensing

and effects company that will contain three high altitude sections with some form of (to be determined) high altitude balloon or platform, four Class III unmanned aerial systems, and an electromagnetic warfare section to manage the ES/EA payloads; and a space company with three sections of three crews to staff up to three Space Control Electromagnetic Warfare kits.

A fully mature MDEB will have the ability to support the Army service component commander in achieving situational understanding through the fusion of national intelligence, reconnaissance, surveillance and security data with data generated by organic assets to support the commander's decision-making cycle. The combination of air launched effects, space capabilities, and long loitering platforms and payloads will extend the operational reach of organic effects. This extended reach enables situational understanding and offers a high level of flexibility and synchronization across all domains to the commander. Subsequent paragraphs will further elaborate while the following concept map shows how the MDEB performs cavalry functions while supporting the multi-domain task force's (MDTF) synchronization of multi-domain operations and targeting functions.

How the MDEBs perform reconnaissance operations. Given the nature of electromagnetic reconnaissance, the MDEB almost exclusively conducts area reconnaissance oriented on enemy forces operating within named areas of interest across the strategic deep area. In competition and crisis, the MDEB enables intermediate target development and follow-on non-lethal reference points in support of the geographic combatant command. In conflict, the MDEB supports the operations process by answering priority intelligence requirements through the positioning of launched effects and airborne electromagnetic warfare assets to identify the position, composition, and intent of enemy forces homing in on their electromagnetic signatures. The MDEB provides additional reconnaissance and security capability to the Joint Force to offset the dispersion of signals intelligence collection assets.[19]

Principles of reconnaissance. While not all inclusive, the MDEB adheres to the fundamentals of reconnaissance by

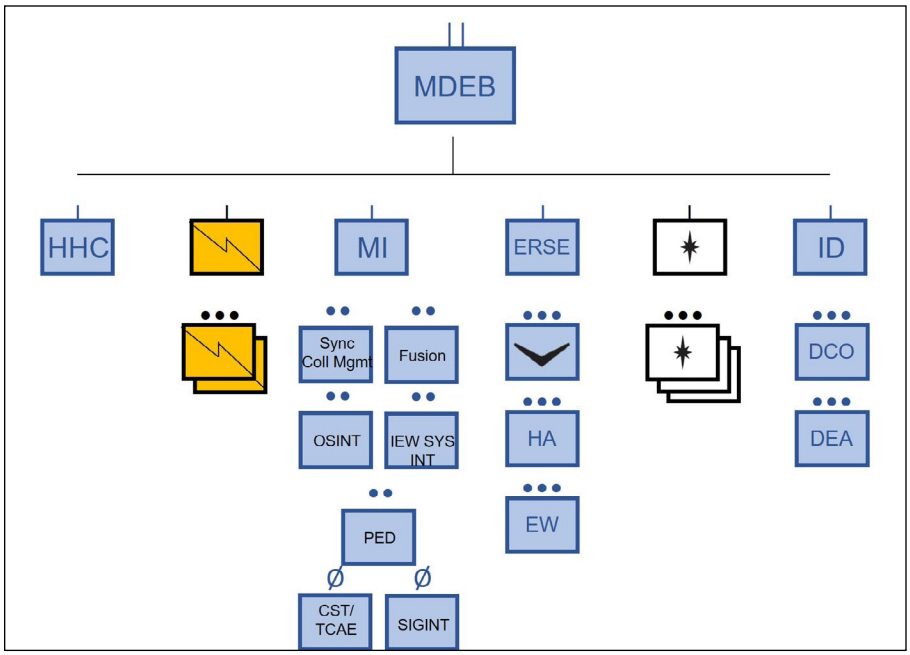

Figure 1. MDEB Force Structure.

gaining and maintaining contact with enemy forces in the EMS and using a robust sensor network to feed information rapidly back into the all-domain operations center. Electromagnetic support sensors find and fix enemy electromagnetic signatures allowing the commander to gain a better understanding of the enemy disposition and feed that information back into the targeting process for follow on kinetic or non-kinetic effects. Additionally, the MDEB uses electromagnetic attack sensors to develop the situation by stimulating enemy capabilities to aid in identification or canalize them into a specific posture or means of communication to achieve other effects.

MDEBs inherently operate as multi-domain teams, or cells, that replicate the combined arms air-ground teams in the sense that they employ cyber, EW, and space assets with a variety of platforms and capabilities. The composition, size and scope of these teams can vary depending on mission, target set, and range required. The MDEB also can partner with special operations forces, expeditionary cyber teams, security force assistance brigades, other partners and allies to further extend operational reach, placement and access to overcome reconnaissance gaps when limited to organic assets.

How the MDEBs conduct surveillance in support of targeting. The MDEB is fully integrated with the targeting cycle through the employment of high altitude and space-based electromagnetic support sensors that provide a "persistent stare" in support of deliberate target development. Through the layering of electromagnetic support capabilities, the MDEB can tip and queues assets to develop and refine targeting data for MDTF organic effects or drive target nomination at the task force, joint and national levels.

Surveillance and target development in competition. In competition, surveillance allows for the deliberate development of target packets through target identification and discovery along with vulnerability analysis provided by intelligence and cyber analysts. This supports the development of concept of operation packets and specific electromagnetic attack and cyber tools that can be prepared ahead of crisis and conflict.

Surveillance and targeting in crisis and conflict. In crisis and conflict, the surveillance capabilities of the MDEB provide the initial que for follow-on air launched effects and airborne sensors that converge to provide refined targeting data for organic and external fires and effects. MDEB sensors and non-kinetic effects capabilities integrate with the Joint Targeting Cycle and Air Tasking Order cycle to find, fix, track and on-order engage.

How the MDEBs perform security

operations. While it is easy to see how the MDEBs perform reconnaissance and surveillance, visualizing how they perform security operations is a little more abstract. As previously pointed out, security operations differ from reconnaissance in that they orient on the protected force. The MDEB's ability to conduct security operations provides the commander with reaction time and maneuver space through a combination of defensive cyber operations and defensive electromagnetic attack capabilities. These teams and assets can perform a variety of support and protection functions in cyber and the EMS buying the commander decision space to react to the enemy's disposition, unanticipated actions, and further developments in the strategic deep. The MDEB's Information Defense company executes security operations in the cyber domain and EMS through the defensive electromagnetic attack platoon and three defensive cyber operations (DCO) mission elements.

The defensive electromagnetic attack element enables the MDEB to perform counter reconnaissance and electromagnetic counter measure tasks to prevent the enemy from determining friendly locations, strengths, and weaknesses by protecting and screening the electromagnetic signature of friendly forces. They provide early warning to the protected force and allows for additional force protection and emission control measures to be put in place reducing the threat of enemy contact and observation in the EMS. Limited electromagnetic attack capabilities also allow for counter reconnaissance to defeat or disrupt enemy EMS reconnaissance elements and capabilities. Likewise, the DCO mission elements screen the key cyber terrain of organic and theater level network and cyber assets providing early warning of compromise and coordinating and synchronizing cyber effects to neutralize or defeat enemy cyber elements.

Conclusion

The MDEBs are uniquely postured to become the cavalry of the future by adding additional depth to the Joint Force Land Component Commander's ability to gain and maintain contact through the electromagnetic spectrum, developing the situation rapidly, and feed information into the operations process and targeting cycle.

The MDEB is capable of far more than support through just intelligence and surveillance. While finding, fixing, and tracking the enemy is a large part of that, the MDEB can also determine enemy strengths, weaknesses, disposition, and intentions and provide early and accurate warning about the enemy. Viewed as a maneuver force, the MDEB actively conducts reconnaissance and security operations in conflict to help commanders ascertain adversary aims, gain initiative and ultimately present dilemmas for the adversary.

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LTC Thomas Burns *is the deputy*

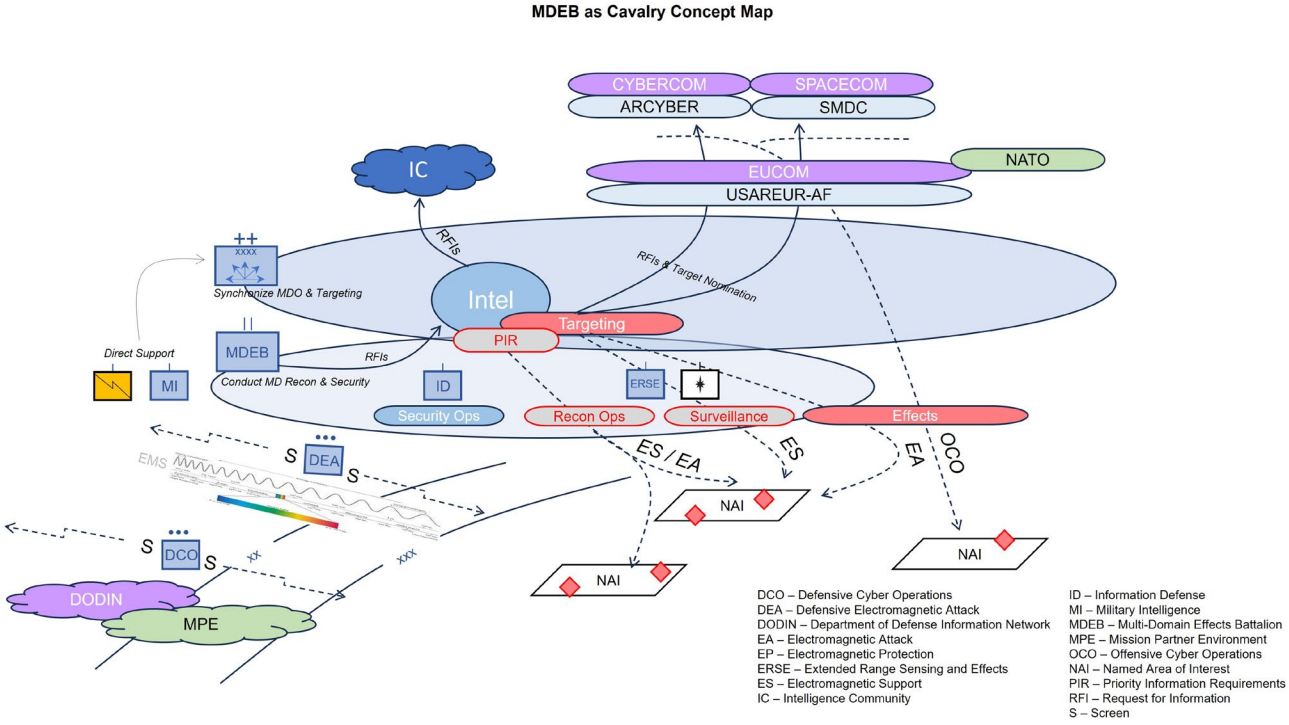

Figure 2. MDEB as cavalry concept map. *(U.S. Army graphic)*

commander, 2nd MDTF. His previous assignments include commander, 4th Battalion, 39th Infantry Regiment, Fort Jackson, SC; chief, Exercise Control Group, Operations Group, Joint Multinational Readiness Center, Hohenfels, Germany; Cavalry Squadron S-3 Observer/Coach/Trainer, Grizzly Team, Joint Multinational Readiness Center, Hohenfels; S-3/executive officer, 1st Squadron, 7th Cavalry Regiment, Fort Cavasos, TX; and commander, Troop A and Headquarters and Headquarters Troop, 2nd Squadron, 14th Cavalry Regiment, Schofield Barracks. He served in combat with the 3rd Battalion, 21st Infantry Regiment; 4th Squadron, 2nd Cavalry Regiment; and 2nd Squadron, 14th Cavalry Regiment. LTC Burns' military schools include Armor Officer Basic Course, Maneuver Captains Career Course, and the Command and General Staff College. He has a bachelor's of arts degree in political science from Boston College and a master's of arts degree in international relations from Princeton University. He is a recipient of the orders of Saint George (Bronze Medallion) and Saint Maurice.

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[3] U.S. Army FM 3-98, ***Reconnaissance and Security Operations***, Jan. 10, 2023, Para 1-5.

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[8] JP 3-0, ***Joint Campaigns and Operations***, June 18, 2022.

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[0] FM 3-98, ***Reconnaissance and Security Operations***, Jan. 10, 2023, Para 1-7.

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Acronym Quick-Scan

ADP – Army Doctrine Publication
DCO – defensive cyber operations
EA – electromagnetic attack
EMS – electromagnetic spectrum
ES – electromagnetic support
EW – electromagnetic warfare
FM – field manual
JP – Joint Publication
MDEB – multi-domain effects battalion
MDTF – multi-domain task force

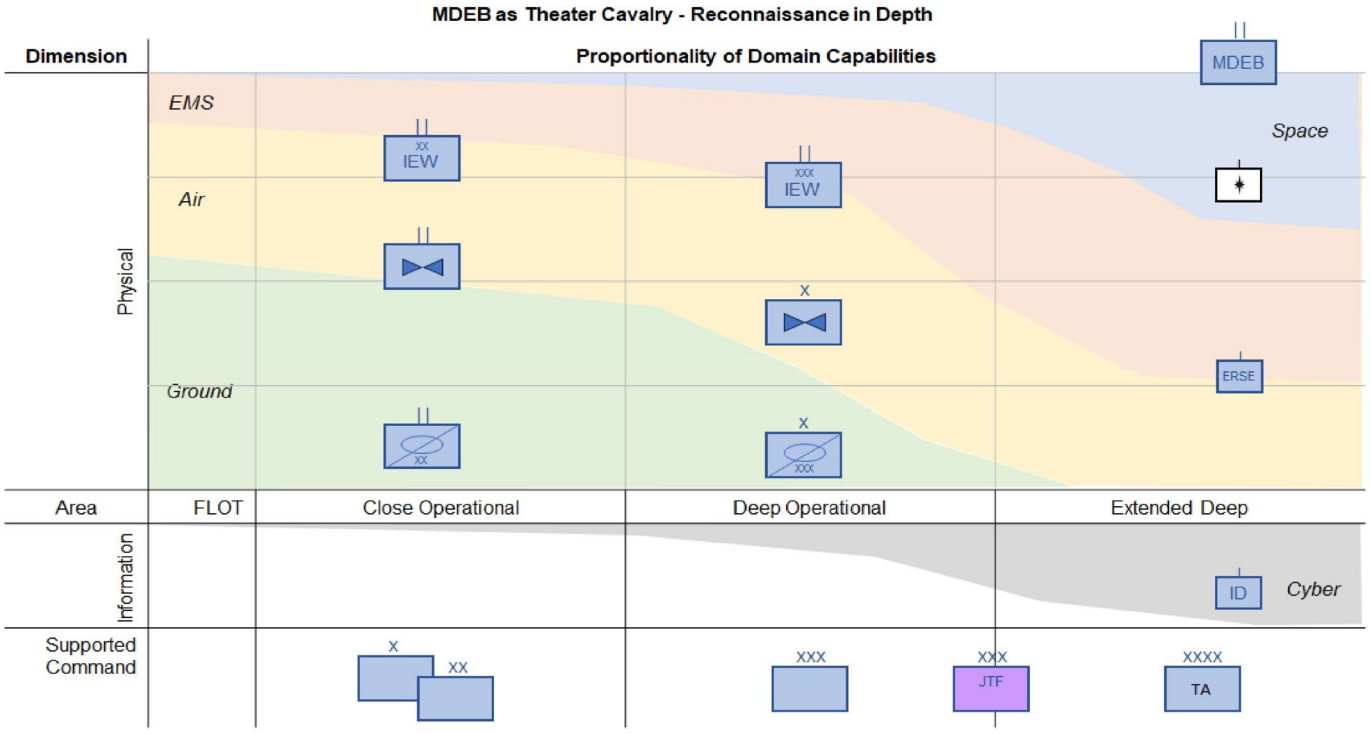


Figure 3. MDEB as Theater Cavalry – Reconnaissance in Depth.

Putting the 'C' Back in BCT: *Creating Change Agents Through Initiative*

by COL Scott C. White and CSM Jonathan M. Duncan

In a message to our Army team Oct. 26, 2023, GEN Randy A. George, the 41st Army Chief of Staff, reinforced that our enduring purpose as a force is to fight and win our nation's wars. He further stated that to do this we must stay grounded and dedicate our energy in four focus areas: warfighting, delivering combat-ready formations, continuous transformation, and strengthening the profession.

As of 2022, basic combat training (BCT) lacked a focus on sustained ground combat and failed to prepare new Soldiers for large-scale combat operations (LSCO). It was challenging but concentrated on events rather than tactical-based training which better prepares new Soldiers to fight and survive on the modern battlefield. As the character of war changes, so must our training strategies, leader development, and resulting culture. Change is a difficult process, as "it's the way we have always done it" clouds the thoughts of some practitioners and creates roadblocks. By giving subordinate elements and external entities significant initiatives to own, develop, and create solutions for, change becomes less about the new idea from "them" and more about how "we" make things the absolute best that they can be.

Throughout 2023, the 193rd Infantry Brigade at Fort Jackson, SC, focused heavily on creating a warfighting mindset and culture within our trainees and cadre. This transition aligned with GEN George's vision of bringing warfighting back to the forefront of our profession and was already in motion within Initial Military Training (IMT) when he became the Army Chief of Staff. Due to the changing character of war, MG John D. Kline, commanding general (CG) of the U.S. Army's Center for Initial Military Training (CIMT), envisioned a BCT environment that immersed cadre and trainees within a scenario-driven LSCO environment. This vision was further discussed with IMT senior leaders for several months before MG Jason E. Kelly, the CG of Army Training Center and Fort Jackson (ATCFJ), tasked the 193rd Infantry Brigade to develop a BCT training concept that better prepared new Soldiers for LSCO. MG Kelly's guidance focused on increasing individual survivability and ensuring the nation's largest BCT enterprise was not only "Making American Soldiers" but "Making Our American Soldiers Better." This evolution, envisioned by MG Kline, embraced by MG Kelly, and operationalized as Forge 2.5 by the 193rd Infantry Brigade, focused on warrior tasks and battle drills (with a primacy on marksmanship), tactical discipline, grit, physical fitness, and teamwork. This field training exercise (FTX) is executed within a 72-hour, scenario-driven format and led by drill sergeants.[1]

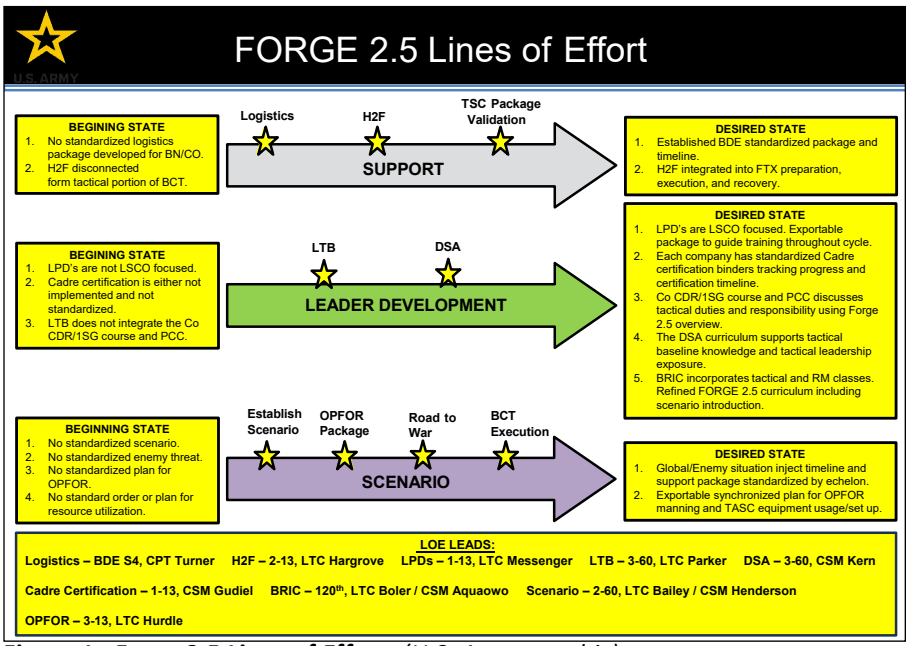


Figure 1. Forge 2.5 Lines of Effort. *(U.S. Army graphic)*

We aimed to produce not just Soldiers but incredibly proud warfighters who were ready and able to be value added to our profession's purpose, and ready to fight and win our nation's wars. As recently attested to by a battalion command sergeant major in the 193rd, "We're now running continuous operations in austere conditions, and you can almost see a company of light Infantrymen by the time we get them back to Hilton Field. They're tired, dirty, hungry — and most importantly, proud of what they were able to accomplish during those 72 hours. I include our drill sergeants in that pool of people as well. You can clearly see the amount of pride they have during the Soldier Induction Ceremony when they're slapping 'Star' patches on new Soldiers." Forge 2.5 is not about a change to the program of instruction (POI). It's about a change in mindset, through which we are creating a warfighting culture among trainees and cadre. Simply put, Forge 2.5 puts the "C" back in BCT!

Refocus on warfighting

The process within the 193rd Infantry Brigade began in early April 2023 with a brigade commander/command sergeant major (CSM) whiteboard session and the establishment of the Forge 2.5 operational planning team (OPT). This council was made up of senior drill sergeants from each of the five BCT battalions in the brigade and led by a company commander from 2nd Battalion, 13th Infantry Regiment. This group of experienced professionals met throughout that month, operating with initial guidance from the brigade commander to embed a tactical focus, defined as noise and light discipline, personal and positional camouflage, to-standard fighting positions, security, and situational awareness within the

Forge with drill sergeants, fulfilling the roles of squad leaders and platoon sergeants, leading trainees through. Battalion staffs were to deploy to the field to establish tactical operations centers and perform their duties in a quasi-wartime manner. Every Forge iteration was to be evaluated utilizing training and evaluation outlines by a brigade-level evaluation team to enable continued refinement through each battalion-level execution. The Forge was to remain 72 hours in duration and all POI tasks were to be completed, but significant work was needed to transition the existing event-driven administrative exercise into a true tactical FTX built around a LSCO scenario.

The OPT developed a viable plan and briefed it to the brigade commander and CSM on April 27, 2023. The important work conducted by the OPT's NCOs started to steer the aircraft carrier into the necessary direction. The first and second iterations of the transitional Forge were conducted by 2-13 Infantry and 2nd Battalion, 60th Infantry Regiment from May 15-18 and July 10-13, 2023, respectively. They were not without serious setbacks though; the most significant of which were the identification of structural shortcomings within the brigade and a realization of major deficiencies in the basic tactical knowledge of our cadre. We addressed these by developing lines of effort (LOEs) focused on increasing structural support to the battalions and the tactical competence of the cadre.

The brigade executive officer led the staff in the development of three broad LOEs identified as essential in moving forward with the Forge 2.5 process. (See Figure 1). The LOEs served two major roles: to push the brigade from current state to desired state and to design an improved Forge with input from as many stakeholders as possible, while using as many of our mission-enhancing resources as practical. This process, although cumbersome at times, gave every battalion within the brigade (as well as key stakeholders external to the brigade) an active role in the transformation process. The result of this approach was increased understanding, a sense of extreme ownership, and a culture that encouraged and incentivized creativity and proactive solutions. What began as the vision of the CIMT CG was

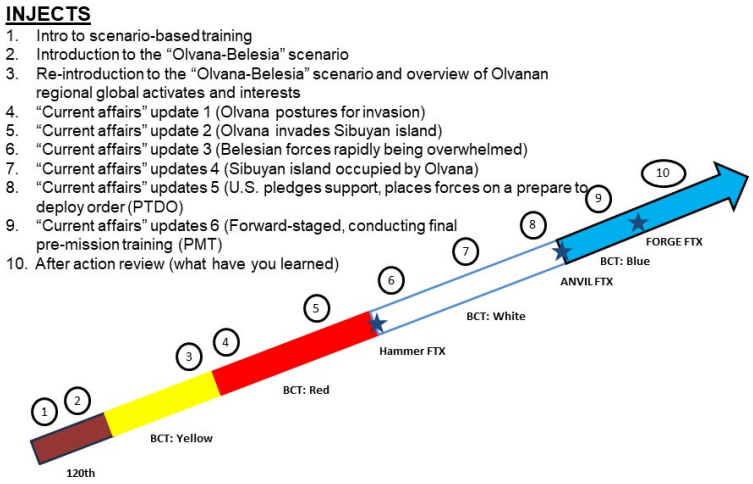


Figure 2 - Overview of Forge 2.5 scenario injects. *(U.S. Army graphic)*

operationalized with input from six battalions and many entities external to the brigade, and thus the initiative became transformational vice transactional.

As the brigade iterated through executions of the Forge with each battalion, the lack of an overarching LSCO-focused scenario proved to be problematic. It prevented the creation of realism and detracted from the purpose of the enhanced FTX. The U.S. Army Training and Doctrine Command (TRADOC) G-2 became the brigade's main effort for enabling the achievement of training realism and scenario immersion. Coordination between the 2-60 Infantry command team and the TRADOC G-2 led to the development of an overarching global scenario, informed by the National Defense Strategy, that provided the operational framework, through the backdrop of a series of nine scenario injects that added training realism and tactical purpose to every BCT event, starting with reception (see Figure 2).

In addition to the important LSCO scenario contributions, 2-60 Infantry developed the brigade's overarching friendly situation and the battalion linear defense concept. This was not without debate within the brigade, but a standardized execution enabled a quicker organizational transition and provided for more accurate and consistent evaluations. Henceforth, every 193rd unit conducting the Forge, except for 3-60 Infantry, would establish a battalion linear defense.

From the outset, MG Kelly was laser focused on ensuring the exportability of the Forge 2.5 concept. Out of the three major BCT installations (Fort Jackson; Fort Leonard Wood, MO; and Fort Sill, OK) only Fort Jackson operationalizes BCT at the battalion level. This makes Fort Jackson's throughput much greater but also puts a battalion commander, CSM, and the requisite support staff on top of every Soldier's initial military training experience. The differences between levels of command involved created some skepticism to this initiative at first. The 3rd Battalion, 13th Infantry and 3-60 Infantry commanders conducted site surveys at Fort Leonard Wood and Fort Sill respectively to better understand their operating conditions and procedures. From their visits, the brigade acquired a wealth of knowledge that enabled them to meet the exportability intent. Accordingly, over the course of two BCT cycles, 3-60 Infantry developed and implemented a concept by which four companies operated detached from the battalion throughout the execution of the Forge and its preparatory tactical FTXs. This important initiative proved the support received by the battalion headquarters could be provided at echelon by the company, and that the level of command in control of the exercise had no measurable impact on the focus, training value, or supportability of Forge 2.5.

The 120th Adjutant General (AG) Battalion is charged with receiving and in-processing upwards of 30,000 civilians annually who are destined for both the 193rd and 165th Infantry Brigades. Under the legacy BCT culture, the 120th AG was where Fort Jackson welcomed civilians into the Army. As the

warfighting culture within BCT began to take root and develop, the battalion identified an opportunity to introduce the newly arrived civilians into the concept of scenario-based training, begin the LSCO scenario immersion, and more appropriately welcome these new trainees into their future warfighting profession. Scenario injects, battle-focused discussions, and physical training were easily threaded into the standard reception tasks to immediately provide a stronger sense of purpose and increased excitement and pride about what these trainees had committed to accomplish during the next 10 weeks.

While working to transform how we welcome civilians into our warfighting profession, the 120th AG also refocused the brigade's permanent party onboarding mechanism, the Bayonet Reception and Integration Course (BRIC). It took a multi-day event that served as an administrative onboarding of new cadre members and completely revised it by adding blocks of instruction on rifle marksmanship, holistic health and fitness (H2F), and the Forge 2.5 scenario and expectations. This effort, coupled with the refined reception initiative, began to plant the warfighting mindset in trainees and cadre before even arriving to BCT.

The 120th's renewed focus on onboarding warfighters created a desire to revisit our standardized handoff mechanism — structured and disciplined pickup. The handoff between reception and the BCT battalions has morphed through the years, but the standard at ATCFJ developed into an extremely professional event focused on Army and unit history, discipline, and Army Combat Fitness Test demonstrations. With the newly found emphasis on warfighting, this event again changed, but this time with the addition of instilling our Army's warfighting purpose. The Army and unit histories were maintained as a means of ensuring ongoing education on the important feats accomplished by those who had previously filled the ranks of BCT, while also applying these important lessons learned to the present and connecting the new crop of trainees to the Army's future. Adding a LSCO-driven scenario into the disciplined pickup affords drill sergeants an early opportunity to introduce the unit's history and lead trainees through physically demanding tactical tasks. The early inculcation enables their absolute connection to the Army's past and future. Through the introduction to the tactical scenario and our warfighting profession in reception, built upon through a refined structured and disciplined pickup, and then codified throughout BCT, realism, purpose, and pride emerged to replace anxiety and confusion.

As in any tactical FTX, the presence and realistic use of opposing forces (OPFORs) within Forge 2.5 became essential. The enemy concept, created by the TRADOC G-2, called for a Southeast Asia-focused threat situation with a fictitious country named Olvana. With the assistance of the Fort Jackson Training Support Center (TSC), 3-13 Infantry developed and sourced a complete package of OPFOR support items: tiger stripe uniforms, pneumatic guns, improvised explosive device (IED) simulators, and a full complement of Kalashnikov assault rifles (AK-47s), Soviet-type light machine guns, and rocket-propelled grenade launchers. With the equipment packages sourced and built, the team developed what became the brigade's tactics, techniques, and procedures (TTPs) for OPFOR utilization, including element size, where they are sourced from, tactical control, scenario control, and day-by-day OPFOR mission sets to ensure the training objectives were achieved. Scenario immersion was further solidified by 3-13 Infantry's creation of more than 20 World War II-inspired propaganda posters. These were devised and designed by the battalion, produced by TSC at Fort Eustis, VA, and posted around the BCT battalion and company areas on Fort Jackson to immerse trainees in a realistic and well-sourced scenario that provides added benefit to, and purpose for, every training event within BCT.

Strengthening the profession

The quest to better prepare our cadre focused internally through the development of a LSCO-focused leader professional development (LPD) program, led by 1-13 Infantry. They developed a holistic plan that progressed weekly throughout cycle reset and the weeks of BCT leading up to the Forge. This LPD plan provided cadre the education necessary to break the mold produced by 20 years of the global war on terrorism (GWOT). It enabled them to think and act in preparation for the next war instead of being anchored to the lessons learned from the GWOT. Simultaneously, 1-13 Infantry worked diligently to identify the key tasks that were imperative for cadre to master. This resulted in the creation of a certification process that succeeded in enabling all cadre, no matter their military occupational specialty (MOS), to embody competence and confidence as tactical leaders.

Although the leadership within the brigade developed effective solutions to the immediate concerns uncovered from our initial iterations of Forge 2.5, lasting change would require education of new cadre members before they were to fill their important roles within BCT. LPDs and cadre certification were enough to get us back on track, but foundational change in our future cadre, instituted through the Leader Training Brigade (LTB) and the U.S. Army Drill Sergeant Academy (USADSA), was necessary to create the "competence to be confident" across every IMT installation. These efforts were spearheaded by 3-60 Infantry.

Drill sergeants are masters of training the POI and have been finely honed by the USADSA to expertly train basic Soldier skills. However, without a focus on tactical leadership and survivability in LSCO, we had asked our drill sergeants (and company command teams) to enter a realm where they weren't competent enough to be confident. There existed a grave delta between what our cadre knew and understood about tactical leadership and where we were demanding that they go during Forge 2.5. Tactical leadership across the cadre spectrum was integral to bringing realism and relevance into training, and the brigade's initial Forge 2.5 iterations uncovered a need for significant cadre investment.

The 3-60 Infantry worked hard refining and establishing the means to fully prepare the battalion's cadre to excel as tactical drill sergeants (as squad

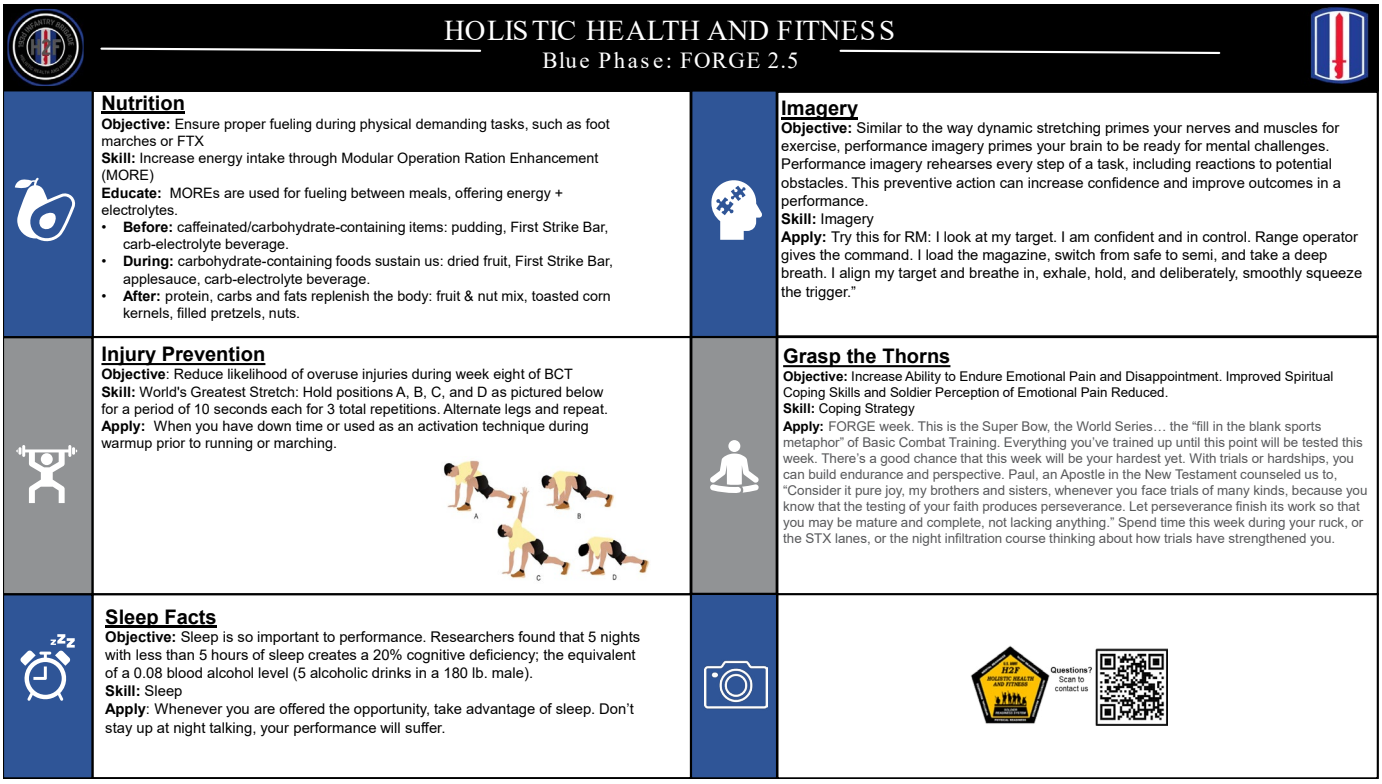


Figure 4. This H2F smart card focuses on enabling top tier performance throughout the execution of Forge 2.5. A similar card was developed for preparation during each preceding week of BCT. *(U.S. Army)*

leaders and platoon sergeants leading trainees in simulated combat). Their experiences were enthusiastically received by the USADSA. With 3-60 Infantry's assistance, USADSA staff members immediately identified where they could evolve training and education to produce not only a better drill sergeant but a better NCO who was ready to lead trainees in a tactical environment. Similarly, 3-60 Infantry Soldiers worked with LTB to investigate their portfolio and identify where they could assist with the endeavor. LTB's offerings, the TRADOC Company Commander and First Sergeant courses and the TRADOC Pre-Command Course, provided other essential venues to educate and market the growing tactical focus in BCT.

LTB developed and refined blocks of instruction to better prepare incoming command teams for the new training environment. The efforts with the USADSA and LTB, led by 3-60 Infantry, resulted in institutional change that ensured cadre and leader training evolved at pace with the changing character of war.

H2F is a powerful weapon in the Soldier's arsenal, the application of which makes them the absolute best versions of themselves possible. As the brigade sought to create irreversible change in the mindset of those within the unit, it became apparent that cadre/trainee investment in each of the five H2F domains (Mental, Sleep, Nutritional, Physical, and Spiritual) was necessary to reach peak performance due to the stress created by 72 hours of simulated combat. Not only would this prepare them for Forge 2.5 and empower them throughout execution, it would also facilitate post-execution recovery.

The 2-13 Infantry, in conjunction with the 193rd's H2F Team, led the operationalization of H2F as a mission-enhancing element of our Forge 2.5 transition. This effort started by immersing our H2F team within the BCT environment throughout the cycle, while simultaneously instituting full five-domain assessments on the brigade's entire cadre population. The assessments educated cadre on their performance blind spots, while the immersion enabled the H2F team to assess the physical and mental demands on both trainees and BCT cadre. Once the subject matter experts understood the stressors on both cadre and trainees, they were able to devise a training strategy to increase performance, not just in Forge 2.5 but throughout BCT (see Figure 4). This led to many supporting H2F initiatives, all geared towards increasing individual and collective performance, developing a strong sense of a warfighting purpose, increasing confidence through competence, and strengthening the sense of team at every echelon.

Continuous transformation

After nearly nine months and almost 15 iterations of Forge 2.5, the 193rd Infantry Brigade had achieved a complete transition. Throughout the process, leaders at every echelon within the brigade laid a substantial foundation of tactical knowledge and capability within their cadre.

The combination of the BRIC, LPDs, cadre certification, and USADSA and LTB instructional modifications, assessments, and battalion/company-level training improvements laid the groundwork for the added complexity that was necessary to complete the LSCO-focused transition and incorporate lessons learned from the ongoing war in

Ukraine such as the use of small unmanned aerial systems (sUAS).

Since their first usage in the GWOT, sUAS have continued to become ever more present throughout global conflicts. From Syria to Ukraine, sUAS have proven to be a normal aspect of modern warfare, and with that, they have reinforced the need for the basic tactical skills that Forge 2.5 produces as part of the foundation of our warfighters. The inclusion of sUAS in BCT provided a means by which cadre could train and reinforce foundational tactical skills, using real-world threat scenarios to provide the "why" behind tasks inherent to individual survival on the modern battlefield. Reacting to sUAS is as important to the individual Soldier today as the GWOT's signature "5s & 25s" were to individual avoidance of IEDs in Iraq and Afghanistan.

The 193rd's quest for realism and relevance through the inclusion of sUAS began with cross talking and visits with the 197th and 198th Infantry Brigades, as well as cadre from the U.S. Army Sniper Course, all under the Maneuver Center of Excellence at Fort Moore, GA. The 197th and 198th conduct Infantry One Station Unit Training (OSUT) and have spearheaded sUAS usage within their training evolutions for almost a year. The OSUT brigades shared valuable lessons learned with reference to gaining approval for sUAS in the airspace, training of operators, and the implementation of sUAS in training. Additionally, they developed and implemented the first react to sUAS battle drill for usage in OSUT, which sparked further refinement and development for usage at BCT. Furthermore, they trained and certified ATCFJ's first operators (one from each brigade). The U.S. Army Sniper School assisted 193rd leadership with understanding how best to defeat detection through the application of basic tactical skills, such as personal and positional camouflage, noise and light discipline, cover/concealment, situational awareness, security, and proper tactical movement (all important basic tasks to be trained in BCT).

Open-source lessons learned from Ukraine illustrate sUAS being used primarily in two ways: to identify adversary formations and to drop munitions or spot for artillery. The 193rd's use of sUAS within Forge 2.5 followed these two tactical applications, and hence, our mitigation techniques focused towards diminishing a sUAS's ability to identify forces to target. This was conducted primarily through reinforcing the foundational tactical standards called for initially in Forge 2.5: noise and light discipline, personal and positional camouflage, to-standard fighting positions (including overhead concealment), security, and situational awareness (SA). The brigade developed two reactions to sUAS that were passive in nature, did not call for engaging the platforms, and required no specialized equipment or skills. These reactions address the types of sUAS contact in the individual Soldier task framework that is essential in BCT (see Figure 5).

Figure 5. sUAS photos of trainees during exercise Forge 2.5. *(U.S. Army)*

In a defensive scenario, the emphasis was put on overhead concealment using natural vegetation. While patrolling or stationary in the open, vertically aligning oneself against a tree trunk enabled the usage of the tree's branches to conceal the Soldier from observation. While "seeking cover" oftentimes involves laying prone, in a sUAS scenario a horizontal body is much easier to observe from the air than a vertical one.

Delivering combat ready Soldiers for modern war

By incorporating a LSCO scenario and continuous tactical operations, the Forge became purposeful, realistic, and more challenging; ensured a firmer foundation of basic skills within our trainees; and empowered our cadre and staffs to develop as leaders. By focusing on the foundational tactical skills of noise and light discipline, personal and positional camouflage, to-standard fighting positions, security, and situational awareness (including SA of aerial threats), it creates an entry-level Soldier with the skills inherent to survive on the modern battlefield.

As the process began, it was evident that change within a TRADOC BCT brigade materialized like the turn of an aircraft carrier. But serious change needed to happen, and it needed to take place on a compressed timeline much more like the turn of a speed boat. Every BCT cycle that graduated before we could accomplish it was another 800-1,200 new Soldiers who were not prepared for the wars that might lie ahead. They would be disciplined and fit yet would lack the tactical foundation necessary to survive in LSCO. A team comprised of these Soldiers would be sub-optimal on the modern battlefield, regardless of their combat mission.

As illustrated throughout the preceding text, creating a warfighting mindset in BCT was a whole of brigade effort. Every battalion had an essential piece of the initiative. Change started with guidance from a few but was planned for, refined, and operationalized by a brigade staff, six incredibly talented battalion command teams and their respective formations, as well as a few

key external stake holders (USADSA, LTB, TSC).

These types of initiatives are difficult and not without resistance from cadre who operated under the antiquated and process-driven FTXs. A clear vision and initiative ownership at the lowest echelons are essential to transformational change, both increasing relevancies now and in the future. This process has created incredibly proud warfighters who are ready, able, and capable of taking on the responsibility of our Profession of Arms to fight and win our nation's wars.

At the time this article was written, ***COL Scott C. White*** *served as the commander of the 193rd Infantry Brigade at Fort Jackson, SC. He currently serves as the U.S. Army Special Operations Command G-3. His former assignments include serving as the assistant chief of staff, G-3 for the U.S. Army John F. Kennedy Special Warfare Center and School; commander of 6th Battalion, 1st Special Warfare Training Group (Airborne); operations officer for 2nd Battalion, 3rd Special Forces Group (A); commander of Delta Company, 2nd Battalion, 1st Special Warfare Training Group (A); and commander of Charlie Company, 2nd Battalion, 3rd Special Forces Group (A). COL White's military schools include the Infantry Officer Basic Course, Airborne School, Ranger School, Special Forces Qualification Course, Static Line Jumpmaster Course, Military Freefall Course, Military Freefall Jumpmaster Course, Military Tandem and Tethered Bundle Course, Special Forces Advanced Reconnaissance Target Analysis and Exploitation Techniques Course, Special Forces Sniper Course, Combined Arms and Services Staff School, Intermediate Level Education/ Advanced Operations Warfighting Course, and SSC. He holds a master's of science degree in defense analysis/irregular warfare from the Naval Post Graduate School, a master's degree in strategic studies from the U.S. Army War College and a bachelor's of arts degree in political science from The Citadel.*

CSM Jonathan M. Duncan *is the command sergeant major of the 193rd Infantry Brigade. His former assignments include command sergeant major of 1st Battalion, 34th Infantry Regiment; operations sergeant major in 1st Battalion, 6th Infantry Regiment; operations sergeant major in 3rd Squadron, 2nd Cavalry Regiment; first sergeant of Iron Troop, 3rd Squadron, 2nd Cavalry Regiment; and first sergeant of Headquarters and Headquarters Company, 1st Battalion, 29th Infantry Regiment. CSM Duncan's military schools include Combat Lifesavers Course, Basic Leaders Course, Army Combatives Level 1 Course, Advanced Leaders Course, Pathfinder Course, U.S. Army Reconnaissance and Surveillance Leaders Course, Battle Staff Course, Senior Leader Course, Mechanized Leader M2A3 Course, Air Assault Course, Stryker Brigade Combat Leader Course, Company Commander / First Sergeant Course, Master Resilience Training Course, U.S. Army Sergeants Major Academy, Battalion Pre-Command/ Command Sergeant Major Course, Command Sergeant Major Development Program Follow-On Battalion, TRADOC Brigade/Battalion Commander Sergeant Major Pre-Command Course, and the Command Sergeant Major Development Program Follow-On Brigade. He holds a master's of science degree in human resources and organization development from the University of Louisville, a bachelor's of science degree in organizational leadership from the University of Louisville,*

Figure 6. Soldiers in training from the 193rd Infantry Brigade occupy a fighting position at Fort Jackson, SC. *(U.S. Army photo courtesy of 3rd Battalion, 60th Infantry Regiment).*

and associates degree in liberal arts from Barton County Community College.

Notes

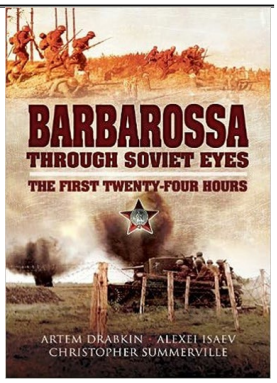
[1] Emphasis added to highlight a major shift in how drill sergeants operate. A key aspect of this warfighting focus is drill sergeants leading as squad leaders and platoon sergeants. As they transition from trainers to leaders, they show trainees true NCO leadership and what it can accomplish.

Acronym Quick-Scan

AG – adjutant general
ATCFJ – Army Training Center and Fort Jackson
BCT – basic combat training
BRIC – Bayonet Reception and Integration Course
CG – commanding general
CIMT – Center for Initial Military Training
CSM – command sergeant major
FTX – field training exercise
GWOT – global war on terrorism
H2F – holistic health and fitness
IED – improvised explosive device
IMT – initial military training
LPD – leader professional development
LSCO – large-scale combat operations
LTB – Leader Training Brigade
OPFOR – opposing force
OPT – operational planning team
OSUT – One Station Unit Training
POI – program of instruction
SA – situational awareness
sUAS – small unmanned aerial system
TRADOC – U.S. Army Training and Doctrine Command
TSC – Training Support Center
USADSA – U.S. Army Drill Sergeant Academy

From the *ARMOR* art archive: "Lessons from OIF"

BOOK REVIEWS



Barbarossa through Soviet Eyes: The First Twenty-Four Hours by Artem Drabkin and Alexei Isaev; English text by Christopher Summerville; United Kingdom: Pen and Sword Books; 2012; 228 pages; table of contents, index, photographs, maps, order of battle and sources; $16 (hard cover), $2.99 Kindle. If there is such a thing as clickbait for folks in the Armor community, it is often the Ost Front of World War II. How can it not be when the most interesting tanks were there? When casualty figures were like those out of some pulp military science-fiction thriller? Soviet tank losses are somewhere estimated in the low 8,000s to more than 100,000 for a loss rate of perhaps 650 tanks per day.

It is for that reason, reading anything from truly the other side of the hill – comprised of fresh Soviet archival material – is bound to catch my immediate attention. Pen and Sword, a publisher of sometimes topics more off the beaten histography path, recently released ***Barbarossa through Soviet Eyes: The First Twenty-Four Hours***.

Author Artem Drabkin catches your attention from the first, telling us that his father was an infantry-platoon commander in Barbarossa, wounded seriously but survived the war. Many of us can relate to hearing such tales as his father and his comrades related, as they are family history, though many veterans disclose little. Drabkin as a homage to the Lost generation of World War II-era Soviets created the ***I Remember Website*** (see https://iremember.ru/en/), a collection of some 4,000-plus Russian interviews and 400 of other nationalities, broken out by fields (confirmed to me in an email from Drabkin). Of course, we found the reminiscences of Russian tankers to be the most interesting, but the site won't disappoint. (I can say that with some assurance, based on duty positions ranging from Military History Detachment commander, responsible for hundreds of interviews from the 9/11 Pentagon attack, through my Army and U.S. Central Command historian duties that lasted to my retirement during the Global War on Terrorism era.)

NIINISALO TRAINING AREA, Finland – U.S. Army SSG Zachary Sobeck, assigned to 4th Squadron, 2nd Cavalry Regiment, takes aim with his M-4A1 carbine, while conducting dismounted reconnaissance movements during Exercise Arrow 22 at Niinisalo Training Area, Finland, May 6, 2022. *(U.S. Army Photo by SPC Garrison Waites, 5th Mobile Public Affairs Detachment)*

The book has satisfactory maps. Compared to the maps in most books of David Glantz's, they are easier on the eye, covering all three Wehrmacht army groups in Operation Barbarossa. The reader gets nine pages of various Russian figures, from Joseph Stalin down through the ranks. The overall resolution quality of the black-and-white photographs is quite good compared to many Soviet World War II photographs. The opening chapter "If War Comes Tomorrow" pulls no punches in discussing the army purges – led by the NKVD and instigated by Stalin – with a good graph detailing it. But with this opening chapter, we see the author's inability to apply some rigorous discipline to "pruning" reminiscences.

This inability leads at times to several pages from soldiers. If this was, say, Dr. Craig Luther's superb work on Army Group Center in Barbarossa – which is a hefty tome – that would be no problem, but as this work is under 200 pages, the lengthy anecdotical material begins to feel too much like filler. The reason, however, that you can't fully dismiss ***Barbarossa through Soviet Eyes*** is that the author makes a valiant attempt to give us a Cliff Notes version of Barbarossa. The smattering of graphs and some heretofore-unseen pictures by this reviewer indicated to me that the author was not simply mailing in his work. So how does the verdict come down on ***Barbarossa through Soviet Eyes***? To be fair to it, I read it twice, as my first gut reaction was one of ambivalence. It was better with a second reading. It is a tough balancing act to judiciously edit the interviews to extract the meaningful story line and not allow it to ramble.

The book doesn't need a draconian edit, but perhaps more context could be given for certain vignettes and less overkill with better editing of the "I was there" that often wandered "lost in the woods." Having said that, it is an interesting read even as you try and weed out genuine stories from those that perhaps still smack of Soviet regime think. Still, the story of modern warfare as told by these Russians is as timeless as Homer's Odessey.

Retired LTC (DR.) Robert G. Smith

From the ARMOR art archive: "The Battle of Cambrai"

JOIN THE TANKS

U.S. ARMY ARMOR FORCE

67th ARMOR REGIMENT

The insiginia is inherited from the 305th Tank Brigade of World War I. Within this Brigade served the 17th Tank Battalion (then designated 303rd Tank Bn.). The Erupting Volcano indicates the Heavy Losses suffered by the Battalion from antitank Mines. The border design is derived from the arms of the French Province of Picardy, where the Brigade saw all of its action. The unit motto, Mortus et Destructo, translates in english as "Death and Destruction".

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