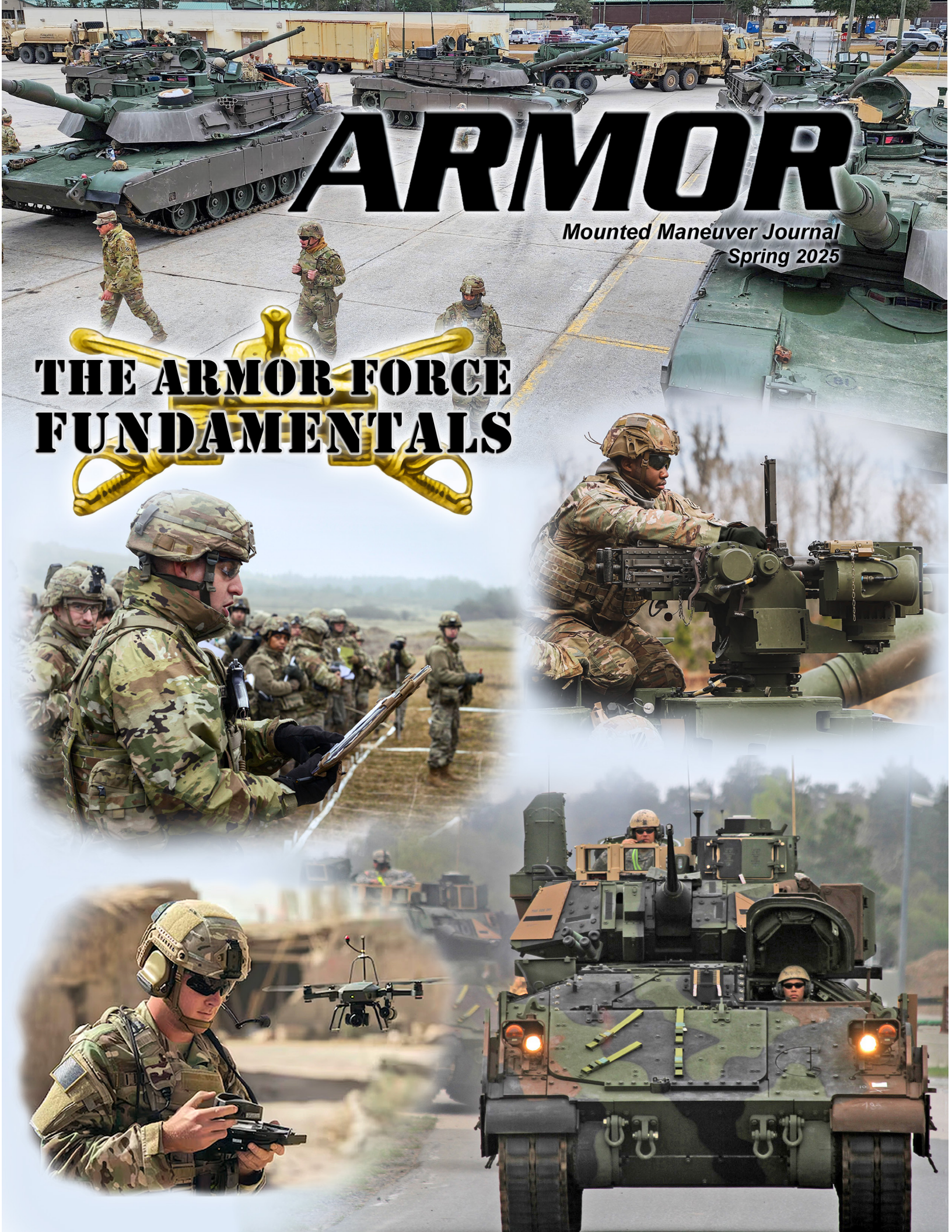

ARMOR

Mounted Maneuver Journal
Spring 2025

THE ARMOR FORCE FUNDAMENTALS

ARMOR

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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

In the last Commandant's Hatch article, I wrote about how the Armor Force's current situation demands that we invest in our training standards. We face a challenging combination of conditions: high operational tempo, personnel turbulence, and a lethal future battlefield. I suggested that we should see this as an opportunity to reinforce and adapt our training standards. Today, we can report that the Armor Force is moving out quickly on our training standards, in part through the ***Army Training Standardization Initiative (ATSI).***

The ATSI is a partnership between the III Corps and the U.S. Army Armor School (USAARMS) that is driving action on Armor Force training standards. Over the past six months, this initiative has focused on the following nine priorities of work.

To show how ATSI is driving toward concrete outcomes for the Armor Force, let's look at our work on **ATSI Priority Work #3:** *Armor Force Fundamentals.* We define "fundamentals" as a defined list of tasks/actions that allow formations to fight effectively. While we may often talk about mastering the fundamentals, we might not always have shared understanding of what these fundamentals are. ATSI has leveraged the judgment and experience of commanders at echelon to reach consensus on Armor Force Fundamentals that are organized by three categories:

Army Training Standardization Initiative (ATSI) Priorities of Work	
Priority #1	*TC 3-20-31-120* ***(Gunnery: Heavy Tank)*** Implementation. III Corps will lead the effort to transition our ABCTs to the new tank crew gunnery standards by October 1, 2025
Priority #2	*Range Capability Gap Assessment.* All divisions in III Corps will review the state of their gunnery ranges and submit their assessmen tto the III Corps Commander. These assessments will enable commanders to prioritize investments in range repairs and modernization.
Priority #3	*Define the Armor Force Fundamentals.* The second half of this article outlines our work on this priority.
Priority #4	*Master Gunner Training, School-Prerequisities, and School Preperation.* III Corps will partner with the USAARMS Master Gunner School to establish clear standards for how we prepare master gunner canidates to succeed in this challenging course.
Priority #5	*Crewmember Maintenance Training.* 1st Armored Division will develop and execute a pilot for a vehicle crewmember Maintenance Skills Test similiar to how we execute Gunnery Table 1/Gunnery Skills Test.
Priority #6	*Simulations Training.* 1st Infantry Division will develop standards for simulations training (crew trainers, collective trainers). The division will also assess our simulations training capability gaps and consider how to piroritize investments to address these gaps.
Priority #7	Readiness Level (RL) Progression (SABOT) Gunner Training Standardization. 1st Cavalry Division will refine and pilot teh program that seeks to increase the quality, efficiency, and standardization of our crew gunnery training strategy
Priority #8	Armor Force Training Strategy Adaptations. 3rd Infantry Division will develop a menu of options that commanders can use to adapt their approaches to Armor Force training, operating within the constraints of our current resourcing models.
Priority #9	*USAARMS Course Outcomes, Enrollment, and Attendance.* 4th Infantry Division will partner with USAARMS to refine and improve institutional training, with particular emphasis on the Advanced Leader Course, Senior Leader Course, Scout Leader Course, and Cavalry Leader Course

Common Fundamentals – The Daily Dozen. These are twelve actions that units do every day during operations. The Daily Dozen is common to all unit types and all echelons.

Common Fundamentals – Critical Tactical Tasks. These twelve tasks enable formations to fight effectively. Critical Tactical Tasks are common to all unit types and are applicable to the company, platoon, section, squad echelons

Formation-Specific Fundamentals. These are the tasks – tailored to specific formation types – that enable good fighting. Formation types include the Tank Platoon, the Scout Platoon, the Tank Company, and the Cavalry Troop.

The Armor Force Fundamentals (2025)

Common Fundamentals (Daily Dozen): *All Units at All Echelons: Fieldcraft & What Units Do Everyday During Operations*
1) Security + Cover, Concealment, Emissions Control
2) Timelines & Priorities fo Work in the TAA
3) Boresight & Prep to Fire Checks
4) Communications
5) Pre-Combat Checks (PCCs) & Pre-Combat Inspections (PCIs): Shoot, Move, Communicate
6) Preventive Maintenance Checks and Services (PMCS) & 5988Es
7) Sensitive Items & Accountability Checks
8) Reconnaissance
9) Operations Orders & Graphics
10) Rehersals
11) Risk Management
12) After Action Reviews (AARs)

Common Fundamentals (Critical Tactical Tasks): *All Units (Company/Platoon/Section/Squad)*
1) Establish Security (Short Duration & Long Duration)
2) Execute Battle Drills & React to Contact (Platoon/Section/Crew/Squad)
3) Conduct Consolidation and Reorganization
4) Conduct Field Maintenance in the TAA (PMCS, 5988 Flow, Parts Flow, Parts Installation
5) Conduct Tactical Combat Casualty Care & CASEVAC Operations
6) Conduct LOGPAC in the TAA, LRP Operations, & Emergency Resupply
7) Conduct Troop Leading Procedures & Rehearsals
8) Establish/Operate Communications & reporting
9) Coordinate with Adjacent Units
10) Execute Detachments, Receive Attachments, & Integrate Unit Enablers
11) Employ UAS (When Equipped)
12) Conduct Counter-UAS Operations

Tank Platoon Fundamentals
1) Execute Movement Techniques: Bounding Overwatch, Traveling, & Traveling Overwatch
2) Conduct Attack by Fire/Support by Fire & Achieve Suppression/Local Direct Fire Superiority
3) Conduct an Assualt
4) Destroy an Inferior Force Using Fire & Maneuver
5) Conduct a Hasty Occupation of a Battle Position for a Hasty Defense
6) Execute Direct Fire Control & Distribution
7) Bypass an Obstacle

Scout Platoon Fundamentals
1) Execute Movement Techniques: Bounding Overwatch, Traveling, & Traveling Overwatch
2) Conduct Reconnaissance (Zone, Area, Route)
3) Conduct Infiltration/Exfiltration
4) Establish/Operate an Observation Post (Short Duration & Long Duration)
5) Conduct a Screen
6) Break Contact/Conduct Displacement
7) Conduct Reconnaissance Handover
8) Conduct a Forward Passage of Lines & Rearward Passage of Lines
9) Execute Direct Fire Control & Distribution
10) Employ Indirect Fire

Tank Company Fundamentals
1) Execute Movement Techniques: Bounding Overwatch, Traveling, & Traveling Overwatch
2) Conduct Attack by Fire/Support by Fire & Achieve Suppression/Local Direct Fire Superiority
3) Conduct an Assualt
4) Destroy an Inferior Force Using Fire & Maneuver
5) Establish a Battle Position Using the 7 Steps of Engagement Area Development for a Hasty or Deliberate Defense
6) Execute Direct Fire Control and Distribution
7) Employ Indirect Fire & Plan Fire Support
8) Bypass an Obstacle
9) Conduct an In-stride Breach

Cavalry Troop Fundamentals
1) Execute Movement Techniques: Bounding Overwatch, Traveling, & Traveling Overwatch
2) Conduct a Screen
3) Conduct Reconnaissance (Zone, Area, Route)
4) Destroy an Inferior Force Using Fire & Maneuver
5) Establish a Battle Position Using the 7 Steps of Engagement Area Development for a Hasty or Deliberate Defense
6) Execute Direct Fire Control and Distribution
7) Employ Indirect Fire & Plan Fire Support
8) Break Contact/Conduct Displacement
9) Conduct Reconnaissance Handover
10) Conduct a Forward Passage of Lines & Rearward Passage of Lines

So, what might we do with the Armor Force Fundamentals? They should assist commanders in prioritizing training. Commanders might also feature them in their training guidance. Leaders would do well to anchor their training strategies and design on these fundamentals. And for sure, we will publish them in our doctrine. For example, the Armor Force Fundamentals will have a prominent place in the soon-to-be published update of ATP 3-20.15 ***(Tank Platoon)***.

Still, and as we discussed in the last Hatch Article, it is what you choose to do that matters most here. As you drive readiness in an environment of high operational tempo and personnel turbulence – with a future lethal battlefield in mind – you can focus on the Armor Force Fundamentals. We challenge you to use your initiative, creativity, and all available time to make your formations better every day. We hope you find the Armor Force fundamentals to be valuable to your efforts.

And as always, the Armor School is available to assist you in all that you do. If there is anything that we can do to help you, just holler!

Forge the Thunderbolt!

BG Chad C. Chalfont
Chief of Armor/Commandant
U.S. Army Armor School

Acronym Quick-Scan

ATP - Army Techniques Publication
ATSI - Army Standardization Initiative
ABCT – Armored Brigade Combat Team
MOS – military occupational specialty
USAARMS - U.S. Army Armor School

FROM THE BORESIGHT LINE

Who Is Your Master Gunner and What Do They Do For You?

Editor's Note: *We are excited to reintroduce our standing column, "From the Boresight Line." This column will provide a platform for Armor Master Gunners to discuss issues, concerns, and solutions specific to the Armor community. I look forward to sharing insights from Master Gunners across both the operational and instutional force. Retired CSM Greg Brobst's following article provides a great starting point for what I expect will be a thoughtful and informative dialogue.*

by Retired CSM Greg Brobst

Commanders, if there is one person standing in your formation that you explicitly trust assisting you in decisions concerning lethality, maintenance, and training, who is it?

If that Soldier is not wearing a Master Gunner Badge on their chest, why not? If your master gunner has not approached you to describe in detail what they can do for you, maybe it's time to schedule an office call with them.

Here is what you should know, "Your master gunner is your advisor for all things gunnery and the combat employment of your fleet." Your master gunner serves as your advisor for crew management, gunnery training and certification records. Your master gunner advises you on the combat employment and capabilities of all organic weapon systems, ammunition, identification of enemy vehicles, and their combat capabilities and vulnerabilities.

Your master gunner serves as your primary trainer for direct fire employment, operation of organic weapon systems (both platform and dismounted), conduct of fire, degraded operations, and a myriad of other tasks associated with the employment and operation of the platforms and weapon systems in your formation.

Your master gunner is trained to advise you on advanced maintenance and troubleshooting of the fire control system and organic weapons and is your subject matter expert for bore sighting, collimation of the Muzzle Bore Device, plumb and sync procedures, Live Fire Screening Accuracy Test and zero. Most notably, due to the rigors of the course, the master gunner graduates with expert level knowledge of training management.

Understandably, your master gunner may also be serving as a vehicle commander or even a platoon sergeant. However, I will ask you again, why not your Mike Golf?

In May of 1973, GEN Donald Starry was selected to command Fort Knox and the U.S. Army Armor School. His initial counseling session with the Army Chief of Staff, GEN Creighton W. Abrams Jr., was direct and to the point. "Don't screw up the tank program. Just start with doctrine, describe the equipment requirements, reshape the organization. And get the Army off its ass!"[1]

In 1974, the Army began its arduous recovery process from a nearly 11-year conflict in Vietnam. For the duration of the conflict, much of the training and combat preparations of the nearly 800,000 Soldiers focused on jungle/guerilla warfare and counter-insurgency operations. With the "Cold War" pending, the Army quickly needed to refocus its training and combat preparations toward the communist threat in eastern Europe.

The concept of the master gunner dates to 1974 when a staff of senior officers proposed the master gunner concept to commanders in the field. The master gunner would provide the needed expertise to help tank crews with the increased complexity of the modern tank fire control systems and the lack of advanced gunnery knowledge. Approved in April 1974 by the U.S. Army Chief of Staff, the U.S. Army (for a one-time execution) graduates 12 NCOs from the first Master Gunner Course. When the new master gunners returned to their

Figure 1. Master Gunner Badge, M2 .50 caliber headspace and timing gauge, lenstatic compass, and notebooks *(U.S. Army National Guard photo by SGT Tara Fajardo Arteaga)*

units, they made immediate positive impacts.[2]

The Army of today looks very similar to that of 1974. We recently closed a nearly 20-year counter-insurgency war which was fought on two fronts, mostly without heavy armor. Additionally, we are once again facing a peer threat on the plains of eastern Europe. There was a 20-year "train-up" for Operation Desert Storm, but that 20-year window may not be available in preparation for the next conflict. Therefore, we need to ensure we are ready now and leverage every available asset to do it.

Recently, we have changed our doctrine from unified land operations to multidomain operations, a significant change in the approach to combined arms operations. Utilizing lessons from the second Nagorno-Karabakh war and the Russo-Ukraine war, like how we utilized the analysis of the six-day war and Yom Kippur war in the early '70s, our current doctrine has changed to embrace emerging technologies and capitalize on their ability to enhance decision making while providing overmatch against our adversaries.

There is little room to argue that our next conflict will look nothing like what we have experienced during the last 20 years in Iraq and Afghanistan. There will be no patrol bases or combat outposts, our service and support activities will be significantly further away from the front-line combat organizations, and any loss of combat power will significantly affect the security of the organizations area of operations.

Under these conditions there can be no substitute for expert vehicle crew members. All crew members must strive to keep their vehicle in the fight because their vehicle is their home, it is their sanctuary, and their means of survival. Crew members must understand how the vehicle was designed to operate, what its capabilities are, what its limitations are, and most importantly, how to overcome them.

Crew members, specifically gunners and vehicle commanders, must have confidence in the weapon systems of their vehicle and understand how to employ them. This understanding not only includes the employment of it under ideal conditions when the vehicle is operating with no faults but also, during conditions that are less than ideal or degraded. Fire control system faults can and will happen, the ability of a crew to recognize them and apply immediate action may be the difference between life and death. In direct fire combat, the opportunity to remove oneself from an engagement and retrograde to the field trains or brigade support area may not be available. When fighting a numerically superior foe, every combat vehicle counts.

As experts, these crew members must be lethal. In simple terms, lethality for an armored crewmember, as demonstrated in the Yom Kippur War, is the tank that fired first with accuracy was the tank that usually won the engagement. One shot, one kill; several years ago, this was the battle cry for many tank companies as they embarked on their path to crew level gunnery. Although it is still said, it is increasingly hard to believe. Our vehicle crews, although qualified, have demonstrated significant shortfalls during qualification gunnery.

In September 2019, III Corps conducted and published a lethality study[3] that highlighted the decline of lethality within the heavy force. At the time of publication, the combat training centers observed a 30 percent decrease in targets hits during the past 20 years and crew qualification rates below 60 percent (III Armored Corps, 2019). In March 2023, the National Training Center (NTC) live fire team non-commissioned officer (NCO) in charge said, "organizations simply do not train as well as they believe they do prior to arriving to NTC." Dragon 40 went on to identify most organizations have continually produced low lethality averages in both offensive and defensive engagements.

For mechanized forces, lethality begins at the crew level; a graduate of Master Gunner School is well equipped to assist Commanders at all echelons with developing training plans that focus on refining or in many cases, rebuilding lethality. For all master gunner courses (Abrams, Bradley, Stryker, and Common Core), the unit training plan is the tie that binds. Every graduate is evaluated on their ability to process the information provided during the course and back brief a panel of instructors on how they plan to implement the concepts trained during the course once they return to their unit. During these briefings, nothing relevant to the course is off limits. Students are required to not only know the material but know how to implement it.

Training Circular (TC) 3-20.31, ***Training and Qualification Crew***[4] defines the duties of the company master gunner as follows.

- Develop and implement live fire gunnery standard operating procedures.

- Track weapons system maintenance tasks and advise the commander on maintenance status.

- Maintain weapon system firing data.
- Assist in the integration of newly assigned Soldiers.
- Establish and conduct initial skills training for new vehicle commanders and gunners.
- Assist in training new crew members.
- Train and certify vehicle crew evaluators.
- Recommend placement of new arrivals to the commander and command sergeant major or first sergeant.
- Recommend crew assignments for all platforms within the unit.
- Assist all elements in the unit concerning direct fire training and employment.
- Forecast and manage ammunition through the Training Ammunition Management Information System. Manages ammunition accounts for all subordinate units.
- Resource and request training areas and ranges through the Range Facility Management Support System.
- Manage direct fire training documents, gunnery skills test records, simulations training records, and crew rosters.
- Establish and oversee gunnery skills test training and evaluating the results.
- Coordinate the pickup, training, use, installation, troubleshooting, and turn-in of all Training Aids, Devices, and Simulations Systems (TADSS) required for conducting effective training.
- Certify and recertify other instructor/operators, if senior instructor/operator qualifies, to conduct crew direct fire training simulations training.
- Develop, validate, and manage games for training scenarios supporting the unit training program and the gaming Gate to Live Fire exercises.
- Plan and manage crew direct fire training simulations training.
- Train crews on TADSS device-based direct fire training systems (installation, bore sighting, and troubleshooting procedures, point of aim, and maintenance).
- Oversee all direct fire training and execution.
- Maintain live fire training standards on all ranges.
- Advise the commander of the tactical capabilities and limitations of all platform weapon systems against threat systems (while in a tactical environment and in coordination with the intelligence staff officer [S-2}).

For the duties of the battalion and brigade level master gunner, refer to TC 3-20.31.

Arguably, there is no one better equipped to coach, train, and mentor you on lethality, maintenance, and training than your master gunner. The unit master gunner has proven themself to a panel of subject matter experts, why are you not allowing your master gunner to prove themself to you? Sit down with your "MG" and have a conversation about what they can do for you and your organization.

Retired CSM Gregory A. Brobst is the Future Large Caliber Ammunition Liaision for Product Manager, Maneuver Ammunition Systems (PM-MAS). His previous assignments include the command sergeant major of 3rd Squadron, 16th Cavalry Regiment, Fort Benning, GA; G-3/5/7 sergeant major, Combined Arms Center, Fort Leavenworth, KS; G-3 sergeant major, 1st Infantry Division, Fort Riley, KS; operations sergeant major, 5th Squadron, 4th Cavalry Regiment, Fort Riley; Abrams Master Gunner Branch Chief, 1st Battalion, 29th Infantry Regiment, Fort Benning, GA; and 1st Sergeant, Headquarters and Headquarters Troop and Company C, 1st Battalion, 68th Armor Regiment, Fort Carson, CO. CSM Brobst's military schools include all levels of NCO Professional Military Education, the Abrams Master Gunner Course, Battle Staff NCO Course, Master Resiliency Course, and Combatives Level 1. He has a bachelor's of science degree in business from Mount Saint Mary College and a master's of science degree in management from Troy University. CSM Brobst's awards include the Legion of Merit (2nd Oak Leaf Cluster), Bronze Star Medal (2nd Oak Leaf Cluster), Purple Heart, Meritorious Service Medal (3rd Oak Leaf Cluster) and the Order of St. George (Bronze).

Notes

1 Sorley, Lewis. "Prologue," Press on! Selected Works of General Donn A. Starry, vol. 1, Combat Studies Institute Press, U.S. Army Combined Arms Center, Fort Leavenworth, KS, 2009, page IX.

2 Partridge, Ira L., "1975-2000: 25 Years of Master Gunner Training," ARMOR magazine, 2000, pages 19–21.

3 III Armored Corps. "Lethality Report on State of the Armored Brigade Combat Team (ABCT) Direct Fire Weapon Systems (M1 Abrams and M2 Bradley Family of Vehicles)," Sept. 20, 2019, page 3.

4 Headquarters, Department of the Army, Training Circular (TC) 3-20.31 Training and Qualification, Crew, Chapter 2, Crew Training Program (2015).

Acronym Quick-Scan

NCO - non-commissioned officer
NTC - National Training Center
TADSS - Training Aids, Devices, and Simulations Systems

Synchronizing Operations in Time, Space, Purpose: The Combined Arms Rehearsal and Commander's Visualization

by LTC Darrell E. Fawley, III

The Combined Arms Rehearsal (CAR) ensures synchronization of assets and units in time, space, and purpose to enable the commander's intent. Additionally, it ensures all commanders and staff officers understand the details of the operation and their responsibility within it. 11th Armored Cavalry Regiment (ACR) conducts in excess of 24 CARs per year and has found that the CAR is the most important aspect of the planning and preparation cycles for a given operation. Given a short planning horizon, the Regiment, represented by the Brigade Tactical Group (BTG), will focus on the CAR to mitigate effects of incomplete or rushed orders. Regardless of the timeline, the BTG never fails to conduct a CAR in person. While such a short amount of planning is not ideal, the demands of operations sometimes make it so and this shows that a detailed CAR can mitigate many issues with planning. This article lays out the methodology 11th ACR uses to synchronize actions in time, space, and purpose using the CAR. The first half of the article focuses on the specifics of the commander's visualization, while the second half describes the CAR itself.

The BTG employs two types of CARs: in contact and out of contact. During predeployment preparation, the out of contact CAR brings all hands together on a massive terrain board replete with relief and all graphics. Here, commanders, intelligence officers, fire supporters, specialty platoon leaders, etc. gather and fight out the plan. In contact, the task force uses a reduced method. The commander determines attendees with the minimum being the S2 shop, Fire Support Officer (FSO), S3, and commanders. The rehearsal occurs anywhere that is inconspicuous such as a well-covered wadi, a non-descript building, or even a garage. The terrain board at times is a large map the task force retains or a smaller terrain model with less detail. When done outdoors the task force erects camo nets to minimize overhead observation and disperses vehicles to look non-descript.

BTG Mission and Commander's Intent

Mission: The 801st BTG conducts a mobile defense between PL Debbie and PL Betty from 221800APR2024 to 250700APR2024 in order to allow the 802nd BTG to establish a deliberate defense in the Central Corridor. O/O the 801st BTG counterattacks along Axis Iron in order to deny the enemy an ability to consolidate for an attack into the Central Corridor.

Commander's Intent

Expanded Purpose: The purpose of this operation is to buy time for the 802nd BTG. Critical to this operation is preventing the enemy from establishing a screen along PL Mike. This is critical because a screen would prevent an integrated counterattack. We seek to push the enemy to the east and then fix them before counterattacking south through Siberia.

Key Tasks:

1. **Render the Enemy Deaf, Blind, and Mute:** Defeat their reconnaissance, destroy their command posts and mission command systems, and destroy or degrade their information collection systems forcing them to fight disaggregated.
2. **Attrit him inch by inch:** Mass the effects of drones, fires, aviation, and maneuver to force the enemy to take ground at extremely high costs. We don't care about any of this ground but we want him to think we want it all.
3. **Keep the Road Open:** Push the enemy off to the east so that the counterattack has a route south through Siberia. Block in the center; give way in the east.
4. **Preserve combat power:** Use passive and active means to keep our combat power alive to kill the enemy.

Decisive Point: Destruction of two enemy companies IVO Snowcone as this will force the enemy futher east, delaying him by 24 hours, and enabling an effective counterattack.

End State: At end state, the 802nd BTG is postured to defend the Central Coordor, the 801st has pushed the enemy back to PL Debbie, the enemy is unable to resume offensive operations for 24 hours, and the 802nd controls PL Mike

Figure 1. BTG Mission and Commander's Intent (U.S. Army)

The scene setter of the CAR is the Commander's Visualization. This provides the framework for synchronization in time, space, and purpose. Therefore, we offer the following insight into a good visualization. The commander's visualization is the commander's opportunity to ensure everyone sees the fight like he or she does and to ensure the organization is focused on a single purpose. One error many commanders make is in using this space to motivate troops, put out notes, or other miscellanea. The commander should rather focus on translating his or her intent into a well understood overview of operations. This sets the tone for the operation. The format the BTG uses is:

Purpose: This is the expanded purpose of the operation and should closely mirror the operations order unless something has changed from its publication to the order. For example: "The purpose of this operation is to buy time for the 802nd BTG to establish an area defense around Razish to prevent the enemy from seizing the provincial capital."

What Are We Trying to Accomplish: This can naturally flow from the purpose, but the intent is to talk about the major elements of what the unit must do. "We are trying to delay the enemy advance through a series of engagement areas to slow down his operations and extend his lines. We want to force him east to create a long line of control (LOC) vulnerable to attack which will set conditions for a counterattack and buy more time for follow on units to prepare their defenses."

Key Tasks: These are likely similar to your operations order. Some commanders prefer very specific key tasks (i.e. "Seize Objective (OBJ) Colts") while others prefer more broad key tasks ("Win the Counter Recon Fight"). We've found in the BTG that using pithy phrases that are easy to remember helps ensure compliance and we tend to use more generalized key tasks. For example:

- Key Task #1: Render the Enemy Deaf, Blind, and Mute – Prevent the enemy from seeing or talking. Kill the recon assets and missions command systems.
- Key Task #2: Attrit Inch by Inch – Make the enemy pay a high price for the terrain he gets.
- Key Task #3: Grab Him By the Belt: Get in close to neutralize the effect of air and artillery assets.
- Key Task #4: Deceive Him – Make it so the enemy doesn't know where our counterattack is coming from.

End State: This is not different from the typical end state of any operations, laid out in Terrain, Enemy, Friendly, and Civilian considerations.

"At end state, the enemy will have lost two battalions worth of combat power, friendly forces are prepared to defend West of Phase Line (PL) Mike, the BTG retains Hill 760…"

Risk: The Army defines risk in terms of accident and tactical, more colloquially termed risk to force and risk to mission. However one defines it, it is important to spell out risk and mitigation measures. One way to consider risk is the Move-Strike-Protect framework. At all times, a unit can normally only do two well. For example, a defense requires loss of ability to move at scale.

"I see three areas of risk: 1. We are in Strike-Protect mode, so we are limited in mobility. We will employ a capable reserve, rehearsed, to return to offense and ensure we protect our flanks from Infantry. 2. We have limited ability to construct obstacles due to limited engineer assets. We will focus on survivability and use terrain and indirect fires to shape the enemy into our engagement areas. 3. We accept risk to our personnel due to the extremely dusty conditions. We will implement a 100-meter dust interval, enforce cleaning of windshields, and provide more time for movements to ensure no loss of personnel to accidents."

Overview: Here, the commander should walk the terrain on the model or map and discuss how he or she sees the battle unfolding. "I believe the enemy will attempt a simultaneous push toward Siberia and Red Lake Pass. At 2100, troops will move north of the Whale Gap and probe our engagement area. 3-67 AR will push north into Siberia attempting to first seize the John Wayne Foothills and establishing a blocking position at the mouth of John Wayne Passs. Simultaneous to that, 3-15 IN will push toward Nabran and isolate it before clearing it. 2-69 AR with engineers will then pass 3-15 IN and attempt to seize Red Lake Pass using dismounts to clear the high ground to the east and west. 3-67 AR will push to the Siberian Ridge Line and establish a hasty defense. 2-69 AR will then push through and seize Forward Operating Base (FOB) Miami as a far side objective. After consolidation and reorganization, 2-69 AR will move to seize Snow Cone while 6-8 CAV attempts to push a screen line along PL Mike from PL Betty to PL Courtney. 3-15 IN will then isolate Barisu and attempt to seize the town from the north. In order to prevent this, we will use a Family of Scatterable Mines (FASCAM) to push them into the eastern approach. What we need to do to counter this is act like an offensive line in pass blocking. Tiefort is our center and our defense along JW Foothills is our guard. Nothing gets through. Continue to push the enemy east. Our defense along Porta-Potty Wadi is our Tackle. We're going to absorb the blow and push the attacking defensive end outside to provide time for our quarterback to throw. As we string them outside along a long LOC, we'll fix with a counterattack and then send our reserve deep to destroy his Position Areas for Artillery (PAAs)."

Once the commander provides their visualization, participants fight out the plan in real time and that fires and maneuver are synchronized with all assets supporting the plan. Generally, anything already covered in an order, confirmation brief, or back brief, is not covered again save the disposition and composition of forces to set the scene. Commanders do not brief, but rather fight their plans in concert with the BTG shaping operation. The S2 fights the enemy plan as if theywere the commander. In the offense, the BTG initiates action during the CAR. In the defense, the S2, acting as the enemy, initiates action. For example, when briefing an enemy battalion, an S2 rep might say: "My name is LTC John Jones, and I am the commander of 1-17 IN. I bring to the fight three infantry companies, a scout platoon, and a mortar platoon. I will [*cross the*] line of departure (LD) at 0600 and attempt to establish a foothold on John Wayne Foothills using A Company to clear the high ground to the west, C Company to establish a support by fire, and B Company to seize the objective."

As this action takes place brigade- and battalion-level assets begin to fight against it. First, the BTG established how it detects the enemy action and answers priority intelligence requirements (PIR). For example, the scout platoon leader may say, "observation point (OP) 1 observes that movement through the Whale Gap, named area of interest (NAI) 5, and reports via Joint Capability Release (JCR) on the Task Force (TF) Battle S2 chat." Then, the S2 may say, "That answers PIR #1. We now know the main avenue of approach."

Next in the sequence is the fires fight. The Fire Support Officer (FSO) might say, "That triggers me to fire target AB1001 which is a Battery 6 fired from Alpha Battery with the task to disrupt the formation as it moves through the Whale Gap." The Joint Terminal Attack Controller (JTAC) would discuss any response from fixed wing aircraft and the brigade aviation officer or liaison from

Figure 2. 11th ACR Conducting a Combined Arms Rehersal Prior to Deployment *(Photo by 11th ACR Public Affairs)*

the aviation element would then discuss and rotary wing response. The S2 may also discuss armed drones if available. Of course, this is only if fixed wing, rotary wing, or armed drones are to be used in this engagement. Rather than go around the horn and having staff officers and leaders brief "no change", only those units or assets contribute to the portion of the fight in question chime in.

Following this, the various protection elements talk. For example, and engineer battalion commander may say, "As the element approaches the John Wayne Foothills, it will come in contact with a 500 m antitank ditch located at MP 3214 5969." The Air Defense Artillery (ADA) officer would discuss arrayal of assets in the event the enemy is expected to employ aviation. Then, the Electronic Warfare (EW) officer would discuss any jamming or other effects arrayed against this threat. For example, "As the enemy battalion exits the Whale Gap they will encounter global positioning system (GPS) jamming until 0200." All of this occurs only if any of these elements have a role in the portion of the fight being rehearsed.

Maneuver comes last after the BTG and its enablers have shaped the fight. The Mechanized Infantry Battalion (MIBN) commander or the commander of the Mechanized Infantry Company (MIC) arrayed at John Wayne Foothills may discuss their direct fire plan. Keep in mind that all this is occurring on the map or terrain model. Commanders and staff orders move about the map; they do not sit back in chairs and brief. The very best CARs the BTG has executed ended up with commanders fighting and coordinating actions on the map with little prompt from the BTG commander or S3. At the end of this exchange, the S-2 assesses the enemy's effect on combat power and the unit's effect on the enemy. "I (S-2 as

Figure 3. Task Force Battle Conducts a Combined Arms Rehearsal in an Abandoned Tent *(Photo by Author)*

the enemy) believe you have lost one MIC and I lost a company of infantry and a platoon of tanks."

When in the defense, it may be helpful for a commander to brief their engagement area development when discussing their establishment, though this can take away from the flow. If inclined, an example is: "I assess the enemy will uses axis of advance (AoA) 1 and 2. I assess the enemy will send two battalions along AoA 1, with one attempting to breach, and the other

1. Rules

2. Orientation to the Terrain Board (AS3)

3. Commander's Intent and Visualization (CDR) (see next section)

4. Initial Set

a. Enemy (S-2): Battalions (including slant), PAAs, C2, Forward Area Refueling Points (FARPs), other High-Payoff Target List (HPTL) targets, obstacles (offense)

b. Friendly (AS3): Bns (including slant), Scouts, Obstacles (defense), C2

[Note: We find that having the AS3 brief all friendly sets significantly reduces time on the front end of the CAR and prevents the CAR from turning into a back brief.]

5. Fight the Plan

a. When on Defense

i. Enemy Action Briefed by S-2 or AS2: "I am LTC John Smith, commander of 1-1 IN BN. I have two mechanized IN companies and one tank company. I will move along Route Eagles..."

ii. Who Sees it? (UAS, recon aviation, scouts, etc.); "I observe four tanks entering EA Smash and report to Brigade S-2 on channel 509, the command net." [All proponents able to sense or observe this action explain how they detect and how they report.]

iii. PIR Answered, if any (S-2)

iv. Fires Response:

1. Artillery (FSO): What targets are being fired and are there any triggers for special munitions?
2. Aviation (as appropriate)
    a. Fixed Wing (JTAC)
    b. Rotary Wing (Brigade Aviation Officer)
    c. Armed unmanned aerial system (S-2)

v. Protection

1. Obstacles (TF Engineer or BEB Commander): Where are the obstacles and what are their effects on the enemy?
2. ADA (Protection Officer): Where is the ADA and what is its engagement and disengagement criteria?
3. EW (EW): What assets will be in support at this time and what are their effects?

vi. Maneuver: What is the ground commander doing to counteract the enemy? The commander should also brief triggers to occupy BPs and use internal fire support measures, such as mortars, as well as engagement criteria, disengagement criteria, and displacement criteria. [Commander's should discuss risk as they see it]

vii. S2 Adjudication: Following this action, the S2 should assess what Red and Blue forces have been destroyed or degraded and this should be kept in mind as the rehearsal progresses.

b. When on Offense:

i. Intel read: How do we identify the enemy disposition, composition, strength, and courses of action (COAs)? What assets detect this? How do we report information?

1. UAS
2. Aviation
3. Scouts
4. Other intel sources

ii. Fires actions to shape the enemy

iii. Aviation actions to shape the enemy.

1. Fixed Wing
2. Rotary Wing
3. UAS

iv. Maneuver

1. Actions at the PLOC, formation, order of movement
2. Engineer Efforts
3. Smoke
4. SOSRA as necessary
5. Maneuver plan 1 level down
6. Risk

v. Enemy Response (S-2)

vi. S2 Adjudication: Following this action, the S-2 should assess what Red and Blue forces have been destroyed or degraded and this should be kept in mind as the rehersal progressess.

6. Decision Points (S-3): A note taker should track along the Decision Support Tool and announce when the unit has reached a decision point and the S-3 should recommend a COA to the commander.

Figure 4. Sample Script to focus on fighting versus briefing *(U.S. Army)*

as the exploitation force. I intend to kill the enemy in EA Crush. I will emplace a turn obstacle from MP 1234 5678 to MP 1265 5690. I will have one company arrayed in BP 1, another in BP 2, and a third in an alternate BP [which the commander points out on the map or terrain model]. I have planned Target AB 1010 to destroy enemy moving along Route Eagles." Commanders should brief their engagement criteria, disengagement criteria, and displacement criteria, with the final one including an assessment of time to displace and reestablish.

In the offense, it is helpful for the commander to brief their transition from movement to maneuver at the probable line of contact. "I will SP from Attack Position Fury at 0200 traveling along Axis of Advance Blue. An advanced guard will lead with companies in column. We anticipate the PLOC being PL California. 500 m from PL California, elements will transition to platoons in wedge and transition to traveling overwatch…"

The commander's role during the fighting portion of the CAR is to ask questions, such as "How long will it take?" and to make decisions that pop up during synchronization. Additionally, the commander verifies that subordinate commanders have nested their scheme of maneuver with theirs. The S3 with assistance from the FSO and S2 help the commander ensure his or her fighting products are nested across the board.

Steps 5 and 6 above will repeat as many times as the commander and S-3 feel necessary. Generally, the commander and S-3 agree upon what they will rehearse and assign each a turn. This may look like: counter-recon fight, fight in engagement area 1, fight in engagement area 2, and counterattack, as an example.

The methodology of the CAR laid out here ensures that commanders and staff officers are rehearsing actions on the terrain model or map rather than back briefing their plans and helps ensure efforts are synchronized in time, space, and purpose. Setting the scene for the CAR is the commander's visualization and the method offered here has proven quite effective. Taken together, these techniques represent a great way to ensure operational success.

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Acronym Quick-Scan

ACR – Armored Cavalry Regiment
ADA – Air Defense Artillery
AoA – Axis of Advance
BAO – Brigade Aviation Officer
BTG – Brigade Tactical Group
BP – battle position
CAR – Combined Arms Rehearsal
COA – courses of action
EW – Electronic Warfare
FARP – Forward Area Refueling Point
FASCAM – Family of Scatterable Mines
FOB – Forward Operating Base
FSO – Fire Support Officer
GPS – global positioning system
HPTL – High-Payoff Target List
JCR – Joint Capabilities Release
JTAC – Joint Terminal Attack Controller
LD – Line of Departure
LOC – Line of Control
MIBN – Mechanized Infantry Battalion
MIC – Mechanized Infantry Company
NAI – named area of interest
OBJ – Objective
OP – Observation Point
PAA – Position Area for Artillery
PIR – Priority Intelligence Requirement
PL – Phase Line
TF – Task Force
UAS – Unmanned aerial system

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Lead, Maintain, Train

A Framework for a successful EUCOM Deployment

by LTC Kyle Trottier, MAJ Timothy Lee, and CSM Mark Lavender

From July 2023 to April 2024, the 1st Battalion, 37th Armor Regiment (1-37AR), 2nd Armored Brigade Combat Team (2nd ABCT), 1st Armored Division supported Operation Assure, Deter, Reinforce as a rotational force to U.S. European Command's (EUCOM) area of responsibility (AOR). The battalion task force used an operational framework of Lead, Maintain, Train to focus battalion efforts each quarter allowing the unit to leave EUCOM as a more ready combat formation.

The Lead line of effort (LOE) focused on the eight Soldier protective factors (SPF) to create areas leaders can engage Soldiers in both formal monthly counseling or informal day-to-day interactions at physical training (PT) or in the motor pool. The intended outcome being that 1-37AR "Bandits" Soldiers thrive in the profession of arms, while strengthening the connection between unit, Soldiers and families. The Maintain LOE focused on creating conditions where Soldiers understand how and are resourced to maintain their equipment to standard through Army systems and processes. The Train LOE focused on building a lethal combined arms battalion. At the end of nine months in EUCOM, the 1-37AR performed better in all these areas and wanted to share these lessons to enable other EUCOM rotational forces to achieve similar success.

Vision: 1-37AR is a trained, fit, and disciplined combined arms battalion able to close with, engage, and destroy the enemy through fire, maneuver, and shock effect or repel their assault by fire and counterattack. We are a values-based organization characterized by platoons that earn the trust of the chain of command and the American people by living the Army Values and Soldier's Creed. We are equally characterized by a team of strong families able to function effectively in garrison and during a deployment.

Mission: On Order, 1-37AR deploys and conducts combined arms maneuver in support of a division/joint task force/multinational force to shape the operational environment and prevent conflict or win our nations wars and consolidate gains as part of Unified Action.

Commanders Intent

Purpose: 1-37AR must build trained, fit, and disciplined Soldiers and cohesive teams prepared to fight and win against a highly capable enemy able to take away our advantages in combat that is chaotic, intense, and highly destructive.

Key Tasks:

- **Lead.** 1-37AR is an officer led, NCO driven organization where engaged leaders enforce standards and discipline and employ H2F and the Eight Soldier Protective Factors through regular counseling. Engaged leaders know their Soldiers, keep them informed, and make their lives predictable. When making a decision, ensure it is legal, moral, ethical and safe.

- **Maintain.** 1-37AR maintains all equipment IAW 10/20 standards, accounts for all property, and enforces standards through regular CSDP, CMDP, and CDDP inspections.

- **Train.** 1-37AR trains lethality IAW TC 3-20.0, UTM IAW FM 7-0, conducts weekly training meetings, employs the Eight Step Training Model and principles of training.

End State:

- 1-37AR is comprised of trained, fit, and disciplined Soldiers ready to deploy, fight, and win!

- Engaged leaders know their Soldiers, keep them informed, and provide predictability.

- Equipment maintained to standard through Army systems and programs.

- Trained individuals and crews able to shoot, move, communicate, medicate, and sustain.

- Families are informed and have predictability.

Lead

While serving as the director of the Army People First Task Force, MG Christopher Norrie argued, "We need leaders who are competent in warfighting and building cohesive teams."[1] He further said, "Command climate cannot be detached from combat readiness," that "winning matters, but we cannot be successful without our people."[2]

Former Chief of Staff of the Army, GEN James C. McConville said, "Highly trained, disciplined, and fit units are ready to fight and win, when each person is treated with dignity and respect."[3] While serving as the commander of the 3rd Infantry Division, MG Norrie implemented the work of the People First Task Force and codified the eight Soldier Protective Factors into daily operations for the division (Figure 1 below). While deployed to EUCOM's AOR as part of Task Force Marne, 2nd ABCT/1st AD and 1-37AR also adopted the eight Soldier protective factors. Through this example, 1-37AR treated "Build Cohesive Teams" as a mission essential task (MET) and used the eight Soldier protective factors to provide concrete focus areas that team, squad, platoon and

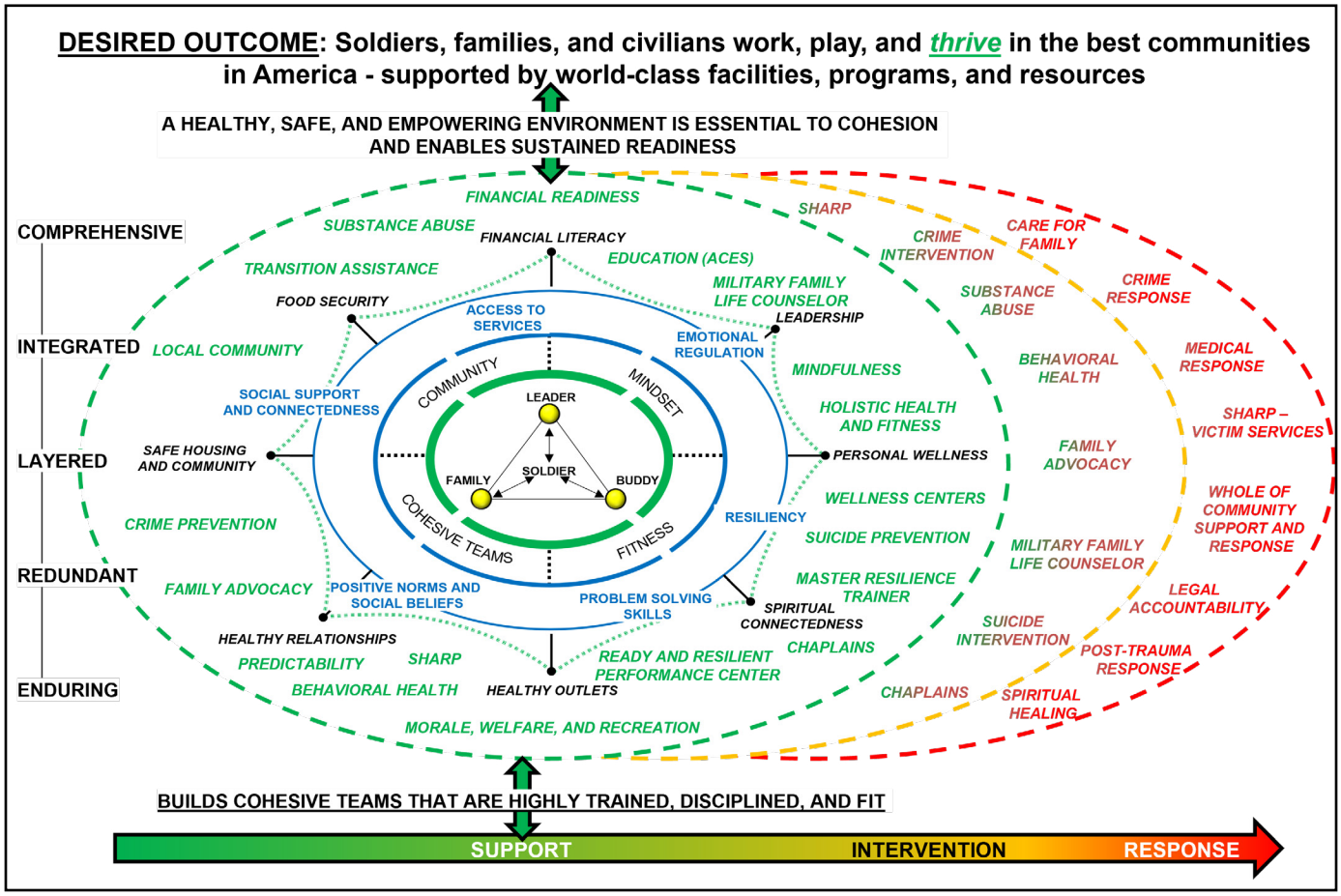

Figure 1. Eight Soldier Protective Factors[4] *(U.S. Army Graphic)*

company leadership could use to engage Soldiers, proactively prevent problems, and build trust within the chain of command and with the American people.

Eight Soldier Protective Factors (SPF):

Figure 1 is a graphical representation of the eight Soldier protective factors to show how Soldiers and their "golden triangle" are influenced by leadership, personal wellness, spiritual connectedness, healthy outlets, healthy relationships, safe housing and community, food security and financial literacy. In this model, the more leaders focus on the left (green), the less frequent problems arise on the right (red). To build cohesive teams units must focus on the eight SPFs.

1. Leadership

According to Army Doctrine Publication (ADP) 6-22, ***Army Leadership and the Profession***, the Army definition of leadership is to "provide purpose, direction, and motivation while working to accomplish the mission and improve the organization."[5] Resources like Field Manual (FM) 6-22, ***Developing Leaders***, are an essential foundation for all officers and non-commissioned officers. The attributes and competencies of BE, KNOW, DO are critical to the successful execution of unified land operations. The first two principles of Mission Command are competence and mutual trust. Trust is built through a combination of demonstrating competence and character repeatedly over time. Units must employ the Principles of Training outlined in FM 7-0, ***Training***, and build Soldiers who live the Army Values and Soldier's Creed.

When leaders engage their Soldiers routinely about their nutrition, financial status, relationships, spirituality, and healthy outlets, Soldiers know they are valued members of the team, their leadership cares about them, and they gain a greater sense of purpose. These Soldiers are more likely to live the Army Values and refrain for negative behaviors and trust is built between the leader and the led, which is the foundation for a cohesive team.

2. Personal wellness

The U.S. Army has invested in Holistic Health and Fitness (H2F) to ensure Soldiers are prepared for the demands of large-scale combat operations. Engaged leaders can use these resources to improve the personal and professional performance of Soldiers. H2F provides tools to improve the cognitive, emotional, and physical abilities of each Soldier.

The 2/1AD H2F team rotated throughout the EUCOM AOR visiting dispersed units every two to three weeks. During these engagements a team composed of a behavior specialist, an

occupational therapist, a cognitive performance specialist, and a physical therapist or athletic trainers would provide blocks of instruction specific to upcoming training events. For example, prior to shooting gunnery, the H2F team focused on cognitive approaches to gunnery and positive self-talk, breathing techniques to either pump up or calm down a Soldier, sleep hygiene and how to maximize sleep both within the garrison environment and in the field. The H2F team also discussed nutritional considerations to maximize performance. Together these classes not only provided individual Soldiers information but also empowered leaders to better manage the time of their Soldiers to achieve optimal performance. The pre-gunnery H2F engagements contributed to achieving a battalion overall average gunnery score of 833/1000.

Figure 2. Soldiers from the 1-37 AR Unit Ministry Team pose for photos
(Photo by LTC Kyle Trottier)

3. Spiritual connectedness

According to the H2F Handbook, "spiritual Readiness is the development of personal qualities needed to sustain a person in times of stress, hardship and tragedy."[6] Unit ministry teams (UMTs) play an important role in preparing Soldiers for the hardships of combat. Regardless of the faith tradition, having something to believe in, something to sustain a Soldier throughout the trials of life, creates a more resilient individual. A unit full of these strong individuals can be trusted to accomplish their given mission.

The 1-37AR UMT would hold weekly inter-faith dialogues to allow Soldiers of different backgrounds to share what they believe and why. This allowed Soldiers to learn and grow together and help them to know they are valued members of the team. The UMT created a "word of the day" Signal chat where the chaplain would send out a short inspirational quote each day. The UMT would ensure all religious services were advertised and coordinate for transportation, so Soldiers had access and opportunity to attend their faith service. For some Soldiers the UMT would coordinate for day trips to religious shrines or temples in the local area. The UMT would hold monthly prayer breakfasts, support different religious accommodations for Soldiers, and provide resources to ensure Soldiers had the opportunity to thrive.

Figure 3. Soldiers from the 1-37 AR Unit Ministry Team pose for photos
(Photo by LTC Kyle Trottier)

4. Healthy outlets

The 1-37AR UMT worked with company command teams to provide healthy outlets for Soldiers. They organized morale, welfare and recreation (MWR) trips to local culturally, and historically significant sites and attractions. They coordinated with the United Service Organizations (USO) to provide monthly events. The monthly USO events had live music, board games, corn hole, video games, and snacks and would normally be attended by about 120 Soldiers. Leaders and the UMT would coordinate for monthly resiliency training events where Soldiers could travel to a local historical location and reflect on the Army Values. They also developed monthly sports leagues (softball, basketball, dodgeball, flag football, volleyball, and weightlifting) to create healthy outlets for Soldiers and build comradery across the formation.

An area of major emphasis for healthy outlets was during the holidays. Leaders across the battalion worked hard to create positive memories and ensure Soldiers were not alone around holidays. For example, for Halloween the battalion held a "trunk or treat" event where each company decorated one of their tactical vehicles and Soldiers could dress up in costumes. The USO was present providing live music, snacks and games. These events resulted in higher morale and a greater sense of community connection for deployed Soldiers.

Figure 4. Soldiers from the 1-37 AR Unit Ministry Team pose for photos
(Photo by LTC Kyle Trottier)

5. Healthy relationships

The center of Exhibit 1 is a Soldier and their "golden triangle," consisting of the Soldier, their family, friends and unit leaders. Engaged leaders conduct regular counseling with Soldiers to understand their relationship with their family, friends and leadership within the unit. Knowing the Soldiers allows leaders to be able to connect with and engage them. From this, leaders understand what the "status quo" can be for those Soldiers and can detect variances. Through regular interactions, ranging from PT to daily duties to formal counseling, leaders can use other protective factors as discussion topics,

Figure 5. Soldiers participate in Halloween activities. *(Photo by LTC Kyle Trottier)*

Figure 6. Soldiers line up their pumpkins for pumpking carving contest. *(Photo by LTC Kyle Trottier)*

Figure 7. Soldiers decorate equipment for Halloween. *(Photo by LTC Kyle Trottier)*

Figure 8. Soldiers pose wearing Christmas sweaters. *(Photo by LTC Kyle Trottier)*

and gauge positive and negative trends. The leader can also engage other members of the Soldier's golden triangle to ensure healthy relationships are helping lead the Soldier to live the Army Values.

6. Safe housing, community

While deployed 1-37AR conducted monthly health and welfare inspections of its living quarters. Through this process leaders were able to identify deficiencies and put in work orders or address the problem to ensure the area was safe and healthy. These inspections also highlighted Soldier needs, like a lack of wall lockers and other quality of life issues and enabled unit leaders to take action to serve their Soldiers and re-enforce they are valued members of the team. One simple win with huge impacts was acknowledging the lack of a place for Soldiers to gather and have access to entertainment like TV. The battalion command sergeant major coordinated for two TVs, two Armed Forces Network (AFN) boxes to provide network television, and for the dining facility (DFAC) to remain open after hours so Soldiers had a place to gather and socialize outside of the barracks in the evenings.

7. Food security

1-37AR was unique in that military occupational specialty (MOS) 92G Culinary Specialists provided the meal services for the battalion, not contract cooks. With 92G Soldiers providing meals, the 1-37AR enjoyed higher quality food and saved $2.3 million in contracts to EUCOM. The 92Gs would cook out of the DFAC most of the time but would also cook out of the containerized kitchen (CK) monthly to maintain their equipment and professional competencies. Cooks would have a monthly culinary arts competition – like popular TV shows – to put the skills of the 92Gs to the test. The 92G culinary specialist took pride in their service. All culinary specialists re-enlisted during the deployment, three of them won Soldier of the Month, three won NCO of the Month, and two won NCO or Soldier of the quarter. By not having a food service contract, 1-37AR ate better tasting nutritious food, saved $2.3 million, and ensured the 92G Soldiers felt valued and appreciated.

8. Financial literacy

1-37AR company leaders would not only inspect Soldier records monthly to verify proper payments but would also provide financial literacy classes. Company leaders coordinated with local finance detachments and other knowledgeable individuals to discuss budgeting and how to save money during the deployment. Company leaders would also reach back to garrison resources to assist with tuition assistance, spousal employment, and financial readiness.

By focusing on the eight Soldier protective factors like a mission essential task, Soldiers in 1-37AR gained trust in the chain of command, believed they were valued members of a team with purpose, were provided opportunities to personally thrive, and left EUCOM better. Engaged leadership began to manifest in unit metrics like a significant increase in retention, decrease in unit indiscipline, and consistently high human resources (HR) metrics.

Maintain

As 1-37AR received its equipment at the seaport of debarkation (SPOD) and off railcars, after a lengthy multi-modal transportation period, its OR rate was well below the Army standard of

Figure 9. Soldiers assemble a containerized kitchen (CK). *(Photo by LTC Kyle Trottier)*

Figure 10. Cooked food ready to be served to Soldiers. *(Photo by LTC Kyle Trottier)*

Figure 11. Cupcakes in rememberance of September 11, 2001. *(Photo by LTC Kyle Trottier)*

90 percent and property accountability issues were abundant. The battalion pursued multiple routes to address these issues. First, the annual service window was extended from the normal three weeks to six weeks. Second, the battalion looked for parts sources outside of Global Combat Support System-Army (GCSSA). Third, the battalion developed a series of leader professional developments (LPDs) focused on Command Supply Discipline Programs (CSDP) and Command Maintenance Discipline Programs (CMDP) followed by monthly Staff Assisted Visits (SAVs).

Services

Battalion leaders know it is essential for crews to shoot gunnery on their own platform. As the staff and company command teams re-assessed the calendar it was clear there was enough time to conduct a more in-depth annual service to give companies enough time to identify faults, put parts on order, repair the fault and have a fully mission capable fleet before gunnery. A six-week service window also accounted for environmental factors such as outdoor services during cold and wet months like October and November. As tank crews conducted services they identified 347 faults among vehicles, plows, rollers, optics, and communications equipment. Crews then had enough time to properly repair the faults with the result being each tank crew qualified off their own platform. Additionally, plow tanks qualified with a fully mission capable (FMC) plow attached.

The success of this service window carried forward into the next quarter when the unit conducted platoon situational training exercise (STX), platoon live fire exercise (LFX), and a company (LFX). Each crew was able to qualify on its own platform and during STX, FMC plows and rollers were employed during combined arms breach exercises. As the unit prepared to redeploy from Europe, 100 percent of the ERC-P items and 90 percent of the ERC-A items drove onto the boat. This was a reflection of the quality maintenance conducted by these crews during the previous nine months. The condition of the fleet upon redeployment was a credit to the investment of an extended service window at the beginning of the deployment.

Outside Sources

GCSS-A is a phenomenal program of record for the Army. But there can often be delay in shipping and shortages of supply that cause a simple repair to be delayed weeks. 1-37AR sought out maintenance solutions outside of GCSS-A to increase the speed of repairs. One key source of assistance was Maintenance Activity Vilseck (MAV).

Maintenance Activity Vilseck (MAV) is depot level maintenance facility on Rose Barracks, Vilseck, Germany. The MAV repaired wiring harnesses, Line Replaceable Units (LRU), and other

common fault items for both tracked and wheeled fleets. The MAV also fabricated parts with their machine shop. 1-37AR had $2.3 million worth of parts fabricated or repaired at the MAV, most of which were complete within 72 hours. Since the MAV has a budget through 21st TSC, the fabrication was no cost to the unit. Meaning, 1-37AR was able to obtain $2.3 million worth of parts at no cost to the brigade and faster than if an item was ordered thru GCSS-A. The only unit cost at the MAV was if they needed to order a part for a repair, like an LRU component.

Leader development and compliance

As normal leader transition happens gaps in knowledge can arise leading to Soldiers or leaders not fully understanding Army standards and/or Army systems of record. To improve both maintenance and property management 1-37AR led a series of LPD sessions focused on the CMDP and CSD-Preinforced with monthly SAVs to ensure compliance.

Battalion CMDP LPDs covered the six most common faults with the M1 and M2 vehicles, roles and responsibilities of leaders and Soldiers during preventive maintenance checks and services, the maintenance management process – reviewing from identification of a fault through closure of the fault to include turn-in of recoverable items. This LPD physically walked each platoon sergeant and above thru the maintenance control office and the supply support activity (SSA) to inform leaders step by step how they get parts. Other LPDs taught platoon sergeants and above how to use GCSS-A with the end state being platoon leadership can not only view their ESR and track parts, but they also can conduct basic parts research. Thus, at the platoon level, leaders can assist the company executive officer (XO) and maintenance team chief to generate solutions to identified faults. The result is competent platoon and company level leaders who know how to use Army systems of record, who proactively seek solutions, and who take responsibility for the proper maintenance of their equipment.

Figure 12. M1A2 Tank using the mine plow during an exercise. *(Photo by LTC Kyle Trottier)*

Figure 13. M1A2 Tank using the mine roller during an exercise. *(Photo by LTC Kyle Trottier)*

Battalion CSDP LPDs covered levels of responsibility, duties of sub hand receipt holders, how to conduct an inventory, review of Bill of Material (BOM) and shortage annexes, the Financial Liability Investigation of Property Loss (FLIPL) process, standardized company property books, and how to order Class (CL) II (when to release for funding vs. hold). This was then reinforced with SAVs focusing on the 1AD CSDP checklist in accordance with Army Regulation (AR) 710-4, ***Property Accountability***. The results included accurate property books, accurate shortage annexes, and five company changes of command without a FLIPL. It also resulted in filling more than $200,000 in CL II shortages.

Together these efforts helped the battalion achieve and sustain 90 percent operational readiness for both ERC-P and ERC-A fleets. Each crew qualified on its platform for tank and Bradley gunnery and collective training. The battalion grew a cohort of knowledgeable leaders who understand and can employ Army CMDP and CSDP programs to better maintain equipment. By having accountability of property and well-maintained equipment, Soldiers were able to conduct higher quality training without distractions from broken or missing items.

Train

Prior to deploying to EUCOM 1-37AR conducted an LPD centered around FM 7-0. Battalion leadership covered the principles of training, eight-step training model, and mission essential tasks lists (METL) for each company. From this each company conducted a METL crosswalk and populated the battalion training calendar for the time the unit would be deployed to Europe. This provided a doctrinally based plan for approaching training readiness in EUCOM the battalion could then adjust as changes in the environment arose. A great reference is Center for Army Lessons Learned (CALL) issue 21-19, "Mastering the Fundamentals" by MG Michael J. Simmering.[7] In this document MG Simmering does a METL cross walk for each company in an ABCT and SBCT and highlights which METs to focus on to be successful at the National Training Center.

The battalion training meeting is essential for providing clear guidance, predictability, and ensuring proper resourcing. 1-37AR worked hard to continually improve the training meeting format to ensure it not only met FM 7-0 guidelines but also had appropriate inputs and outputs to create shared understanding across the formation. Having and enforcing a battalion battle rhythm is a critical element to proper training management. By standardizing input T to T+8 formats, battalion logistics synchronization (LOGSYNC) meeting requests, and the battalion LRTC each battle rhythm meeting could be predictable and efficient. By putting all documents on MS Teams all leaders had access to the same products and meetings could be held with live data, removing discrepancies associated with version control. Finally, battalion top five leadership would rotate and attend company training meetings to ensure training meetings are being conducted to standard in accordance with Field Manual (FM) 7-0, Training to create well-resourced quality training and provide predictability to Soldiers and their families.

Example battle rhythm

Monday: Command maintenance.

Tuesday: Battalion training meeting, and company maintenance meeting.

Wednesday: Battalion maintenance meeting, and BCT training meeting.

Thursday: BCT maintenance meeting, company training meeting, sergeants time training, and combat-focused PT.

Friday: Company T to T+8 due to battalion S-3; S-3 and battalion staff update training meeting/command and staff, and Iron Soldier Family Time (3 p.m.).

Following the METL Crosswalk, companies trained individual thru collective events taking advantage of these opportunities to qualify every Soldier on their assigned systems. Other opportunities include team building events like obstacle courses, rappel towers, and puggle stick competitions. Competition drove excellence in the Expert Infantry Badge, Expert Skills Badge,

Course	Count
Medic Tables/Validation	4
Master Drivers Trainer	2
Unit Movement Officer	3
Unit Armorer	3
HAZ-11	2
Unit Supply Course	6
CBRN Defense	2
DTMS Manager	1
HAZ-15	1
BLC	25

Figure 14. Table of additional duties and quantity of each. *(U.S. Army Graphic)*

Expert Field Medic Badge, and regional competitions like the EUCOM Best Medic Competition. Other opportunities arose to increase Soldier large-scale combat operations competencies like the ability to conduct land navigation courses and use the CS (also known as tear gas) gas chamber to build confidence in chemical, biological, radiological, nuclear, explosives (CBRNE) equipment and tasks. Finally, 1-37AR used its time in EUCOM to build professional competency through schools run by the 7th Army Training Command.

1-37AR built proficiency conducting offensive and defensive operations through squad STX, crew gunnery, platoon STX, platoon LFX, and CO LFX. The Emergency Deployment Readiness Exercise (EDRE) program was a great way to get additional training repetitions conducting offensive and defensive operations and evaluate unit deployment readiness. 1-37AR developed a platoon EDRE system where platoons would be notified, conduct troop leading procedures (TLPs), and deploy to a range complex to conduct offensive and defensive events "dry" or without ammunition. Upon arrival, the platoon leader received additional information, completed TLPs then conducted a tactical exercise.

Example EDRE scenario: A tank platoon deployed to a range, is given an order to conduct an area defense, and must be ready to defend within one hour. The tank platoon maneuvered to the farthest battle positions (BPs) down range, conducted engagement area development and platoon rehearsals. Then, after one-hour, targets are presented and the platoon leader and platoon sergeant fight the platoon through calls for indirect fire, platoon fire commands, section fire commands, bounding to subsequent battle points (BPs), then conduct a counter-attack to a given phase line. This whole process is discussed through the after-action review (AAR) process, time is given to re-train, then a second iteration is conducted. Upon completion of the second iteration an AAR is conducted, and the platoon is given a fragmentary order to maneuver to a different training area. Upon arrival at the tactical assembly area the platoon is provided an additional order, conducts TLPs, then competes against a second platoon in a force-on-force maneuver exercise. The EDRE ended when both platoons redeploy to the motor pool

Figure 15. U.S. Army SGT Rusty Hilligos, assigned to 128th Signal Company, 39th Signal Battalion, 2nd Signal Brigade, 5th Signal Command, answers questions without his protective mask on in a cloud of CS gas. *(U.S. Army Photo by Visual Information Specialist Pierre-Etienne Courtejoie)*

and begin after-operations maintenance.

The EDRE program is a low-cost, high reward learning event where platoon leadership gets multiple repetitions conducting mission essential tasks. Platoon leadership learns the value of proper maintenance and load plans to be ready to deploy with short notice. They learn to conduct TLPs and think quickly as conditions change. Finally, it spurs a healthy drive to continually improve through competition as each platoon will end up fighting another platoon in both offensive and defensive scenarios. Through this process professional competence, unit pride, and cohesive teams are developed.

A second opportunity the EUCOM deployment afforded was to train the forward support company. As the battalion moved through its collective training cycles it afforded multi-echelon training opportunities for the forward support company (FSC) to establish command posts and conduct base defense exercises. It also allowed the FSC to certify all Soldiers on individual and crew-served weapons, ground mounted and vehicle mounted, and then conduct platform live fire exercises with both wheeled and tracked (M88) platforms. During this EUCOM deployment the FSC continually performed its duties not only in the motor pool but in tactical environments. This created a massive surge in unit pride and the company completed 124 percent of its retention mission. Connecting back to the first mission essential task, "building cohesive teams," we saw a direct connection between quality training, cohesive teams and unit retention. When Soldiers have competent leadership, know they are valued members of a team, and have purpose, positive outcomes abound.

The multiple iterations of EDREs and collective training provided opportunities to experiment with different ways to employ organic equipment to become better prepared for large-scale combat operations. Knowing the contemporary operating environment has persistent surveillance and increased lethality, a command post that is highly mobile is increasingly important. Therefore, 1-37AR looked for new opportunities beyond the traditional M1068 command track with a Modular Command Post System tent combination tied to a large command post node. What the battalion found was a shelter already existing within the GCSS-A supply system for $25,000 that can be installed on a Light Medium Tactical Vehicle within three hours. Then the battalion installed a 3kw generator and created a mobile capable command post.

Conclusion

The EUCOM rotational deployment presented an opportunity to build a cohesive team competent in combined arms warfighting tasks. The Lead, Maintain, Train framework allowed the battalion commander to provide clear guidance for the staff to resource and companies to execute. Employment of the 8 Soldier Protective Factors and H2F cadre built more healthy Soldiers and created opportunities to build

positive relationships and memories through shared experiences.

The employment of routine Staff Assisted Visits inspecting and enforcing CSDP and CMDP created a culture of ownership and responsibility for property and equipment. With better property accountability, maintenance, and resourcing of parts higher quality training was achieved. Because the equipment was FMC, Soldiers received training of greater value enabling experimentation like different command post configurations. The use of the Lead, Maintain, Train framework helped 1-37AR to leave EUCOM better.

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Notes

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[6] 23-06-784-holistic-health-and-fitness-handbook-jun-23-public-release-1.pdf (army.mil)

[7] 21-19 - Mastering the Fundamentals | Article | The United States Army

Acronym Quick-Scan

AAR – after-action review
ABCT – armored brigade combat team
ADP – Army doctrine publication
AOR – area of responsibility
CMDP – Command Maintenance Discipline Programs
CSDP – Command Supply Discipline Programs
EDRE – Emergency Deployment Readiness Exercise
EUCOM – U.S. Army European Command
FM – field manual
FMC – fully mission capable
FSC – forward support company
LFX – live fire exercise
LOE – line of effort
MET – mission essential task
METL – mission essential tasks list
PT – physical training
SAV – staff assistance visit
SBCT – Stryker brigade combat team
TLP – troop leading procedures
UMT – unit ministry team

Production Control: Way to Prioritize Maintenance in Armor Battalion

by LTC Michael D. Hebert, MAJ Grant P. Roberts, CW4 Wes Leach, and CPT Colleen Talbott

It is well known the National Training Center (NTC) can challenge and stress maintenance and sustainment systems. Following a rigorous training cycle 1st Battalion, 68th Armor Regiment left Fort Irwin with three of 29 tanks operational and zero of 18 Bradley fighting vehicles operational. It was late November and 3rd Armored Brigade Combat Team (ABCT) was scheduled to begin outload operations in January. In six working weeks, the battalion rebuilt the operational readiness (OR) rate to 79 percent and drove 37 of 47 combat platforms (under their own power) from the motor pool to the railhead.

During the subsequent deployment to the U.S. European Command area of operations, the battalion maintained a readiness rate of 77 percent or better throughout the deployment. This statistic includes 30 days of Field Operations. This was despite a national (federal) budget funding deficit for the first quarter and being at the end of the supply line as a standalone battalion. After NTC Rotation 24-02 the battalion maintenance program needed some additional rigor. That rigor came in the form of a meeting observed in the adjacent aviation brigade: The production control meeting (PCM) and the plan methodology (problem, people, parts, time, tools, and training or P4T3).

Production control, ABCT maintenance

Maintenance is important in any formation, but it is especially vital in both aviation and armor units. For years, Army aviators have adhered to the P4T3 methodology to ensure their equipment is maintained to the highest standard. Prior to NTC, the concept of executing a PCM had been discussed inside the battalion. However, many ground units are reluctant to adopt the PCM, as it seems cumbersome and impossible to accomplish. One issue that arose is the difference between the amount of support personnel assigned to aviation units compared to those assigned to an armored unit. For example, assets available at the aviation squadron/battalion level differs from those of a combined arms battalion (CAB). If you ever sit in an aviation PCM, you'll be surrounded by chief warrant officers, military occupational specialty (MOS) 92Y, Unit Supply Specialists; and field service representative (FSR) liaisons. On the other hand, a CAB has one maintenance warrant officer and limited habitual direct support from FSRs. And that's okay. The PCM and P4T3 is still a framework that CABs can use to prioritize the assets you do have.

The PCM was developed over time, after attending a few aviation PCM's with the 6th Squadron, 17th Air Cavalry Regiment and using Army Techniques Publication (ATP) 3-04.7, ***Army Aviation Maintenance*** as a guide. The 1-68 Armor trained company executive officers (XOs) were to brief their status of equipment using the P4T3 model. Briefers were trained to cut to the point quicker by describing the P4T3 challenges directly as opposed to briefing all seven steps individually.

There was a lot of maintenance to be done, with limited crews and mechanics to do it all. Over time, the PCM allowed a daily touch point for commander priorities, that provided troops to tasks, and job prioritization that previously had been overwhelming. The focus enabled field maintenance teams (FMTs) and the maintenance platoon to apply themselves to directed maintenance priorities based on parts, people, and tools available. The PCM also armed the battalion leadership with accurate projections for daily maintenance expectations.

The PCM is now executed four days a week (Tuesday-Friday). This 30-minute or less meeting produces daily maintenance priorities and troops to tasks. This is now the most important meeting in the battalion and ensures the fleet receives the appropriate attention. Executing a PCM 30 minutes prior to the duty day, commanders (CDRs) or XOs brief planned jobs. Support shops/sections back-brief planned jobs to confirm priority. This immediate feedback and direct coordination lead to an increase in OR rate, decreasing time equipment spent non-mission capable by roughly 30 percent across the battalion. The ability to address any of the seven areas in that meeting and alleviate issues allowed for a shared understanding and "ownership" of who would remedy the gaps in assets or support. This reduced the "3-foot wall" and helps operators and mechanics understand most issues could be resolved the same day. Overall, there is a better understanding in troubleshooting and maintenance actions directly correlating to increases in readiness.

After a few months, the PCM could be conducted in as little as 20 minutes. The XOs sought maintenance resolution through cross talk, preventing issues from becoming larger problems and/or delays. With direct involvement and enforcement from the battalion command team, the companies were able to overcome hurdles and continue towards getting equipment ready to fight. The ability to conduct a quick, precise, and worthwhile meeting also allowed for the battalion command team to brief more accurate readiness pictures to higher by ensuring all obstacles were addressed and plans were in place to repair equipment as efficiently as possible.

Production control meeting

The PCM is chaired by the battalion CDR or XO. Companies are represented

by their CDR or XO and the FMT chief. The meeting is supported by the battalion maintenance tech, battalion maintenance officer, and the team leads for base maintenance, search and recovery, armament, and shop office. If the battalion has other maintenance support assets, they should also attend and follow suit with the maintenance team leads.

The meeting begins with opening comments from the chair, then quickly moves to the companies to brief their slant (operational readiness rate) then

This check served as confirmation the team was ready to work and complete the job. After each of the companies completes its brief, the support elements back brief the priorities and confirm for shared understanding. This critical step that was previously missed in battalion maintenance meetings, since support elements were generally there in a more passive receive role. The PCM gives them an active role and forces communication between line companies and the battalion support sections. Figure 1 below is the agenda and meeting framework for the PCM.

unit welder averaged one weld job a week. Previously the lack of priorities and oversight of the welder workload was a blind spot in the maintenance program. Following the introduction of the PCM the unit welder completed anywhere from 10-15 jobs a week.

Plan methodology

The plan methodology is well discussed in Army aviation. Chuck Brown's article, "P4T3 Supporting 'Ready Now' Maintenance"[1] and resident experiences provide the maintenance team with the tools to ensure conditions were set

Agenda		
ACTION	REPRESENTATIVE(S)	SUPPORT ACTION
Opening Comments	BN CDR, BN XO, BMT, BMO, MCO, MCS	Acknowledge
Company Brief (in sequence specified at start)		
Slant Brief	CO CDR or XO	Acknowledge/record
Bumper Number and Priority		
Plan: Problem, People, Parts, Time, Tools	CO CDR or XO	Provide People, Time, and Tools
Repeat as necessary		
Support Back Brief		
Back brief, support requirements / priority, people, time, tools	Base Maintenance	Company Confirmation
Back brief, support requirements / priority, people, time, tools	S&R	Company Confirmation
Back brief, support requirements / priority, people, time, tools	Armament	Company Confirmation
Back brief, support requirements / priority, people, time, tools	Shop Office	Company Confirmation
Close		
Alibies	Companies in sequence	Acknowledge
	Supporting Elements	
Closing Comments	BN CDR, BN XO, BMT, BMO, MCO, MCS	

Figure 1. PCM Agenda & Meeting Framework *(U.S. Army)*

priority jobs by bumper number. While briefing priority jobs, the P4T3 method is used to confirm that all resources and assets are in place to complete the job. This is repeated for each of the jobs planned for that day. Expeditionary maintenance can be chaotic. Finding available special tools or a part that just came off the logistics package can derail the maintenance team for hours.

One of the most immediate impacts from the PCM was the dedication of battalion support elements (weld support, wheeled mechanics, light track mechanics, M88s, etc.) to the application of the meeting's outputs. One example of tangible feedback following the implementation of the PCM is the number of weld jobs the battalion completed. Prior to NTC 24-02, the

to begin a specific job. The methodology develops the plan by identifying the problem, people, parts, time, tools, training required.

Figure 2 is a worksheet made to allow operators, mechanics, and leaders to develop their plan. Once the worksheet is completed, it can be provided from the platoon leadership to the company to prioritize jobs and brief

Plan Methodology (P4T3) Worksheet					
"Plan" Brief Format					
Bumper Number:		Company Priority:		Nom:	
PL:					
PSG:					
Problem					
People	1				
	2				
	3				
	4				
Supervisor/QAQC					
Parts	NSN	Part#	NOM	QTY	O/H
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
Time	How much time is required to complete the maintenance action?				
	Estimate:				
	Is there sufficient time, free of distractions to affect the repair?				
	Yes / No	Remarks:			
Tools	Special Tools:				
	Additional Required Tools				

Plan Methodology (P4T3)
"Plan" Brief Explained
Complete admin data for reference and accountability
Describe the problem. A maintenance event or problem must be identified.
Identify the people for accountability. Maintenance managers will assess available resources who are adequately trained to conduct maintenance.
Parts. Before performing maintenance, personnel should verify that they have the correct type and quantity of parts. Parts assessments are necessary to determine what is requred and available to correct deficiencies. If parts are not available a request for necessary parts/components must be processed immediately.
Time. For the maintenance manager, time is critical to mission accomplishment. Maintenance managers must accurately evaluate time constraints when determining if there is sufficient time available for the action.
Tools. Supervisors must identify the tools required to do a job and make sure they are on-hand, serviceable, and if required, calibrated. Leaders must educate themselves on different tools and enforce TM/TB standards.

Figure 2. Plan Methodology (P4T3) Worksheet. *(U.S. Army)*

higher headquarters. If the plan is incomplete, additional resources must be provided before the job can be started. A complete plan means the job is ready to action.

Strict adherence to the P4T3 briefing methodology is critical to keeping the meeting productive and concise. However, support elements/sections include in their back briefs an additional outline of jobs their subordinate teams are executing to ensure the whole team is used effectively. Example, Team 1 is supporting an Infantry Fighting Vehicle with an M88 Recovery Track, Team 2 is processing recoverable parts for turn in, and Team 3 is conducting annual services on two Light Track Vehicles. This shows us that Team 2 could be used more effectively on another job. This additional step helps drill down to the individual Soldier for troops to tasks and efficiency. Recommend adding that in as an additional step. Keep the companies to the P4T3 style briefing and shared sections brief P4T3 based on teams available.

Conclusion

The production control meeting is not exclusive to aviation formations. The PCM is widely applicable and can be used at the battalion and company levels to help organizations prioritize and manage maintenance programs. There is only one way to eat an elephant: one bite at a time. For the 1-68 Armor, the PCM allowed company FMTs to take small bites out of a major maintenance problem, and it established a means to manage jobs in a fast-paced ABCT operations tempo. The P4T3

methodology provided a framework to brief maintenance priorities and confirm conditions are set prior to each duty day. Implementing these practices across the battalion enabled positive organizational change in maintenance and readiness.

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CW4 Wes Leach is a U.S. Army chief warrant ordanace officer currently serving as the battalion maintenance tech, 1-68 Armor, 3rd ABCT, 4th Infantry Division, Fort Carson, CO. His previous assignments include automotive warrant officer, 1-68 Armor; senior ordnance ground maintenance warrant officer, 1-2 Stryker Brigade Combat Team (SBCT); automotive warrant officer, 23rd Brigade Engineer Battalion, 1-2 SBCT; automotive warrant officer, 3rd Battalion, 13th Field Artillery Regiment; and automotive warrant officer, 709th Military Police Battalion. CW4 Leach's military schools include Intermediate Level Education (formal education program for mid-career U.S. Army officers. It's a required part of the Command and General Staff Officer Course), Fort Rucker AL; Warrant Officer Advanced Course, Fort Gregg-Adams, VA. He has a bachelor's of science degree from Embry Riddle Aeronautical University.

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Notes

[1] Chuck Brown, "P4T3 Supporting 'Ready Now' Maintenance" (Flightfax, 2019) https://safety.army.mil/Portals/0/Documents/ON-DUTY/AVIATION/FLIGHTFAX/Standard/2019/Flightfax_78_June_2019.pdf.

Acronym Quick-Scan

ABCT – armored brigade combat team
CAB – combined arms battalion
CDR – commander
FMT – field maintenance team
FSR – field service representative
P4T3 – problem, people, parts, time, tools, and training
PCM – production control meeting
NTC – National Training Center
XO – executive officer

"Sharing knowledge and experience is the greatest legacy that you can leave to subordinates."

- Chief of Staff of the Army GEN Carl E. Vuono (1987)

Employment of sUAS: Enhancing Maneuver Training Experience and Preparing Armor Officers for Future Capability, Threats

By MAJ Matthew L. Simon

Ahead of an attack, a U.S. tank platoon approaches its assault position and establishes a coil. The platoon leader orders her loader to "deploy drone." Without climbing out of his hatch, the loader turns on a handheld, small unmanned aerial system (sUAS) and places it on the turret in front of him. As the handheld controller syncs to the sUAS, he quickly launches the aircraft into the sky, and it loiters 100 feet above the platoon. The loader presses the joystick forward with ease and advances the sUAS towards the objective where it is believed three enemy tanks are established in battle positions, awaiting the attack. The platoon leader leans over the shoulder of the loader, watching as the sUAS disappears beyond the tree line a few kilometers forward and above the objective. The sUAS provides instant video feedback to the platoon leader, confirming the exact location of three tanks. The platoon leader excitedly keys the radio and says, "drone confirms enemy most dangerous course of action, change direction of attack, move to phase line red, platoon online, assault through the objective." As the tanks begin to uncoil, the loader presses a single button on the controller, placing the sUAS in "follow mode." As the platoon converges onto the objective, the sUAS follows along, recording the attack in real time.

The platoon successfully engages the enemy tanks and reaches their limit of advance. As the platoon consolidates and reorganizes, the loader guides the sUAS down from the sky and in a matter of minutes, the device is safely stowed and ready to be employed again in support of follow-on operations. Suddenly, a crackled voice comes over the radio "gas, gas, gas!" The platoon leader scans right and sees a plume of yellow smoke engulfing the bravo section tanks 75 meters away. Hovering above the section is an enemy sUAS that dropped a chemical munition overtop of the platoon. As the tank crews scramble to withdrawal out of the contaminated area, the enemy sUAS becomes more aggressive, moving quickly between the platoon's tanks as if ready to drive itself directly into a tank. The sound of artillery is heard around the tank platoon, likely being observed by the fanatical enemy sUAS.

Figure 1. SFC Christopher Bane, instructor for the ABOLC "Ten Day War", operate a sUAS dismounted whlie in support of ABOLC Class 24-001. *(U.S. Army Photo by MAJ Matt Simon)*

This is not an imaginary scenario, but an example of experimental sUAS tasks developed by instructors and executed by students of the Armor Basic Officer Leader Course's (ABOLC) 2nd Squadron, 16th Cavalry Regiment, 199th Infantry Brigade, at Fort Benning, GA.

Introduction

sUAS are shaping operational environments (OEs) across the globe. With the combination of blue list and commercial off the shelf solutions, the American Soldier, allies, partners, and adversaries alike, can employ sUAS, with simplicity, to fulfill a variety of ground combat roles. From sensor, observer, communicator, deceiver, to shooter, sUAS can be leveraged to provide both traditional and innovative solutions. As sUAS technology becomes increasingly simpler to operate and more cost effective to procure, it will likely become a weapon or capability as common and accessible as the rifle.

Based on observations from the Russian-Ukraine War, ABOLC incorporated several lessons learned on the employment of sUAS into all facets of the program of instruction (POI). ABOLC has gone so far as to update course lesson plans as part of its fiscal year 2025 POI review.

Lesson plan development

During the introductory phase of training, ABOLC students in Hawk Troop received an sUAS orientation during land navigation and practice the dismounted react to unmanned aircraft system battle drill. During the tactics phase, Iron Horse Troop required all students to account for sUAS in all operations orders. In addition to sUAS, ABOLC leverages the Combined Arms Integration Division for cyber and electromagnetic activities and space expertise to ensure students gain knowledge and perspective on what it takes to fight and win in all domains. Based on the sUAS type, capability, and employment techniques, there is a potential convergent point across land, air, space, cyberspace, and electromagnetic domains that students must be prepared to encounter.

During preparation week ahead of the "10 Day War" (ABOLCs culminating training exercise for Armor lieutenants), instructors of Iron Horse Troop provide video and imagery taken via sUAS from operational environments (OEs) and from previous classes to teach camouflaging techniques for personnel and equipment. These lessons are reinforced throughout the field exercise, particularly during tactical assembly area operations. In addition to sUAS integration, students are taught skills to reduce their electromagnetic signature and account for other methods of communication in the event their tactical radios are jammed. Of note, students are not permitted to have access to cellular devices, GPS devices, or smart watches for the duration of training. With an increased use of sUAS and the reduction in the use of devices that omit electromagnetic signature, students are learning to balance the right capability and tools to achieve mission success while enabling survivability.

Figure 2. SFC Dustin West, Instructor for the ABOLC "Ten Day War", operates a sUAS from the turret of a M1A2 SEP Main Battle Tank while in support of ABOLC Class 24-001. *(Still image from video taken by SFC Dustin West)*

Student employment techniques

In addition to conducting the platoon react to unmanned aircraft system while mounted battle drill during the 10-Day War, students employ sUAS in the following ways to support mission execution:

- Instructors provide a traditional role of reconnaissance to confirm/deny enemy most probable and most dangerous courses of action while students are in the defense. Emphasis is placed on ensuring sUAS is in a direct support role to the platoon, whereas in past training environments, conflicts, or theaters of operation, it was more common for this asset to only be available at the company or above level. Students must communicate directly with the sUAS operator via tactical radio to provide clear priority intelligence requirements and reconnaissance tasks while the sUAS remains "on station."

- Instructors riding with students in the loader's station of the tank, employ sUAS from the turret while the platoon is in the offense. This allows the attacking platoon leader to confirm opposing force plans on the move, observe and employ notional indirect fire as needed, and then retrieve the sUAS at the end of the attack.

- Students request the employment of smoke to provide obscuration during offensive operations. sUAS operators tether M83 white smoke training aids and activate prior to launching along a designated avenue of approach.

- Recorded video is used as part of the after-action review process to reinforce good and bad tactics or techniques.

- Soon, ABOLC will explore options to employ sUAS as a notional lethal munition against OPFOR. Additionally, ways to replicate counter sUAS with notional non-lethal effects for students are being considered.

Figure 3. SSG Tanner Leigh provides a survivability and camouflaging block of instruction to Class 24-001 to prepare both personnel and equipment to avoid detection from sUAS druing the Ten-Day War. *(Photo by MAJ Matt Simon)*

OPFOR employment techniques

- Instructors use sUAS to find friendly positions, validate proper camouflaging techniques, and conduct disruption operations to force students to react to sUAS at the individual through platoon level.

- Instructors employ a pay load system to drop M18 yellow smoke training aids to replicate chemical, biological, radiological, and nuclear attacks against stationary positions and moving formations.

- Instructors employ a payload system to drop water ballons onto tanks to replicate the employment of lethal munitions.

Current capabilities, future requirements

Equipment on hand. Instructors currently employ at least four different types of manufactured sUAS models in support of ABOLC. Foreign made sUAS are configured to use modified handheld controls so that COTS equipment is not connected to U.S. Army networks or data systems to mitigate concerns of adversarial compromise, but it limits the ability to receive software upgrades provided by manufacturers.

Certified operators. There are currently seven sUAS certified instructors (and growing) within 2-16 Cavalry, and on average ABOLC logs 15 to 28 hours of flight time for about 11-13 days of training per class. The objective is to increase training and equipment on hand so that, at a minimum, there is a certified sUAS instructor and at least one sUAS on hand for each tank within a platoon (24 total instructors and systems to support the "10-Day War").

Future requirements. As a future operational requirement, the U.S. Army should assess the feasibility of building redundancy in the employment of sUAS on mounted platforms (loader, vehicle commander, and gunner stations). In terms of simulated and live fire training, the U.S. Army should explore how to replicate sUAS threats during crew qualification and collective live fire tables (e.g., simulators like the Advanced Gunnery Training System, range targets, and multiple integrated laser engagement systems during situational training exercises).

Limitations and constraints

Air Space Management. ABOLC must open air space 30 minutes prior to employing a sUAS and inform Fort Benning Range Operations of "wheels up" and "wheels down" times and the number of sorties launched. On average, the approved altitude ceiling for sUAS is 500 to 1,000 feet. Although this limitation may be exclusive to training environments (Federal Aviation Administration owned airspace), the U.S. Army must approach the use of sUAS like the employment of a direct fire weapon system, rather than as an aircraft. This will provide ground force commanders more flexibility in its employment, particularly when operations may necessitate multiple sUAS performing a wide range of tasks all at once. Delegating management down to the ground level will also improve the development of direct fire control measures and allow leaders to account for surface danger zones if sUAS is used as a lethal munition.

Weather. High winds, rain and fog continue to have adverse effects on the employment of sUAS. The lighter the platform, the more challenging it can be to effectively employ systems which may cause damage to equipment or personnel. As with any capability, students learn to employ the right tool, for the right job, at the right time and may need to assume risk of loss, damage, or destruction of sUAS when employed in less-than-optimal conditions.

Training. It requires four days to certify instructors to employ sUAS at Fort Benning. With the simplification of new sUAS technology, training can and should be reduced to a single day. The U.S. Army should approach operator certification like that of the Integrated Weapons Training Strategy. Developing qualification tables with quantifiable metrics will ensure Soldiers are trained and proficient to employ sUAS to achieve a variety of tasks. The U.S. Army should re-look master sUAS requirements and empower training and usage to the lowest level to increase use and familiarization.

Procurement. The U.S. Army must keep pace with commercial sUAS technology to make systems cost effective and readily accessible. Currently, ABOLC, through a red tape cutting Maneuver of Center Excellence policy, is authorized to purchase COTS sUAS to support training. Access to industry has amplified innovation and the effects leveraged in training. The U.S. Army issued system, however, is cumbersome, expensive, and difficult to repair or replace when damaged. It is also unable to provide a payload capability.

Sustainment. A consistent, dedicated sUAS budget to repair or replace systems, coupled with accessibility to a three-dimensional printer to fabricate parts will only increase flight hours and employment effects.

Conclusion

Employment of sUAS in training drives innovation, replicates emerging threats in the OE, and adds combat stress and complexity at low cost. The experimental sUAS tasks developed by ABOLC instructors ensure Armor lieutenants arrive to their first units of assignment better prepared to share their institutional level experiences with sUAS across the force, better integrate systems, capabilities, and account for the breadth and depth of their assigned areas of operation.

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Acronym Quick-Scan

ABOLC – Armor Basic Officer Leader Course
OE – operational environment
POI – program of instruction
sUAS – small unmanned aerial system

Figure 4. U.S. Soldiers assigned to the Joint Multination Readiness Center (JMRC), operates a drone during a Small Unmanned Aircraft System (sUAS) Validation Lane. *(U.S. Army Photo by CPL Nicko Bryant Jr.)*

ROK-US Combined Division: How Fighting Together Enables 2nd Infantry Division

by LTC Brennan Speakes, LTC Jared Ferguson, MAJ Ian Murdoch, MAJ Seohyun Park, MAJ Bradley Rager, MAJ Wesley Mooseman

The U.S. Army's Mission Command Training Program "supports the collective training of Army units as directed by the Chief of Staff of the Army" through the execution of its Warfighter Exercise (WFX) scenario.[1] As the premier training event for division and above formations, the WFX provides opportunities to stress and train units across the six warfighting functions. However, the 2nd Infantry Division must contend with another challenge in its operational environment that the Mission Command Training Program does not replicate but the nature of the Korean Theater of Operations (KTO) demands.

The Indianhead Division is the only combined division in the U.S. Army since it has members of the Republic of Korea (ROK) Army serving and working directly with their U.S. counterparts. Moreover, the U.S. and Korean armies appropriately refer to the division as the 2nd Infantry Division/ROK-U.S. Combined Division (2ID/RUCD). The combined nature of 2ID/RUCD enabled the division to successfully execute WFX 24-2 by creating mutual understanding between the two armies, ensuring a unity of purpose and action throughout operations. This enhanced the division's ability to:

- Conduct timely intelligence operations.
- Execute a responsive, combined targeting process
- Prioritize protected assets obligatory to division wet gap crossing operations
- Conduct a forward passage of lines with a foreign military under enemy contact

2ID/RUCD's combined staff coordinates actions in post-Korean War armistice conditions and is well-rehearsed in working together to achieve operational objectives. During the WFX, the combined staff's unique nature was vital to the division's success. ROK Army operations, logistics, signal, protection, intelligence officers, and non-commissioned officers (NCOs) enabled 2ID/RUCD to make decisions rapidly. While exploring options for adjusting the battlefield framework, the division staff was able to coordinate simultaneously with both the ROK Army and U.S. Army headquarters to develop coordination measures and synchronize actions immediately. The staff's integration surpassed traditional habitual relationships and united the team's purpose in meeting the commander's intent. 2ID/RUCD demonstrated a substantial

Figure 1. MG Taylor, 2ID/RUCD CG briefs GEN Park, Chief of Staff of the ROK Army and GEN Kang, Deputy Commander, South Korea/U.S. Combined Forces Command. *(U.S. Army Photo by 2ID/RUCD PAO)*

unity of purpose and effort within the intelligence warfighting function.

Intelligence operations

Intelligence operations in a combined staff are highly challenging, given the different security requirements and national caveats when working with foreign militaries. Throughout WFX 24-2, the combined intelligence section (C-2) capitalized on those differences. It used the strengths of both nations, most notably in intelligence support to targeting, situational awareness, and support to the rapid decision-making synchronization process (RDSP).

The intelligence warfighting function within the U.S. Army forces decision-point tactics, while the ROK Army is more detail-oriented. Within intelligence support to targeting, this resulted in the balance of providing the commander with the relevant analysis required to target capabilities while providing a high level of detail. This ultimately contributed to an effective targeting process that removed threat capabilities from the battlefield. The U.S. Army's emphasis on decision-point tactics and the ROK Army's detailed analysis enabled the commander to understand how the high-payoff target list shaped the enemy, allowing resources to be focused effectively.

Analysts process massive amounts of data within the U.S. intelligence enterprise through the various sensors and reporting mechanisms. During large-scale combat operations, vast data and information can be challenging to synthesize into a suitable format for the commander's situational awareness. The ROK Army has the reverse problem and needs help generating enough reporting to create a solid picture. Once again, the two intelligence backgrounds created a situation that complimented the strength of both sides. U.S. forces were able to collect the necessary data, while ROK intelligence officers rapidly processed that data and created a format easily interpreted by the commander for situational awareness.

Finally, through RDSP, intelligence Soldiers from both armies worked closely to generate products useful at all echelons of command rapidly. The ROK Army doctrinally works on a compressed timeline, and the U.S. Army is naturally flexible. Therefore, combining these approaches led to detailed planning products with minimal turnaround time, allowing the combined staff to publish detailed orders rapidly. The successful intelligence analysis enabled an in-depth targeting process and delivered lethal fires.

Lethal fires success

Applying lethal fires through fire control systems was one of 2ID/RUCD's most successful characteristics during WFX 24-2. The 2ID/RUCD is well-postured to conduct combined fires based on technical and organizational factors. ROK Army Fires officers and liaison officers (LNOs) from adjacent units on the Division staff provided organizational benefits to Fires planning and execution. For example, while conducting a forward passage of lines (FPOL) of the 2nd ROK Corps, the staff and LNOs were able to leverage 2nd Corps firing units early in the FPOL by establishing them in their position area artillery within 2ID/RUCD's area of operations. LNOs and ROK Army fires officers also leveraged adjacent unit fires assets into the Division Air-Tasking Order, facilitating the FPOL and enabling higher headquarters' mission. The uniquely combined nature of the 2ID/RUCD staff and the ability to work

Figure 2. MG Taylor, flanked by LTG (R) Terry Ferrell, provides his command guidance during the 2ID/RUCD ROC drill.
(U.S. Army Photo by 2ID/RUCD PAO)

Figure 3. An engineer briefs MG Taylor during the 2ID/RUCD ROC Drill. *(U.S. Army Photo by 2ID/RUCD PAO)*

closely with allied units at short notice and throughout the year has ensured 2ID/RUCD is capable of rapid, well-coordinated combined fires in any potential conflict. The firing units were critical to ensuring we had protection through the operational environment, and 2ID/RUCD leveraged them to support our protection.

Limited protection assets across the KTO dictated the refinement of the Protection Prioritized List to protect specific assets for specific durations. For instance, the multi-role bridging company bridges were critical for the division's wet-gap crossing. The division engineer cell's ROK officer was crucial to conducting the rapid analysis of where to cross these gaps. He used both U.S. and ROK Army geospatial assets to identify the critical bridges along with the requisite data, including the bridge length, seasonal river width, and probable water velocity, to facilitate the requirements to support the gap crossing sites. The data collected helped identify the necessary protection assets and key terrain required for the operation. His knowledge of the capabilities of the ROK Army formations was invaluable in preparing and conducting the FPOL with the 2nd ROK Corps, which was able to preposition critical air-defense assets. Without these assets, enemy forces would have been able to target and disrupt the FPOL's momentum and disrupt 2ID/RUCD operations.

The forward passage of units during combat is challenging enough between U.S. units. Its complex nature and detailed planning require a common understanding at the lowest level possible. This challenge is made more difficult during combined operations. A common understanding of roles, responsibilities, and control measures is paramount to maintaining tempo and mitigating risks. 2ID/RUCD effectively conducted an FPOL by quickly understanding the problem and developing a solution utilizing the relationships across the combined staff.

During WFX 24-2, 2ID/RUCD planned and executed an FPOL between its organic forces and the 2nd ROK Corps in a time-constrained environment under enemy contact. The combined nature of this FPOL required a detailed understanding of each headquarters' disposition and operations. The division further identified issues from the difference between the U.S. and ROK Armies' doctrinal approaches to the passage of lines. Likewise, 2ID/RUCD's passing of a more extensive, non-U.S. higher headquarters created uncertainty in command and support relationships. The nature of 2ID/RUCD's combined staff allowed it to rapidly integrate headquarters' operations due to its standing relationships with the adjacent ROK units.

Early integration

2ID/RUCD leveraged its combined U.S.-ROK staff by integrating the 2nd ROK Corps early in the planning process. 2ID/RUCD planners previously developed an FPOL operational framework and concept as a sequel plan, which enabled the division to leverage previous work to establish a common understanding. The 2nd ROK Corps provided its planned scheme of maneuver, enabling 2ID/RUCD to adjust its graphic control and fire support coordination measures to facilitate 2nd ROK Corps' future operations. This common framework enabled discussions on roles, responsibilities, and command relationships between each headquarters.

Similarly, 2ID/RUCD was able to organize its command posts to support the FPOL effectively, leading to greater situational awareness and understanding across both headquarters. Therefore, 2ID/RUCD was able to tailor its schemes of support across the

Figure 4. MAJ Kim briefs 2ID/RUCD Leadership during the 2ID/RUCD Targeting Meeting during the division WFX. *(U.S. Army Photo by 2ID/RUCD PAO)*

warfighting functions to enable the passage of lines. Planners were able to bridge the concepts between U.S. and ROK doctrine to develop acceptable and feasible schemes and relationships. 2ID/RUCD's scheme of collection and fires was essential to shape the 2nd ROK Corps' follow-on operations. 2ID/RUCD and 2nd ROK Corps identified and agreed on triggers using doctrinal considerations for the transition of command and support relationships between 2ID/RUCD and 2nd ROK Corps. These were critical in supporting the passage of lines and allowing both formations to maintain momentum throughout the operation.

Figure 5. MAJ Athanasopoulous, the 2ndID/RUCD DIV Aviation Officer, Discusses targeting with MAJ Hudson during the WFX. *(U.S. Army Photo by 2ID/RUCD PAO)*

Conclusion

2023 marked seven decades since the end of combat operations in the Korean War. More importantly, however, it marks 70 years of a ROK/U.S. alliance that remains strong today. The Korean phrase, "katchi kapshida," or "we go together," captures that alliance's strength. The relevant and robust term exemplifies today's U.S./ROK relationship and served as an edict for 2ID/RUCD's WFX.

The combined nature of 2ID/RUCD enabled the division to successfully execute WFX 24-2 by creating mutual understanding between the two militaries and ensuring a unity of purpose and action throughout operations. This enhanced the division's ability to conduct combined large-scale combat operations. As a ROK planner on the 2ID/RUCD staff described it: although we wear different uniforms, the two staffs have developed an understanding and respect for one another, allowing our armies to overcome tactical and doctrinal differences and build trust as teammates. This respect further solidifies the U.S./ROK alliance.

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LTC Jared N Ferguson is the assistant chief of staff G-2, 2ID/RUCD. His previous assignments include professor of military science, North Dakota State University; operations officer (S-3), 650th Military Intelligence Group; brigade intelligence Observer/Coach/Trainer, Joint Multinational Readiness Center; S-2, 3rd Brigade Combat Team (BCT), 82nd Airborne Division; and battalion assistant intelligence officer (AS2), 4th BCT, 1st Infantry Division. LTC Ferguson's military schools include the Command and General Staff College, Fort Leavenworth, KS; Military Intelligence Captains Career Course, Fort Huachuca, AZ; Maneuver Captain's Career Course, Fort Benning, GA; U.S. Army Ranger Course, Fort Benning; and Infantry Officer Basic Course (now known as Infantry Basic Officer Leader Course), Fort Benning. He has a bachelor's of arts degree in history from the University of Wisconsin-Stevens Point and a master's of science degree in international relations from Troy University.

MAJ Ian A. Murdoch is a C-5 planner, 2ID/RUCD, Camp Humphreys, Republic of Korea. His previous assignments include brigade chief of operations (S-3), 516th Theater Signal Brigade, Fort Shafter, HI; battalion assistant S-3, 307th Expeditionary Signal Battalion-Enhanced, Helemano Military Reservation, HI; deputy chief of operations, United Nations Command Military Armistice Commission, Camp Humphreys, ROK; battalion S-6, 3rd Battalion, 15th Infantry Regiment, Fort Stewart, GA; and squadron S-4, 4th Squadron, 10th U.S. Cavalry Regiment, Fort Carson, CO. MAJ Murdoch's military schools include the Maritime Advanced Warfighting School, College of Naval Command and Staff, the Battalion S-6 Course, Signal Captain's Career Course, Army Reconnaissance Course, Armor Basic Officer Leader Course. He has a bachelor's of science degree in biology from Virginia Polytechnic Institute and University and a master's of arts degree in defense and strategic studies from the U.S. Naval War College.

Figure 6. MAJ Kim briefs 2ID/RUCD Leadership during the 2ID/RUCD Targeting Meeting during the division WFX. *(U.S. Army Photo by 2ID/RUCD PAO)*

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Notes

[1]"Mission Command Training Program (MCTP) | US Army Combined Arms Center," accessed Dec. 2, 2023, https://usacac.army.mil/organizations/cact/mctp.

Acronym Quick-Scan

2ID/RUCD – 2nd Infantry Division/ROK-U.S. Combined Division
FPOL – forward passage of lines
KTO – Korean Theater of Operations
LNO – liaison officers
NCO – non-commissioned officer
RDSP – rapid decision-making synchronization process
ROK – Republic of Korea
WFX – Warfighter Exercise

Tanks Designed for Urban Combat

Image 1. U.S. Army M1 Abrams tanks maneuver in the streets in the city of Tal Afar, Iraq, Feb 3, 2005. *(By Staff Sgt. Aaron Allmon)*

by Michael McCabe

Traditionally, tanks are seen as being at an inherent disadvantage in urban combat. In the 21st Century, however, the U.S. military must be prepared for urban combat in large, densely populated cities. The Army would do well to introduce heavy infantry divisions for this task, and these divisions will need armored cavalry for scouting, escort duty, and fire support. Developing a tank specifically for urban terrain will therefore be necessary, both for practical and doctrinal reasons.

A tank designed for urban terrain would have radically different design requirements than a main battle tank designed for open warfare. Main battle tanks rely primarily upon their speed and long-range firepower and are willing to sacrifice extra armor to retain mobility. In urban combat, however, the reverse is true: fights are at much closer ranges, mobility is measured by the ability to navigate sharp turns and tight/narrow streets, and speed can be sacrificed to retain maximum armor protection. Other unique requirements are the ability to shoot in multiple directions at once, shoot around 90-degree corners, increased importance on the ability to shoot at high and negative elevations, and designing the hull to carry cage armor and/or active protection systems. This article will go through these and other design principles for an urban tank, dividing them between "hard factors" which are easily measured, and "soft factors," which are less cut-and-dry. Soft factors are what war-winners excel at and will consequently be given more attention.

Hard factors

The first, most important, hard factor in an urban tank is its armor. Urban tanks will routinely fight at close range, and so every trick in the book will be necessary to ensure safety and survivability. Armor should be uniformly thick on the front, sides, and rear, since attacks from every angle are to be expected. A pentagon-shaped hull can offer the benefits of sloped armor and V-hulls for protection from mines. A slightly more complex alternative is an octagon-shaped hull, which can offer more angles and smaller flat surfaces for increased shot deflection. Additional armor modules, like cage armor and active protection systems, will not replace or reduce the hull armor's thickness, and the chassis must be designed to carry them all at once without overloading.

The second hard factor, relating directly to the first, is the vehicle's engine and mobility. Rather than being built for speed, a tank's engine will instead resemble a bulldozer engine. An urban tank will be a very heavy vehicle, and so a bulldozer-style engine will be capable of both handling the sheer weight of the vehicle and will allow the tank to overpower obstacles. Obstacle clearing must be an expected, routine occurrence for urban tanks, and the ability to smash through them and other man-made fortifications without requiring a separate armored bulldozer will be advantageous.[1]

The third hard factor is the tank's guns. An urban tank will use short-barreled guns, since longer barrels are difficult to maneuver in tight spaces and the tank is less likely to engage in long-range shooting. As a bonus, short-barreled guns are quicker to acquire targets.[2] High-elevation and negative-elevation shooting also benefits from this quicker target acquisition.

An urban tank would have a mixture of gun calibers for its main turret and side turrets/sponsons, since it will need to be capable of firing in multiple directions at once. Side turrets and sponsons will not necessarily require large-caliber guns, but they will require rapid-fire guns. These will often be fired around street/building corners and into buildings from the street to provide flanking fire in support of advancing infantry. Urban tanks may also incorporate a flamethrower in front. The flamethrower would be desirable for covering a tank's underbelly from attackers in spider holes, tunnel entrances such as manholes, and/or basement windows. It can also thwart attempts to drag mines into the tank's path and reduce ground-level enemy gun posi-

tions designed to provide grazing fire.

Soft factors

A major development in modern tank design is the unmanned turret. As mentioned before, urban tanks must expect enemy fire from multiple directions simultaneously, and thus would benefit from having multiple turrets like a 1920s tank[3] or a pre-dreadnought battleship. The 1920s designs were a failure because the turrets needed to be manned. Thus, they could not effectively balance the following needs:

- Armor protection
- Interior cubic volume for the men and the ammunition
- Ergonomics
- Accessibility for operation, reloading, and clearing jams
- Optics and fields of view
- Power supply
- Preventing the turrets from getting in each other's way

The advent of World War II also favored main battle tanks, which displaced the 1920s designs for the same reason dreadnoughts displaced pre-dreadnoughts: longer-range guns, better speed, etc.

Unmanned turrets, however, allow modern side turrets/sponsons to be much smaller and more compact than their 1920s ancestors, and keep the operators at a safe distance in the event of a direct hit and/or ammunition cook-off. Unmanned turrets can also be placed farther forward on the hull than manned turrets, since they weigh less and thus pose less risk of causing balance/center-of-gravity issues. Placing side turrets further forward, in turn, enables urban tanks to fire around 90-degree corners while exposing as little of its hull as possible. The controls for these would ideally be constructed like the A-10 Warthog's controls, with redundancy and mechanical backups for all automated systems.

A second soft factor design element is the inclusion of escape hatches on all sides and the rear of the tank, a move that necessitates placing the engine and side turrets/sponsons towards the front of the vehicle. These are not new concepts; the WW2-era Churchill[4] heavy tank had side exits, while rear exit doors are included in the design of the Israeli Merkava tank, itself a product of Israel's experiences in dense urban terrain. The logic behind them is simple: if the tank is knocked out, the crew will need escape hatch options in all directions, not just the top of the tank. Classic urban antitank tactics involve firing down onto the tank from above; while this will be less damaging to an urban tank than a main battle tank on account of its uniformly thick armor, limiting urban tankers to exiting via top hatches noticeably reduces their likelihood of escaping safely when bailing out under fire. This survivability need will also affect the design and employment of cage armor; cage armor designs must not block escape routes, and the escape routes must not widen the cage armor profile any more than is necessary. If the tank becomes too wide, then its usefulness in narrow streets declines rapidly.

Placing the engine in the vehicle's front, along with the flamethrower, side turrets, and sponsons, increases the safety of the crew from the fuel as well as the ammunition. The crew in the rear of the tank can be physically separated from the fuel tanks and ammunition by a protective thermal/blast-proof barrier and pilot the tank's weapons remotely. Placing the fuel tank in front instead of a driver or gunner also allows the front of the tank to be any shape; thus, the front can be a steeply sloped nose for maximum deflection of oncoming frontal or flank shots.

Visibility in urban terrain is another traditional difficulty for tanks. In addition to using the 360-degree cameras already available to M1 Abrams tanks, an urban tank would carry drones for reconnaissance. The 360-degree cameras can only provide ground-level vision, whereas drones can offer the commander a bird's-eye view and aid in spotting targets in high-rise buildings. These should be digitally linked, so that data can be shared in real time between tanks and commanders. Lateral communication is difficult in urban terrain, and anything which can ameliorate this should be incorporated.

Closing thoughts

Urban tanks will always be a niche role, but their niche will become more prevalent in a future war. Urban combat without the presence of armored vehicles is extremely hazardous to the infantryman, and the side which develops a purpose-built tank for urban combat will enjoy a marked advantage over one that continues to use main battle tanks. Many of the technological hindrances to developing such tanks in the past no longer exist, and it is no longer a matter of "if," but rather "when" these new tanks will appear on the battlefield.

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Notes

[1] Heavy Infantry Divisions would likely possess both armored bulldozers and urban tanks, as sappers and engineers have use for both.

[2] Stagecoaches in the Old West used sawed-off shotguns rather than full-barreled guns for this same reason.

[3] Many factors in the trench warfare of World War 1 are like those in urban combat: the terrain was linear, yet the battlefield was a 360-degree battlefield. An attacker could expect to be fired upon from multiple directions at once, defenses were arrayed in depth, etc. The 1920s tanks were designed for such scenarios.

[4] The Churchill tank was a heavy tank designed to maneuver in difficult terrain and survive intense fire. It offers an ideal starting point for an urban tank design.

Planning: Preventing Preventable Problems in Military Decision-Making Process

by Retired COL Esli Pitts

There I was, an Observer Coach/Trainer (O/C/T) in Hohenfels, Germany. It was cold and wet as the airborne infantry battalion's combined arms rehearsal ended. The mission was a night attack into an urban area, and the plan required four companies to follow the same route to the objective. Some companies set conditions for the attack while others acted on those conditions. The commander asked for any final questions.
One company commander asked for the order of march into the objective and the field grades looked at each other — how did we miss that?

They quickly devised a scheme and departed. Meanwhile, the four company commanders remained behind to discuss the other significant gaps in the plan and to carve up the objective in terms of direct fire planning and actions on the objective. None of this essential coordination made it higher, leaving the battalion's senior leaders in the dark about how the battalion would seize an urban objective at night (and, because this was Hohenfels), during a driving rainstorm.

Bad rehearsal? No. Bad planning. Let's talk about preventing preventable problems in detail and flexibility while using the full military decision-making process (MDMP).

Devil is in details

Our goal is to mature the plan from that single-page course of action (CoA) sketch to a complete order — within the allotted time. The plan must meet a certain threshold of detail to be successful. If the order lacks detail, leaders figure out a workaround or the mission fails. It's fine when we recognize those gaps early on, such as when the commander points out a shortcoming during the CoA briefing. But it gets progressively harder to come back. Hard questions during the confirmation- or back briefs are inconvenient but fixable. It is awkward when a commander asks a hard question about the plan's shortcomings while standing on the terrain model during the rehearsal, but we can still issue a fragmentary order (FRAGO). It's harder — but still possible — to overcome insufficient planning while in execution, but sometimes we only realize the plan's shortcomings when the O/C/T helpfully guides us through the after-action review (AAR). Figure 1 shows a conceptual depiction of an order's lifecycle with the necessary level of detail in green and the typical level of detail in red.

Conversely, the longer we plan, the more details we add — often unnecessarily — until we risk the reverse of insufficient details, which is excessive details, creating rigidity and a lack of flexibility. It's critical to success to plan the right details, in the right level of detail, not waste time on the wrong ones.

So, how do we build from a concept sketch to an appropriately detailed order using MDMP? The goal is a plan with sufficient detail to execute an operation but not to develop a plan that is so heavily detailed that it becomes inflexible or reliant on everything unfolding perfectly and fails if conditions change. We are talking about simple plans, with appropriate details for the essential elements.

Can't we just go with intent? *There I was, OC'ing (performing as observer/coach) for a British heavy battle group equipped with Challenger tanks and Warrior fighting vehicles. The commander's order consisted entirely of intent, and intent graphics. His two Challenger companies both violently*

Figure 1. Lifecycle of a Battalion Operation Order. *(U.S. Army Graphic)*

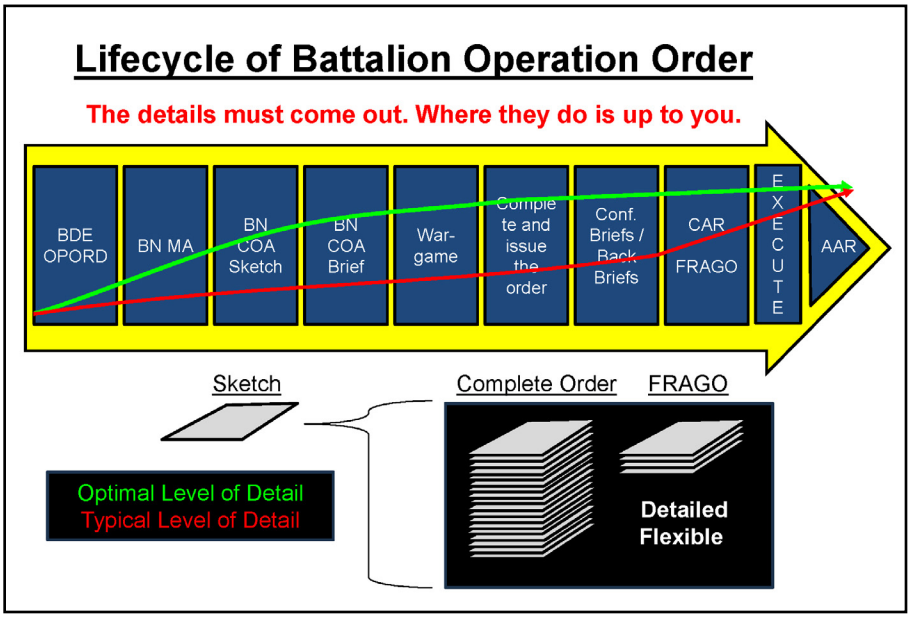

Figure 2. Raider Brigade conducts a combined arms rehearsal at the Joint Multinational Readiness Center. *(Photo by COL Esli Pitts)*

attacked within his intent but, lacking the details of a complete plan, it was unsynchronized. The two tank companies attacked on a wide frontage, without mutual support, and on a timeline that allowed the enemy to sequentially defeat both. The predictable result was the failure to penetrate the defense with piecemeal destruction of the tank companies followed by the commitment and subsequent destruction of the mechanized infantry. Afterwards, this commander was surprised to find out that the British Army's planning doctrine differentiated between intent graphics and operations graphics (just like we do). ***We MUST enable intent through sufficient details.***

Despite my examples, we usually do a pretty good job setting up the maneuver plan and integrating indirect fires. But we don't always plan the other warfighting functions to a similar level of detail.

Wait; doesn't a high degree of proficiency in battle drills lessen the need for detailed planning? Yes — if you are a platoon or even company.

Everything a platoon does from the assembly area to the objective is a drill, whether uncoiling, support by fire, actions on contact, a change of formation, emergency resupply, or platoon assault. The leader's job in planning is largely determining the series of drills that comprise the plan and where they will happen. In execution, the leader's job is to execute that planned flow of drills and, when circumstances change, select the best drills in response. Platoons should be masters of drills.

Companies are like platoons, but the commander writes an order that sequences platoon actions, and plans to have them in the right places, in the right order, to achieve the company's mission, while weaving in elements of the warfighting functions.

Battalions' orders establish where and when the actions of the companies, or any element under battalion control, will occur. The plan deconflicts how and where companies tie in with each other, while also integrating the battalion's operation within the complex framework of brigade's shaping efforts, adjacent units, and follow-on forces. The battalion accounts for sequencing, conditions to be set, triggers for execution, tasks and purposes, and associated graphics, across all warfighting functions. Said another way, the details.

So, why don't we plan with appropriate detail? Here are some indicators you might see in your next unit.

Uninvolved commander: Commanders are the most experienced people in their formation. However, they are often absent from planning, and they are not necessarily experienced in THIS kind of formation, THIS kind of terrain, or THIS kind of mission.

Insufficient commander's planning guidance: the doctrine says commanders should give initial planning guidance upon receipt of the higher headquarters' order. They should give refined guidance at the completion of MA. They should refine their guidance again before the order goes final. They should also refine their intent as the plan continues to mature. Not all commanders do this.

Insufficient mission analysis (MA): Einstein famously said, "If I were given one hour to save the planet, I would spend 59 minutes defining the problem and one minute resolving it."[1] We, on the other hand, jump right to course of action development. Field Manual (FM) 5-0, ***Planning and Orders Production*** proposes allocating 30 percent of available time to MA and 20 percent to CoA Development.[2] Do we give it that attention?

Insufficient time or time management. The 1997 version of FM 101-5, ***Staff Organization and Operations states:*** "The critical product … is an initial allocation of available time. The commander and the staff must balance the desire for detailed planning against the need for immediate action."[3]

Inexperience. Invariably, the staffs I observed had just formed and were doing MDMP for the first or second time. We don't fully train MDMP at home station and, lacking repetitions, we are unable to maximize the limited time we have at a combat training center. The lack of familiarity with the process, lack of a plans standing operating procedure (SOP) or formatted base products, and the lack of reps all manifested in inefficiency, complaints about the process, attempts to abbreviate it, and (thus) insufficient detail. These factors consistently denied subordinate echelons their two-thirds of

Figure 3. Warhorse tanks assemble at the National Training Center. *(Photo by COL Esli Pitts)*

the time. First, LEARN the process. Then learn to USE the process.

In addition to inexperience with MDMP, young staff officers/NCOs who lack maneuver experience simply don't plan as effectively. Lacking experience, we don't recognize the gaps in our planning, and we provide too much focus on unimportant areas.

Wargaming: The wargame is the staff's opportunity to refine and complete the CoA across all warfighting functions. Unfortunately, it usually happens in the dead of night and participants soon default to "no change." We typically build a maneuver plan with associated fires but neglect the necessary depth of detail in most of the warfighting functions. The lack of planning becomes apparent in execution.

There I was, observing a (different) airborne rifle battalion. Its entire plan for an airfield seizure consisted of detailed planning for the airborne operation, followed by drawing a route from the drop zones to the airfield, with a circle around it. The commander didn't realize the insufficiency of his plan until he was unable to control the fight, describe it to me (or brigade), or even estimate a percentage cleared. This plan was prepared by graduates of the career course and staff college and approved by an experienced commander. They wrote the order weeks before the rotation, so time was not the issue. During the AAR, I provided the commander and staff time to draw the plan they wish they'd executed — starting with planning guidance. In 15 minutes, they produced a workable CoA that was much better than the original plan. How could this happen?

The sufficient level of detail must come out. Where, when, and how is up to you. Ideally, it does so during planning, rather than in execution or at the final AAR when the OC/T asks questions.

If any of this sounds like your last unit, read on.

Mission analysis

Good mission analysis (MA) highlights what is necessary, what is possible, and it precludes bad ideas. This enables the commander to formulate useful refined planning guidance, which improves CoA development. **If your MA didn't shape options for the commander, it was poor MA.**

The commander already received the higher order and already understands their plan. An immature staff spends the majority of MA capturing things the commander already knows — that's wasted energy. Let's focus MA on areas the commander needs.

Analysis of specified tasks. The order says our unit will conduct a river crossing. The immature staff dutifully writes "conduct river crossing" in the specified tasks list and moves on. The mature staff analyzes this task. First, where is the river narrow enough, the approaches solid enough, and the angle of the banks appropriate to emplace a bridge? (And where can we NOT cross?) Secondly, is the crossing deep in the zone of advance, or early in the movement? These answers will heavily influence our scheme of maneuver. Do some analysis on our specified tasks and we'll find that the additional details make it easy for the commander to write planning guidance that informs CoA development.

Identify the tactical problem. Immature staffs use a simplistic problem statement such as "how do we conduct XYZ?" and rightfully characterizes this as worthless. Instead, let's think of the problem statement as identifying the hardest thing we will do, and the conditions that cause it to be the hardest thing. Analysis thereof allows us to plan to achieve that most difficult

thing. I use a model of "Given [condition], [condition], and [condition], how do we [do the difficult thing]? What do I mean?

Consider an enemy objective, moderately defended, but with an anti-tank (AT) platoon and a significant obstacle belt. We have an attached engineer company, and we assess that our biggest problem is dealing with that AT platoon so we can breach. Here's a possible problem statement: "given a threat AT platoon, high exposure, and a complex obstacle, how do we mitigate the AT threat to enable a breach?" The commander formulates guidance focusing the maneuver plan on suppression or destruction of the AT platoon because, after that, the breach is easy.

What if we lost the attached engineer company? The AT platoon is still the same threat, but now the hardest thing is getting through the obstacles. Here's our new problem statement: "Given a complex obstacle, overwatched by enemy AT systems, and a lack of engineer assets, how do we breach?" This problem statement might lead to other CoAs that don't require us to close on the objective, or we go back to higher for more assets, or we figure out how to destroy the AT platoon so we can breach by ourselves.

Because we understand the tactical problem, we can focus staff energy on mitigating the negative conditions and planning how to achieve the problem. Or we can just ask "how do we breach?"

Lack of understanding of the terrain. There I was, a tank company commander attached to a mechanized infantry battalion at Hohenfels. The S-3 slapped the map and identified the support-by-fire (SBF) from which I would set conditions for the mechanized companies to close on the objective. I pointed out that the large hill between me and the objective would prevent success from there. Oh.

The fact is terrain in Europe is different from that in the desert, and from an urban environment, or that in the Pacific or the jungle. If your frame of reference is six rotations in the desert, you will plan for that on your seventh rotation even though it is in Germany. You can't bring your National Training Center (NTC) plan — fought at long range — to the rolling and compartmentalized terrain and one-vehicle-wide mobility corridors fought as a knife fight at Hohenfels. If you don't understand the impacts of varied terrain, learn to.

Closely related to the terrain, do we understand the battlefield framework within which we will operate? Are we clear on how we nest within higher's operation as established by their operational graphics? Do we also understand the constraints, limitations, and flexibility inherent within an area of operations, a zone, a sector, a battle position? Are higher's boundaries clearly established? Do we understand the fire support coordination measures? (In particular, the coordinated fire line and fire support coordination lines are often misunderstood.)

Lack of understanding of the enemy. If our intelligence preparation consists of using higher's red wire diagrams rather than a general force laydown in time and space on a map, analysis of threat capabilities and associated range arcs, it is insufficient. If our products don't step down from higher's products, and don't analyze two echelons down from us, it is insufficient. If we don't have an event template that differentiates between threat CoAs and informs friendly decision-making, it is insufficient.

Force ratios. We often do an overall force ratio but neglect analysis of various points in the zone or sector. We need to generate a 3:1 HERE, and then THERE. But also HERE, too. Penetrating threat defenses in an urban environment? That's 18:1 according to Army Techniques Publication 5-0.2-1, ***the Staff Planner's Guide.*** Understanding the required force ratio at different points in the fight will be essential during CoA development, so we can array forces.

Insufficient time analysis. Not simply an enemy and friendly timeline, but the time/distance factors associated with tactical actions which you already know must be done. How long does it take to uncoil from an assembly area? Execute Route Black? Refuel on the move. Breach? Dig in? The element of time/distance analysis starts during MA and only becomes more important later in planning.

These points are the kind of details the commander needs in mission analysis to advance understanding and start formulating planning guidance.

We delivered a good MA briefing and armed the commander to give us some great planning guidance. Let's build the CoA.

CoA development

How much detail do we need? First, we build that one-page CoA sketch. But we need it to be feasible, acceptable, suitable, and complete. (And distinguishable if we build more than one.) That's a lot to ask for a one-pager, so let's flesh it out.

Decisive Point. What is it? How much combat power do we need to apply there? How long will it take to achieve? What conditions must be set to ensure success at that point?

Arrayal of forces. Given our force ratio analysis throughout the area, how do we array combat power at various points to achieve appropriate force ratios at both main and supporting efforts? This will drive task organization.

Direct fire control measures (DFCMs). There I was, watching rotational units' frustration with the very real constraints of live ammunition during live-fire exercises. I'm going to say something radical: DFMCs should drive CoA development in both offense and defense. In considering the objective, first understand how you will use direct fires to achieve the mission, then lay in the DFCMs necessary to do so, and then build the maneuver graphics that get the unit in position to execute

the planned DFCMs (and use your master gunner). By establishing the DFCMs first, we account for the impacts surface danger zones, minimum safe, or risk estimate distances will have on the operational graphics. This suddenly becomes important when our operations switch from lasers to live ammunition. **Don't be surprised by the limitations live weapons impose on your scheme of maneuver; bake them in from the outset.**

Operational framework. FM 3-0, ***Operations*** defines several operational frameworks, including: assigned areas; main effort, supporting effort, and reserve; or deep, close and rear operations. These help in "clearly visualizing and describing the application of combat power in time, space, purpose, and resources…"[4] What is higher's? And how do we nest within it?

Task and purpose. There I was as a young tank platoon leader, listening to my battalion commander's mantra that purpose drives task. The WHY of task and purpose is the determinant factor in task selection, and we must get it right. Understanding purpose allows us to pick from the various tasks by which we can achieve the purpose. My experience is that our analysis is sometimes shallow and trends toward checking the block, and sometimes we state our tasks as purposes.

- Immature staff: Establish SBF 1 to fix enemy forces north of Objective MUSTANGS. Note: SBF 1 is a position in the U.S. Army that allows a platoon to clear a no-fire area. SBF stands for "support by fire."

- Mature staff: Fix enemy forces north of target reference point seven to prevent them reinforcing Objective MUSTANGS.

See the difference? The young planner established a graphic, SBF 1, from which to do the task, but it is not the task. The SBF becomes the focus, and we are successful by getting to it. In the second example, the focus is on fixing the enemy, but we also use the graphics to clarify the task. Yes, it is still happening from SBF 1, but that's a graphic, not the task; and if we can't get to SBF 1, we can still fix enemy forces.

Defeat Mechanism. Did we decide on a defeat mechanism? Is our higher headquarters plan based on a particular defeat mechanism? If so, is our plan nested within that?

Scheme of maneuver. Given the selected defeat mechanism, decisive point, required arrayal of forces at various points, the planned DFCMs, the right tasks and purposes, etc., what is the scheme of maneuver that will accomplish them? And then, what are the necessary graphics to depict that scheme?

Necessary graphics. Graphics are the skeletal structure that underlies the operation. Maybe you've seen an old-school map board with ops, engineer, fires, logistics, threat, and decision support overlays all taped to it — truly "stacking overlays." In the age of PowerPoint, under-utilized mission command systems, and the shallow detail of "concept of operation" planning, we've lost the art of developing detailed plans. Compounding the problem is the heavy use of intent graphics in place of operational graphics. FM 5-0, ***Planning and Orders Production,*** states that "planners select control measures, including graphics, only as necessary to control subordinate units during an operation."[5] This sounds minimalist, so maybe we should say that if it is in our plan, it should be on our graphics.

I'm not saying we should create overly detailed plans with so many graphics

Figure 4. A Stryker suppresses an urban objective. *(Photo by COL Esli Pitts)*

you cannot see the map. Where young staffs struggle is in over-planning for subordinate elements. Here are a couple of rules to prevent that. First, don't plan the subordinate's plan for them. If everything that happens between HERE and THERE on the graphics is the responsibility of one subordinate, then just be comfortable with allocating the maneuver space to that subordinate. The subordinate plans it and submits the graphics. If two subordinates are involved, we put in the graphics necessary to control or deconflict them. Second, even with mission-type orders, it is not "micromanaging" if we tell subordinate A to be at THIS location, with THIS orientation, at THIS time, so they are synchronized within the larger plan. **When we need this level of detail, intent graphics don't work.**

The boss has approved our feasible, acceptable, suitable, complete, and distinguishable CoA, and we are ready to move on.

Wargame

We use the wargame to finalize, and synchronize, the plan. However, let's be real. As mentioned, our wargame rapidly moves into this alternate reality where the staff increasingly announces, "no change." The planner gratefully captures that on the synch matrix. At the end, the executive officer feels uneasy, but it's late. Now we've underwritten a lack of detail. **The best response to "no change" is to ask "Are you sure? What about XYZ?"**

What are the ramifications of an incomplete synch matrix? Well, there I was….

The fight advances too far and the tactical operations center (TOC) loses digital or voice communications with the companies as they approach the objective. We should have anticipated this and planned to jump the TOC or move a retransmission team. Instead, in execution, the frustrated executive officer jumps the TOC at the worst possible time, and we are unable to influence the fight at the objective.

The mortars report they are black on ammunition but there was no trigger to move a planned resupply forward. Instead, they fire until their racks are empty and then hunker down, hoping for resupply.

There is no radar coverage at critical points.

There is no understanding of planned or active ambulance exchange points and evacuation assets move to the wrong point.

Conditions are not set for the breach, but we fire the smoke mission anyway. Now we are burning precious minutes of smoke.

The information collection plan is insufficient and not focused on the information necessary to make decisions. As a result, we don't recognize or collect priority information.

The wargame's primary output is a synchronization matrix. This is the document that moves our plan from a concept to reality — a plan we can execute. The synch matrix establishes several things. Where? Planned actions should have an associated graphic. The matrix depicts sequencing of both events and units. Event 1 must happen before Event 2. And Unit A goes first, followed by Unit B. It establishes priorities: Alpha is the priority of fires, but priority shifts to Charlie upon…. It lays out conditions to be set prior to commitment, triggers for commitment, and end states to be achieved by that action. It establishes primary and alternate responsibilities for execution. Our synch matrix captures the details of all those moving pieces that happen in execution.

How do we build the details of these critical events? Recall we talked about time/distance analysis in MA? How do these factors apply on the synch matrix? If Event 1 takes 90 minutes, then Event 2 cannot begin until X+90. If so, when must conditions be set? These details are how we integrate combined arms. What are the triggers? Remember our mortar resupply? Here are three event-, time-, or conditions-based triggers to move resupply. Which one works best?

- Our lead company crosses Phase Line Steel.
- Two hours past crossing the line of departure.
- The mortars have fired targets AB 2001 and AB 2002 or otherwise report amber.

Picture the TOC crew using this detailed matrix to manage the details of execution.

If it is important to the plan, is it important to plan in detail? We're moving that green line for the level of details in our plan much higher.

But haven't we just created a rigid and highly restrictive plan which won't survive first contact? Maybe. How do we create flexibility in the plan?

Flexibility

There I was in a battalion's defensive AAR, describing how the enemy sat at one of the unit's obstacles for 20 minutes, unobserved and unengaged, before bypassing it and penetrating the battalion's southern flank. The commander exclaimed, "I knew they were going to do that!" Maybe he knew it, but he didn't tell anyone. Therefore, there was no plan.

We know the situation will change. Von Moltke famously said: "You will usually find that the enemy has three courses open to him, and of these he will adopt the fourth."[6] How can we account for that maxim by building flexibility into our base plans?

There are things we know about the enemy, and things we've only templated; but our S-2s brief the threat CoAs as if they've already read the enemy's (not yet written) orders. When the S-2 briefs with that level of certainty, we invariably plan against that detailed enemy CoA, even though the template is little more than a guess at this point

— and then we are surprised in execution when it is wrong. The S-2 should use different colors to clearly differentiate between known and templated enemy information, and we account for that by building in flexibility where there is uncertainty. For example: "We've identified seven battle positions under construction and assess the enemy's main defensive positions run from HERE to THERE. We've seen no indicators in the security zone but template they will screen from HERE to HERE." Now we can plan with some certainty against the main defense but also build flexibility in the security zone: "If we identify a combat security outpost (CSOP) HERE, we'll destroy them from attack by fire (ABF) 1. If there are no indicators of a CSOP, we'll continue movement to ABF 2." We are building in flexibility because the enemy situation is unclear — just like reality. We will plan with flexibility but our final intelligence update prior to the mission will bring some clarity. For example: "Scouts report no enemy forces in the vicinity of ABF 1. Recommend Bulldog continues movement to ABF 2."

We've all heard that no plan survives first contact. This is why Eisenhower said, "plans are worthless, but planning is everything."[7] This means both threats and opportunities will emerge, so let's build graphics that enable flexibility.

If we've dropped a series of checkpoints on our graphics (just in case), it is easy to say, "Chaos this is Warhorse 6; move to Checkpoint 8 and establish an SBF oriented north." Our above-mentioned battalion commander was worried about getting penetrated in the south by an enemy force that bypassed his obstacles. Could the staff have planned a series of battle positions at various depths oriented on that gap and tasked the companies to recon them and be prepared to occupy them? Yes.

If our base plan reads like we can only execute it in one way, it is inflexible.

We aren't done because the base order is published. Available time goes to building flexibility both during the operation and following it. How fleshed out are our decision products, branches, and sequels?

Decisions. Does the staff have a common understanding of what the commanders' decisions are? There I was, in a battalion TOC, asking the S-2, S-3 and executive officer what the commander's likely decisions were. I got three different answers. Think the decision products were well-developed? Let's agree to the three-to-five likely decisions and build them up. How? Let's look at a potential decision: switching from defense against the most likely enemy CoA to defending against their most dangerous one (the above-mentioned penetration on the south flank). I use the model of IF [condition] AND [condition], THEN [action].

Branches. "If we identify an enemy company (-) east of Phase Line Red, AND we have identified minimal enemy forces north of XXX, THEN we will displace Alpha to battle position 4A to block penetration in the south." We've established an expectation that the TOC watch for these conditions. We laid the groundwork earlier with some contingency graphics, but now we've built it into a viable branch plan, available in execution, stemming from a decision, which is responsive to the commanders' big concern. How can we improve that basic branch?

If our plan does not allow us to shift between the enemy's most likely and most dangerous CoAs, or otherwise respond to emerging threats or opportunities, it is inflexible.

Sequels. FM 3-0 charges us to anticipate, plan for, and execute transitions. There I was, in command of a battalion during a defense at a combat training center and we had just defeated the opposing force's regimental attack. We are supposed to plan for success, but I can assure you I had no plan for going on the attack after a successful defense. In the moment, I requested permission to conduct a counterattack into the next corridor, where we knew the enemy was building their future defense. (Denied!)

This is an example of a sequel, which I should have been prepared for. What are the minimum necessary details our base plan requires to ensure we are prepared to transition to a subsequent operation (sequel) based on the results of our current operation — ranging from spectacular success to catastrophic failure—without losing tempo or the initiative?

Time and again, the OC/T says some variation of "you fought the plan, not the enemy" or "you were wedded to the plan." Are we audacious enough to make use of our flexibility? What is your information collection plan to support deviating from the base plan? How comfortable are we at recognizing variance in the form of an emerging threat or opportunity and recommending we use our planned flexibility? Can we recognize variance early enough to respond proactively? Or only reactively? If we build in the flexibility but are unwilling to use it, we will lose every time.

Experienced staffs routinely plan to an appropriate level of detail and build in flexibility. Maybe they didn't do so in your last unit. And they might not be doing them in your next unit. But you can change things in your current unit.

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in international relations from Troy University and a master's of science degree in security studies from the U.S. Army War College.

Notes

[1] Spradlin, Dwayne. "Are You Solving the Right Problem?" Harvard Business Review, The Magazine, September 2012. https://hbr.org/2012/09/are-you-solving-the-right-problem#:~:text=%E2%80%9CIf%20I%20were%20given%20one,it%2C%E2%80%9D%20Albert%20Einstein%20said; (Accessed 15 February 2024).

[2] FM 5-0, Planning and Orders Production, May 2022, Pages 5-6, paragraph 5-24.

[3] FM 101-5, Staff Organization and Operations (rescinded), May 31, 1997. Pages 5-4.

[4] FM 3-0, Operations, October 2022. Pages 3-23, paragraph 3-127.

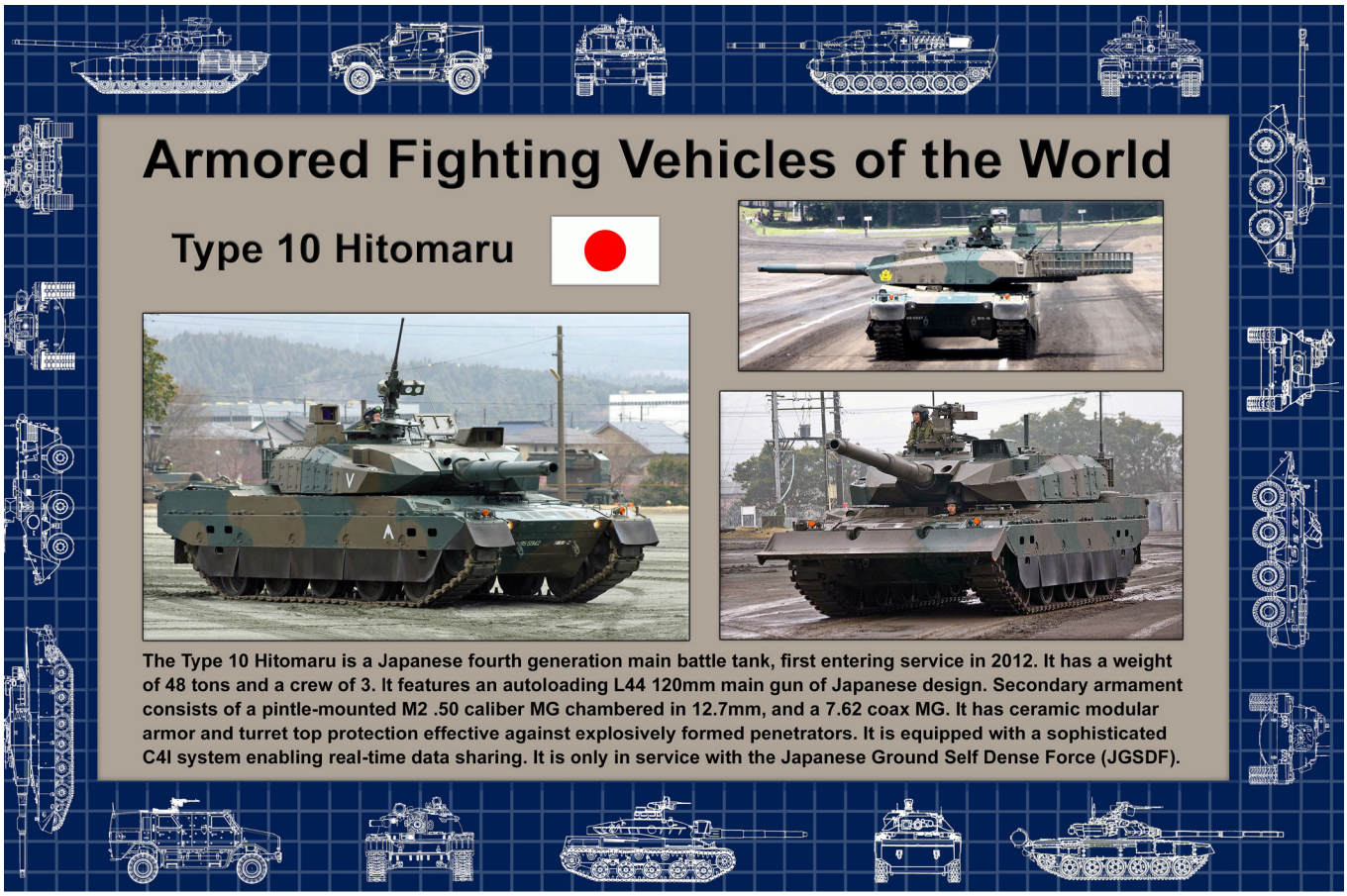
[5] FM 5-0. Pages 5-30, paragraph 5-126.

[6] Justin Wintle, Dictionary of War Quotations, (New York: The Free Press, 1989) page 85.

[7] National Archives: Dwight D. Eisenhower Presidential Library, Museum, & Boyhood Home. Quotes. https://www.eisenhowerlibrary.gov/eisenhowers/quotes; (Accessed March 25, 2024).

Acronym Quick-Scan

AAR - after-action review
ABF - attack by fire
AT - anti-tank
CoA - course of action
CSOP - combat security outpost
DFCM - direct-fire control measure
FM - field manual
FRAGO - fragmentary order
MA - mission analysis
MDMP - military decision-making process
NTC - National Training Center
O/C/T - observer, coach/trainer
SBF - support-by-fire
TOC - tactical operations center



Adapting to Multi-Domain Battlefield: Developing Emissions Control SOP

by CPT Ryan McGovern

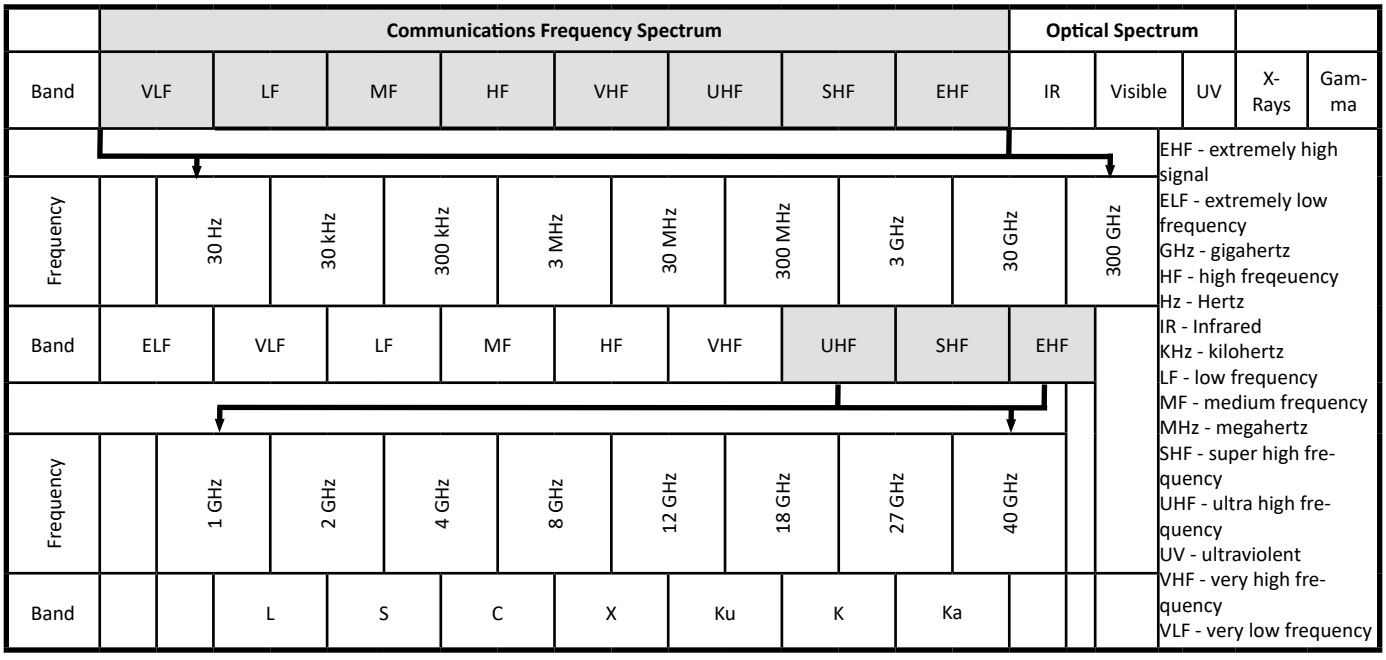
The current fighting in Ukraine has demonstrated how electronic warfare systems can be employed to enable the protection and targeting of ground forces, foreshadowing how U.S. forces must be prepared to operate amidst a contested electromagnetic spectrum (EMS). Managing emissions control (EMCON) can greatly reduce the vulnerability of U.S. forces to enemy detection, targeting, and electronic warfare, while improving communications resiliency. Recent Army, as well as armor and reconnaissance doctrine, has outlined considerations for operating in an environment characterized by persistent enemy electronic warfare, but many armor and cavalry units have yet to develop EMCON standing operating procedures (SOPs) or integrate emissions control techniques and procedures into tactical training. This article outlines emissions control techniques and considerations to support the development of EMCON SOPs within combined arms battalions and cavalry squadrons and offers recommendations for building readiness to conduct operations amidst a contested electromagnetic spectrum.

Threat environment

U.S. adversaries, including Russia and China, each field multiple mobile electronic warfare (EW) platforms capable of radio frequency (RF) direction finding, signals intelligence (SIGINT) collection, jamming, and spoofing. The variety of EW platforms Russia and China field enable both militaries to operate across the electromagnetic spectrum, including on high frequency (HF), very high frequency (VHF), and ultra-high frequency (UHF) bands, but most Russian EW systems are designed to operate on VHF and higher frequencies.[1] In Ukraine, Russia has arrayed electronic warfare systems to provide continuous coverage across its front and used them to jam Ukrainian drone-control station connections and GPS receivers on munitions, inhibiting collection and targeting efforts.[2] In addition, Russian radio frequency direction finding capabilities have enabled it to identify drone control stations to target with indirect fires.[3] Modern EW platforms enhance enemy capabilities to disrupt and target U.S. forces, reinforcing the multi-domain operations imperative to "account for being under constant observation and all forms of enemy contact."[4]

For ABCT combined arms battalions (CABs) and cavalry squadrons (SQDN), enemy radio frequency direction finding in support of lethal targeting represents the most acute EW threat to tactical ground maneuver. Command posts, field trains, and maintenance collection points, which often offer stationary and consistent EMS emissions profiles, are the most vulnerable to direction-finding enabled targeting and represent high-payoff targets. The widespread proliferation of short-range precision munitions, such as the first-person view drones employed against military vehicles and positions in the Russo-Ukrainian War, has lowered the cost of targeting individual vehicles, increasing the chance armored vehicles will be targeted from above if detected.[5] In addition to lethal threats, once an enemy detects the frequencies friendly units are employing, it can jam and spoof communications and GPS frequencies to disrupt combined arms maneuver, particularly during high-coordination operations, such as obstacle breaches. Jamming can also sever the link between UAVs and their control stations, inhibiting cavalry squadron collections using tactical UAS systems.

Figure 1. The Electromagnetic Spectrum and Communications Bands [6] *(U.S. Army)*



BATTALION/SQUADRON COMMUNICATIONS SYSTEMS BANDS		
BAND	SYSTEM	FREQUENCY RANGE (MHz)
HF/VHF	AN/PRC-150; AN/PRC-160 Radios	1.6 - 60
VHF	SINCGARS RT-1523 Series	30 - 88
VHF/UHF	Multi-Band Inter/Intra-Team Radio (MBITR) AN/PRC-148	30 - 512
UHF	Joint Battle Command - Platform (JBC-P)	950 - 2150
UHF	Combat Service Support - Automated Information System Interface (CAISI)	2400 - 5400; 5800

Figure 2. ABCT Battalion/Squadron Communication System Bands[7] *(U.S.Army)*

Doctrine, emissions control integration

By enabling units to adjust their EMS emissions based on threats present in the operational environment and mission requirements, EMCON procedures can reduce the vulnerability of armored formations and improve the resilience of communications. Emissions control is "the selective and controlled use of electromagnetic, acoustic, or other emitters to optimize command and control capabilities while minimizing, for operations security: a. detection by enemy sensors, b. mutual interference among friendly systems, and/or c. enemy interference with the ability to execute a military deception plan."[8] Recent Army doctrine and writing have placed renewed emphasis on EMCON procedures and techniques, including the tension between controlling emissions and the robust communications architecture required to support convergence.[9] A survey of armor and cavalry doctrine reveals mentions of electromagnetic spectrum considerations in FM 3-98, ***Reconnaissance and Security Operations*** and an orientation to EMCON in ATP 3-90.5, ***Combined Arms Battalion***.[10] However, current unclassified, uncontrolled doctrine offers limited guidance on operationalizing EMCON procedures and lacks example SOPs.

To better integrate EMCON concepts and procedures, armor and cavalry units should develop EMCON SOPs at the squadron/battalion echelon. In addition to enabling the rapid adjustment of unit emissions profiles through standardization and shared understanding, EMCON SOPs provide a basis for building training proficiency, assessing performance, and refining or adapting codified procedures. In designing EMCON SOPs, units should consult ATP 3-12.3, ***Electromagnetic Warfare Techniques*** and ATP 6-02.53, ***Techniques for Tactical Radio Operations***, which together offer both practical techniques for limiting the emissions of tactical systems as well as information on the scientific concepts involved in radio wave propagation (including visual examples of directional antenna design and setup instructions).[12] Units can implement multiple techniques and procedures for controlling emissions without special equipment or specialized training on radio system electronics, as outlined by the "EMCON" acronym below. [13]

Emit on least vulnerable frequencies

• Communicate on the portion of the spectrum the enemy is least capable of

Figure 3. Emission Control (EMCON) Status[11] *(U.S.Army)*

EMCON STATUS	DESCRIPTION
EMCON 5	Describes a situation where there is no apparent hostile activity against friendly emitter operations. Operational performance of all EMS-dependent systems is monitored, and password-encription-enabled systems are used as a layer of protection.
EMCON 4	Describes an increased risk of attack after detection. Increased monitoring of all EMS activities is mandated, and all end users must make sure their systems are secure, encrypted, power levels monitored, and transmissions limited. EMS usage may be restricted to certain emitters, and rehearsals for elevated EMCON is ideal.
EMCON 3	Describes when a risk has been identified. Counter ECM (encryption, FH, directional antennas) on important systems is a priority, and the CEWO's alertness is increased. All unencrypted systems are disconnected.
EMCON 2	Describes when an attack has taken place but the EMCON system is not at its highest altertness. Non-essential emitters may be taken offline, alternate methods of communication may be implemented and modifications are made to standard lower EMCON configurations (for example, power levels and antenna types).
EMCON 1	Describes when attacks are taking place based on the use of the EMS. The most restrictive methods of EP are enforced. Any compromised systems are isolated from the rest of the network.

direction finding, intercepting, or jamming within the area of operations (AO) (based on enemy EW platform capabilities). Always use frequency hop (FH) modes.

• HF frequencies are the least impaired by jamming measures. Low power UHF frequencies (GPS; Joint Battle Command Platform (JBCP)) are more vulnerable to jamming.[14]

• However, the greater propagation distance of lower frequency bands (HF) increases the distance at which they can be detected, compared to higher frequency bands (VHF, UHF), which have greater atmospheric absorption.

Mask wave propagation from enemy

• Use antennas with the shortest range possible.

• Use directional antennas. Directional antennas for HF and VHF radios can be erected using standard equipment or improvised designs.

• Limit stray emissions propagation toward the enemy by surrounding antennas with radar-scattering camouflage netting, leaving a gap for the direction of transmission (for both directional line-of-sight antennas and satellite systems).[15]

• Mask line-of-sight (LOS) system propagation using terrain features.

• Consider where civilian EMS usage and communications infrastructure provide masking. For example, commercial cell networks (UHF) usage near urban areas can mask military communications using similar bands (as occurred in Ukraine when Russian advanced closer to Kyiv).[16]

Communicate Concisely

• Ensure all transmissions are necessary. Convey orders and critical information rapidly.

• Preplan messages before transmitting them.

• Transmit clearly, quickly, and precisely to avoid repetition.

• Use brevity codes. See ATP 1-02.1, ***Brevity: Multi-service Tactics, Techniques, and Procedures for Multi-Service Brevity Codes*** (March 2023) to add relevant codes to unit SOPs.

• Use an alternate means of communication, such as wire or physical message copies.

Only use power necessary for transmission

• Use the lowest power setting possible to achieve message receipt.

No predictable emissions patterns

• Minimize recurring emissions at the same location, frequency, time-inter-

Figure 4. Emission Control (EMCON) Status[11] *(U.S.Army)*

EMCON OPERATING PROCEDURES						
EMCON LEVEL		**5**	**4**	**3**	**2**	**1**
COMMS SYSTEMS	P	JBCP	FM VHF	FM VHF	HF	HF
	A	FM VHF	JBCP	JBCP	FM VHF	FM VHF
	C	HF	HF	HF	JBCP*	Physical Relay/Linkup
	E	Relay/Displace to Re-establish Comms.			Physical Relay/Linkup	JBCP*
COORDINATING PROCEDURES	Transmit Timing/ Volume	Unrestricted	1. Minimize non-essential transmissions 2. Transmit rountine reports in assigned windows	1. All Non-CCIR/FFIR reports restricted to assigned windows 2. Vary windows every 24h		CCIR/FFIR Reports Only
	Brevity	Unrestricted	**FM-VHF:** Continuous transmissions <3 mins. **JBCP:** Continuous connection	**FM-VHF:** Continuous transmissions <20s; Use prowords/brevity codes **JBCP:** Connect only during reporting/ update windows	**FM-VHF:** Continuous transmissions <10s; Use prowords/brefity codes **JBCP:** Connect only for CCIR/FFIR***	All Systems: 1. Minimize transmission duration: essential information only 2. Use prowords
	Antennas**	Unrestricted	1. Minimize transmitting antenna height 2. JBCP: Radar net mask transceivers toward enemy	1. Use directional antennas 2. Use terrain masking 3. Radar net mask antennas		
	Power	Unrestricted	Use minimal power possible		1. NO FM-VHF power amplifiers **FM-VHF & HF**: Use minimal power	
LEGEND	* CCIR/FFIR Only **Radar net masking: use radar-scattering camouflage netting around antennas, leaving a gap for the direction of transmission ***To receive CCIR/FFIR reports, at least one squadron/battalion command post must operate a JBCP transceiver continuously					

val, and duration.

• Execute net calls, situation reports/updates, and remote meetings on a variable schedule.

• Use offset (remote) antennas for command post/C2 node radio systems (>1km if possible).

• Transmit (VHF; HF) or unmask/turn-on JBCP transceivers (which transmit and receive continuously when powered on) only during reporting windows.

Essential considerations

In determining the EMCON levels for their units and the criteria for changing them, leaders must consider the trade-offs with situational awareness and responsiveness when operating at more restrictive levels. Leaders and command posts will have less ability to actively control maneuver, disseminate guidance, coordinate changes, and receive frequent updates as EMCON levels become more restrictive. Systems with continuous, significant emissions signatures, such as JBCP, also provide near real-time situational awareness and reduce the likelihood of fratricide when operated without restrictions. Thus, more restrictive EMCON levels are generally better suited to operations requiring less frequent decision-making, coordination, and maneuver, such as defense, area security, and logistics operations, in which more static dispositions increase the threat from enemy direction finding and targeting. During offensive, combined arms operations, the advantages of more resilient command and control (C2), achieved by operating multiple communications systems spanning the electromagnetic spectrum, likely outweigh the risk posed by enemy EW systems. To reduce the trade-off between vulnerability to enemy collections and friendly C2, leaders should consider how they can adapt to operate effectively at more restrictive EMCON levels, such as by increasing their reliance on mission-type orders, using prowords, and scrutinizing reporting requirements.

An EMCON SOP creates opportunities for units to employ deception and better enable friendly SIGINT collection efforts by adjusting their emissions signatures. In an environment in which EMS collections contribute to enemy intelligence assessments, commanders can direct certain units to minimize their signatures while others operate at less restrictive EMCON levels to make their actions more convincing to deception targets, such as to enable a feint (ambiguity-decreasing deception). Commanders could also adjust unit emissions signatures to increase ambiguity in the enemy's understanding of likely friendly actions.[18] Tactical military communications systems may have readily identifiable emissions profiles, while commercial cell phone communications could be masked amidst civilian use, complicating enemy electromagnetic reconnaissance efforts. Although pervasive reliance on commercial cell communications attributable to U.S. military operations poses operations security risks, the limited use of civilian cell phones without military encryption to send prowords or messages obfuscated to external interceptors could provide sufficient C2 for units concealing their military system emissions through radio silence. Through operating at more restrictive EMCON levels, leaders may also enhance friendly electromagnetic reconnaissance efforts by reducing the noise and clutter present on the spectrum, making it easier to detect and focus collections on enemy emitters.[19]

There are multiple historic examples of large, mounted units training to operate amidst a contested electromagnetic spectrum by employing EMCON procedures. During the 1988 Return of Forces to Germany (REFORGER) exercise "Certain Strike," the 1st Cavalry Division conducted a division movement of two combat brigades and support elements under radio listening silence. In 42 hours, the division deployed 4,534 vehicles, including 813 tracked vehicles, over 150 kilometers along three routes from the staging area to a tactical assembly area. Employing military police and G-3/G-4 teams at refuel-on-the-move and maintenance halt locations to control movement, overcome friction, and provide only necessary reporting, the division successfully executed the movement under radio listening silence (a pre-execution movement exercise achieved shared understanding essential to the operation's success).[20] More recently, during the Marine Air Ground Task Force Warfighting Exercise 1-20 at Twenty-Nine Palms, CA in 2019, the 2nd Marine Division tested emissions control concepts during a division level, force-on-force exercise. Units used their own or division-standard EMCON procedures and practiced movement under restrictive EMCON levels. In addition to gaining experience employing various emissions management techniques, units experienced and learned from the C2 trade-offs associated with operating at restrictive EMCON levels.[21]

Limitations

Although the development and integration of EMCON SOPs have the potential to reduce the vulnerability of armored forces to enemy EW and lethal targeting, EMCON procedures must be combined with other concealment techniques and tailored to AO-specific threats to be most effective. ABCT CABs and SQDNs have significant visual signatures, especially when many vehicles are co-located together during maintenance and logistics operations. Satellite imagery and drone cameras, collection tools widely available to peer and non-state adversaries, increase the difficulty of concealing armored unit positions. Thus, units must employ visual camouflage, noise discipline, and light discipline in conjunction with EMCON procedures for effective concealment. For EMCON procedures to work and be worth the tradeoff in C2 capability, they must also be tailored to minimize signatures based on the collection capabilities of enemy EW platforms in the AO. Different variants of Russian and Chinese EW platforms collect on different portions of the spectrum, with varying ranges, interception, and jamming capabilities. During pre-deployment training and upon receiving intelligence updates in theater, battalion signal and intelligence officers must collaborate to refine the EMCON SOP based on enemy capabilities.

As with other SOPs, the effectiveness of EMCON SOPs will be largely determined by training proficiency and

equipment readiness. Underpinning the shared understanding of EMCON levels built through integrating EMCON procedures and posture changes into the unit's training progression is the proficiency of individual Soldiers operating each communications system. Soldiers must be capable of performing the tasks required to restrict the emissions of their vehicle or dismount team, such as adjusting power levels, using directional antennas, and transmitting only in designated windows or to report specific information. Limited proficiency operating HF radios, particularly in combined arms battalions, could hinder transitions to restrictive EMCON levels. Achieving a breadth of proficiency in EMCON procedures and communications systems operation across the formation is essential, as crews must be able to adjust their emissions from dispersed locations without additional assistance.

Ensuring the property and maintenance readiness of communications systems is critical for ensuring it remains feasible for units to operate at various EMCON levels. To ensure key leaders and required elements have the communications capabilities needed to operate at each EMCON level, battalions/squadrons may need to redistribute communications systems between subordinate units, for example to achieve the required density of HF or JBCP systems in each formation. Pending EW threats and mission requirements, leaders should consider requesting the support of other communications capabilities resident in the brigade or division, such as tactical satellite radios or iridium phones, to augment their primary, alternate, contingency and emergency (PACE) plans and EMCON procedures. Units can requisition additional components available through the Army supply system, such as long RF transmission cables and HF directional antenna kits, to support EMCON procedures. The equipment readiness of all communications systems must be addressed in battalion maintenance reporting and SOPs and should be validated during training and maintenance events.

Recommendations

Given the risks presented by adversary EW and electromagnetic spectrum-enabled targeting capabilities, combined arms battalions and cavalry squadrons should develop EMCON SOPs to reduce their vulnerability to these capabilities and improve the resilience of their C2 architecture. Battalion/squadron signal officers, with the support from the intelligence section and other staff leaders, should coordinate with the brigade staff signal section to ensure the unit's EMCON SOP is nested with the brigade EMCON SOP and PACE plan. If EMCON SOPs are undeveloped at the brigade and even division levels, the process of designing nested SOPs provides an opportunity for signal staffs to assess threats and capabilities through collaboration to integrate EMCON concepts and procedures at echelon. The review of draft EMCON SOPs must involve representatives from across the battalion staff sections and key company-level leaders to ensure the SOP accounts for trade-offs with other capabilities and operational considerations, and its adoption is feasible based on available equipment.

After developing EMCON SOPs, units should ensure EMCON procedures, and their supporting tasks are integrated into individual and collective training events to develop proficiency in adjusting emissions signatures. Units can use a variety of forums to improve leader and Soldier understanding of emissions propagation and how different tactical communications systems use the EMS, such as leader professional development sessions on wave propagation and brevity codes, or competitions to setup and use directional antennas. To build confidence and proficiency operating at various EMCON levels, units should operate at multiple EMCON levels during collective training events and integrate EMS-based injects into tactical scenarios.[22] A new emphasis on building proficiency in techniques to manage electromagnetic signatures also provides an opportunity to revitalize training on tactical communications systems and validate existing C2 SOPs, including PACE plans.

The development of EMCON SOPs should serve as a basis for the peacetime experimentation with and assessment of procedures to reduce emissions signatures. Using the Networked Electronic Support Threat Sensors, which can generate EMS "heatmaps," the National Training Center Operations Group can offer units feedback on their EMS signature and emissions management efforts during rotations to determine the effectiveness of their EMCON procedures and enable refinement. Armored formations should also use combat training center (CTC) rotations to fully assess the tactical trade-offs associated with operating at restrictive EMCON levels. Empirical data on the effectiveness of various EMCON procedures and associated trade-offs collected at CTCs should be aggregated and considered in conjunction with intelligence on the performance of adversary EW systems, for example the Russian systems operating in Ukraine, to inform updates to armor and cavalry doctrine.

Conclusion

For the last two decades, Army tactical formations have operated with little

Figure 5. Specialist SSG Orlando Varela demonstrates the wear of the Versatile Radio Observation and Director (VROD). *(U.S. Army Reserve Photo by CPT Jamie Cottrell)*

consideration of their electromagnetic signature and spectrum access. Facing adversaries with significant EW and EMS-enabled targeting capabilities, armor and cavalry units must now adopt procedures to manage their emissions and spectrum usage in future operations. Developing, integrating, and assessing EMCON SOPs offers combined arms battalions and cavalry squadrons a means to reduce vulnerabilities and improve communications resiliency as they adapt to the challenges of the multi-domain battlefield.

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Notes

[1] EW platform characteristics are available on the U.S. Army Training and Doctrine Command (TRADOC) OE Data Integration Network; 2021, "ODIN - OE Data Integration Network," Army.mil. 2021, https://odin.tradoc.army.mil/.

[2] Carlotta Gall and Vladyslav Golovin, "Some U.S. Weapons Stymied by Russian Jamming in Ukraine," The New York Times, May 25, 2024, sec. World. https://www.nytimes.com/2024/05/25/world/europe/us-weapons-russia-jamming-ukraine.html., and Thomas Gibbons-Neff and Yuri Shyvala, "'Jamming': How Electronic Warfare Is Reshaping Ukraine's Battlefields," New York Times, March 12, 2024. https://www.nytimes.com/2024/03/12/world/europe/ukraine-drone-russia-jamming.html.

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[4] Headquarters, Department of the Army, Field Manual 3-0, ***Operations*** (Washington, D.C., 2022), 3-10 – 3-11.

[5] Gibbons-Neff and Yuri Shyvala, "Jamming."

[6] See Figure A-3 in Army Techniques Publication (ATP) 3-12.3, ***Electromagnetic Warfare Techniques*** (Washington, D.C., 2023).

[7] ATP 6-02.53, T***echniques for Tactical Radio Operations*** (Washington, D.C., 2020), 3-1 – 3-15, 5-1; J. Michael Gilmore, Director, Operational Test and Evaluation, "***Joint Battle Command-Platform Multi-Service Operational Test and Evaluation Report***," (2015), https://www.esd.whs.mil/Portals/54/Documents/FOID/Reading%20Room/Science_and_Technology/16-F-0250_(REPORT)_MOT&E_Report_on_the_Joint_Battle_Command_-_%20Platform_(JBC-P).pdf, 8.

[8] ATP 3-12.3, ***Electromagnetic Warfare Techniques.*** Emission control techniques fall into the category of electromagnetic protection, alongside measures including spectrum management operations, electromagnetic hardening, electromagnetic masking and electromagnetic compatibility.

[9] MAJ Matthew Tetreau, "Convergence and Emission Control: Tension and Reconciliation," Military Review November-December 2023 (November). https://www.armyupress.army.mil/Jo urnals/Military-Review/English-Edition-Archives/November-December-2023/Convergence-and-Emission-Control/, 60-61.

[10] ATP 3-90.5, Combined Arms Battalion (2021); and HQDA, Field Manual (FM) 3-98, ***Reconnaissance and Security Operations*** (2023).

[11] See Figure 5-1 in ATP 3-12.3, ***Electromagnetic Warfare Techniques***.

[12] Chapter 10 of ATP 6-02.53, ***Techniques for Tactical Radio Operations*** also includes essential procedures for identifying and overcoming enemy jamming efforts.

[13] Techniques provided in ATP 3-12.3, E***lectromagnetic Warfare Techniques,*** served as the basis for developing the "EMCON" acronym.

[14] ATP 3-90.5, ***Combined Arms Battalion***.

[15] Units must validate techniques for using radar-scattering camouflage nets to conceal EMS emissions, as the configuration and distance of the nets from transmitting antennas (pending transmission bandwidth) could induce distortion.

[16] Bryan Clark, "The Fall and Rise of Russian Electronic Warfare," IEEE Spectrum, July 30, 2022, https://spectrum.ieee.org/the-fall-and-rise-of-russian-electronic-warfare; Tetreau, "Convergence and Emission Control."

[17] See TRADOC, Threat Handbook: Battlefield Survival and Radioelectronic Combat (Fort Monroe, VA, 1983) for description of radio frequency direction finding procedures and protection measures.

[18] FM 3-13.4, ***Army Support to Military Deception*** (Washington, D.C., 2019).

[19] Electromagnetic reconnaissance is the detection, location, identification, and evaluation of foreign electromagnetic radiations (energy). Electromagnetic reconnaissance is an action used to support information collection and is an element of the tactical task reconnaissance. FM 3-98, ***Reconnaissance and Security Operations***.

[20] MAJ Michael W. Everett, "Moving a Heavy Division Under Radio Listening Silence," Edited by MAJ Patrick J. Cooney, ARMOR, January-February 1989. https://www.moore.army.mil/Armor/eA RMOR/content/issues/1989/JAN_FEB/ArmorJanuaryFebruary1989web.pdf.

[21] LTC Chris Niedziocha, "Fighting a Peer Adversary Part 1: Observations and Recommendations from MAGTF Warfighting Exercise 1-20," Edited by Christopher Woodbridge, Marine Corps Gazette, https://www.mca-marines.org/gazettemagazines/gazette-july-2020/.

[22] An example inject could be a react to jamming battle drill.

Acronym Quick-Scan

ABCT – armored brigade combat team
CAB – combined arms battalion
C2 – command and control
EMCON – emissions control
EMS – electromagnetic spectrum
EW – electronic warfare
HF – high frequency
JBCP – Joint Battle Command Platform
LOS – line of sight
PACE – primary, alternate, contingency and emergency
RF – radio frequency
SIGINT – signals intelligence
SINCGARS – Single Channel Ground and Airborne Radio System
SOP – standing operating procedure
SQDN – cavalry squadron
UHF – ultra high frequency
VHF – very high frequency

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How Innovation Helps Cavalry Formations Solve Age-Old C2 Challenges

by MAJ Mike Eads and MAJ Matt Coccia

Decades of reconnaissance efforts have focused on addressing communication and command and control (C2) challenges in contested environments over long distances. While cavalry units typically encounter no issues establishing contact with enemy forces, they often face difficulties providing rapid and accurate reports due to communication limitations. Moreover, the large size of squadron-level command posts sacrifices their speed and maneuverability, and their corresponding electromagnetic spectrum (EMS) signatures exposes them to risks of enemy contact.

Testing new concepts

4th Squadron, 2nd Cavalry Regiment (Stryker) completed a combat training center (CTC) rotation as part of exercise Saber Junction 23 (SJ23) at the Joint Multinational Readiness Center where we tested and validated two new concepts to improve C2 of forces over long distances: The Regimental Enabler Command Post (REC-P) and the recently fielded Integrated Tactical Network (ITN) communications systems. Both innovations enabled the regiment and the cavalry squadron to fight lighter and leaner, while reducing risk to both force and the mission. By integrating the bulk of the squadron staff at the REC-P, the squadron planning efforts were better synchronized with the regiment throughout the rotation.

C2 NODE DUTIES					
	CUOPS	**BR REPORTS**	**FUOPS**	**FRAGO PUBLICATION**	**FIRES**
RECP	Alternate	Alternate	Primary	Primary	Alternate
CTCP	Cont.	Primary	X	X	X
2CR LNO	X	X	Alternate	X	X
TAC	Primary	Cont.	Cont.	Alternate	Primary

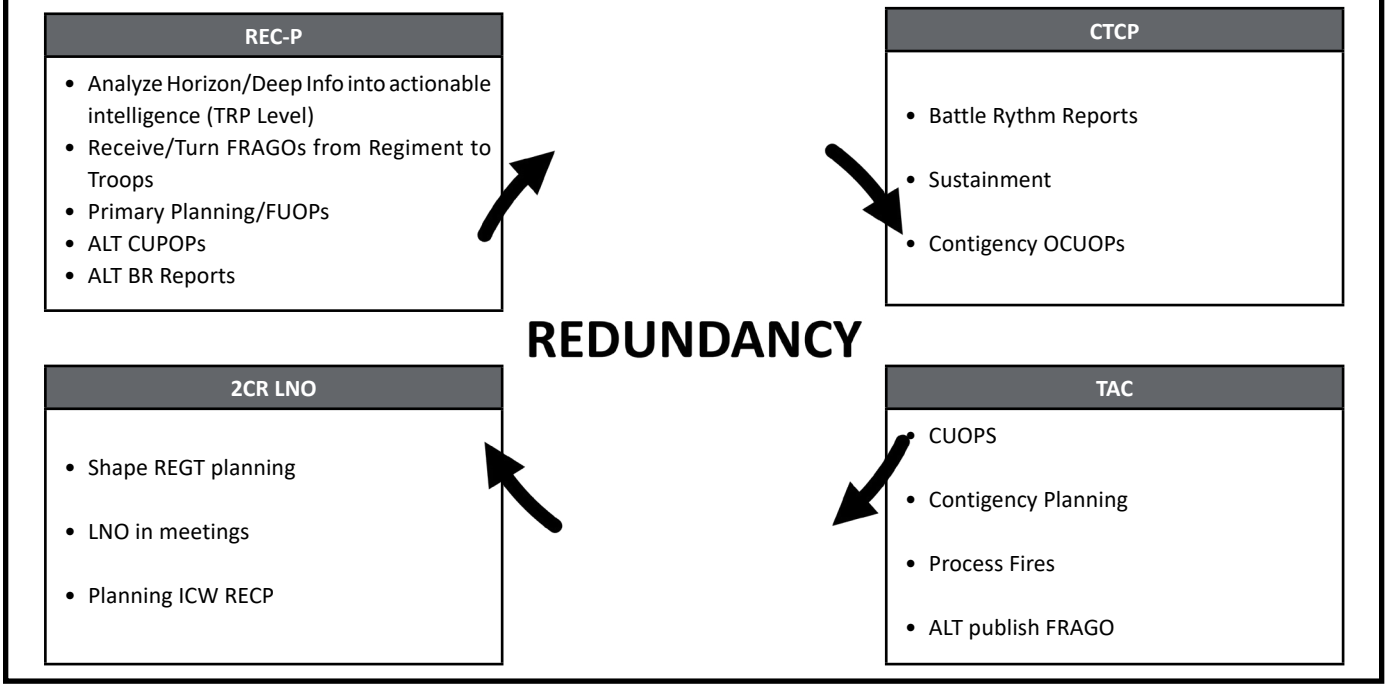

Figure 1. Squadron Command and Control Node Role and Duties PACE from 4th Squadron, 2nd Cavalry Regiment (4/2CR) CPSOP *(U.S. Army)*

Reducing signature, vulnerability

The REC-P is a command post (CP) located in a permissive environment, and in the case of SJ23, more than 80 kilometers to the rear of the FLOT, housed within a defendable hardstand building out of direct and indirect fire contact. The building simulated the occupation of any suitable structure, potentially located in a nearby town or urban area near a brigade-size area of operations during large-scale combat operations (LSCO). The regimental staff located at the REC-P included the Regimental Intelligence Support Element (RISE), the deputy commanding officer, and eventually included a robust future operations cell along with a large portion of the regimental administrative/logistics operations center (ALOC). These personnel adjustments were made in stride to reduce the regiment C2 signature. Our squadron had most of our ALOC and half our primary staff, including the S-2 and our intelligence section, operating out of the REC-P. The squadron commander, the S-3, and fire support officer were located at the forward command post. The core value of the REC-P is the reduction of the EMS and physical signatures of command posts near the FLOT.

Our forward command post consisted of four vehicles and 20 personnel. It was the only headquarters element in the box for the rotation. Its smaller footprint allowed it to move around the battlefield much easier than the typical squadron-sized command post. For example, we were able to breakdown and setup in less than 15 minutes. The typical squadron CP may have upwards of 12 vehicles to include security elements, along with associated tentage, and 35-40 personnel to sustain and move across the battlefield.

CP roles, ensuring redundancy

During the rotation we refined our standing operating procedure (SOP) to differentiate the roles and responsibilities for our different C2 nodes as depicted in Figure 1.

We found the functions of each node were important to define and morphed throughout the rotation as we continually refined our processes. One key function of the recon squadron staff element at the REC-P was to work closely with regimental planners, ensuring the synchronization of intelligence, surveillance, and reconnaissance across the battlefield. Additionally, regimental and squadron intelligence analysts and planners at the REC-P were able to successfully do their jobs because they didn't have to contend with the added stress of multiple jumps during the typical CTC rotation. The squadron staff at the REC-P provided the commander with daily planning updates, even following heavy periods of fighting by the forward elements. Planning timelines and battle rhythm events were less impacted because of the REC-P's distance from the FLOT. Between the constant, uninterrupted intelligence analysis, and a more expedient reconnaissance asset management process, we found clear advantages to the permissive environment afforded by the ITN capabilities resulting in effective C2 at range. The combat trains command post and field trains command post had their typical responsibilities as described in Field Manual (FM) 6-0, ***Commander and Staff Organization and Operations***, along with some added reporting requirements and the ability to assume the duties of the other CPs as necessary.

Transforming in contact

Management of multiple command posts requires thoughtful analysis of where key personnel are placed, how they can best affect operations and decision making, and what their clearly defined roles and responsibilities are. This is especially critical when introducing an innovative command post concept. Staff roles and responsibilities need to be reevaluated based on location of the command posts in relation to the FLOT, or the higher headquarters. The communication capabilities must also be evaluated to determine if changes in the unit's battle rhythm and reporting processes need adjustment. Additionally, key signal support personnel may need to be rebalanced across the CPs to account for the wider range of communication platforms needing to be maintained.

If conducting a battlefield update brief, from three different CPs, including one like the REC-P, ITN must be fully functional to support the inclusion of key personnel required to both receive, and provide inputs. The management of the ITN which includes satellite communications, ground stations, user terminals, multiple radio systems, along with tactical and non-tactical internet protocols, requires an array of signal specialists to support each CP. This is no easy personnel task but can be managed with careful planning and continual assessment.

Managing capabilities

We learned several lessons about the placement of key personnel during the exercise. We know the cavalry squadron intelligence officer plays a critical role in enabling reconnaissance and assessing the enemy course of action (CoA) and disposition for the regimental commander. For instance, Army Techniques Publication (ATP) 3-20.96, ***Cavalry Squadron,*** states that "the S-2 is the critical link between BCT priority intelligence requirements and squadron collection," which is why we embedded the S-2 within the RISE to act as that link. It was located at the REC-P. With no assistant S-2 forward due to manning shortfalls, this left the squadron commander without an experienced intelligence officer collocated with him at the tactical-actions center.

Having the S-2 located within the RISE increased the regiment's ability to assess the enemy situation and provided a direct intel link for the recon squadron staff conducting the military decision-making process during operations at the REC-P. However, this degraded the commander's ability to use a

dynamic assessment of the enemy's CoA, combat power and timeline. Our recommendation is to ensure the commander has a capable intelligence officer forward to provide those real-time assessments.

The S-6 was also located at the REC-P, along with several upper and lower Tactical Internet (TI) and tactical communications specialists. This was critical to maintaining the systems of the ITN. The Mobile User Objective System (MUOS) was the primary voice communication capability utilized between the REC-P and the forward elements of the squadron and the primary voice communication from the squadron to the regiment. In addition to MUOS, the squadron relied on the Mission Partner Environment and Secure Internet Protocol Router networks for voice and data communications. This was a challenge with disbursed C2 nodes across great distances due to the limited upper TI expertise within the squadron. Ensuring we had the right subject matter experts located at the forward CP to enable communications with the regiment was critical to the mission but limited our flexibility supporting multiple C2 nodes with low-density signal personnel. We accomplished this in limited capacity with air movements via rotary wing, though this was unreliable and likely unrealistic during LSCO.

The challenges with limited expertise on ITN systems and the validation of personnel placement should be mitigated through multiple internal command post exercises and ITN validation exercises prior to unit deployment. An increased number of these exercises would have helped our squadron better position the right key personnel and capabilities ahead of exercise Saber Junction 23. While we were able to transform in contact by adjusting and updating SOPs in stride, we recommend a deep look at the equipment and manning of each CP and exercising the concepts to codify the SOPs as early as possible. It will also be important for the Army to prioritize and invest in our 25-series Soldiers through recruiting and incentivizing to keep pace with the modernization of ITN capabilities.

C2 Node 2-Minute Drill Sync

Line #	Content
1. FLOT	a. FLOT of all subordinate units to PLT level
2. Last 10 SIGACTS	a. DTG b. Location c. Activity d. Reporting Unit
3. Timeline Updates	a. Higher (Operational and Battle Rhythm) b. Squadron Operational c. Squadron Battle Rhythm d. Planning Timeline
4. Slant	a. TF Slant b. Attachments Total Vehicles c. Organic Total Vehicles
5. Fires	a. Current Division/Regiment/Squadron Targets 1. Location 2. Strike Window 3. Observer
6. PERSTAT	a. TF Total b. Organic Total c. Attachment Total d. Last 24 movements e. Casualty Update 1. # WIA and Status 2. # KIA (Status if exercise)

Figure 2. C2 Node 2-Minute Drill Sync *(U.S. Army)*

Endurance over long distance

Two of the greater challenges we faced during the exercise were fighter management and maintaining an accurate common operational picture (COP) between C2 nodes. During Reception, Staging, and Onward Integration we struggled to balance planning efforts with all the requirements of Reception, Staging, Onward Movement, and Integration at a CTC because we had limited personnel in the staging area. Therefore, we recommend both nodes should be together for improved synchronization during this stage of operations, with the REC-P positioned at the Intermediate Staging Base. Additionally, once the exercise began there were greater demands on the personnel at the forward CP, so balancing security, command post operations, and rest cycles began to challenge the team mid-way through the exercise. To assist in maintaining endurance, a key tenet of multi-domain operations, we would recommend considering a rotation of key personnel between the C2 nodes, such as the executive officer and the S-3.

We also found how critical it was for both the REC-P and forward CP to remain synchronized during prolonged operations. The issues we faced in maintaining our proposed battle rhythm highlighted the need for continuous adaptation to optimize staff synchronization. What we developed to help improve the C2 nodes maintain accurate COPs while dispersed was a synchronization battle drill as depicted in Figure 2. This enabled each node to simultaneously update their COPs through voice or text communication during a daily COP sync executed multiple times per day, often taking 10 minutes or less.

Way forward

By combining the REC-P concept with the capabilities of the ITN system, not only did we learn to fight distributed

to improve survivability on the battlefield, but we also found improved integration with readiness and sustainment planning efforts between the regiment and squadron staffs. While the REC-P and forward CP may not be the ultimate solution, they represent a positive step forward with great promise of improving the ability to conduct staff planning during LSCO, remain flexible and survivable, and maintain C2 over vast distances.

Ongoing tests and adaptations by 4-2 Cavalry aim to address challenges faced during SJ23 and synchronize a staff split between CPs positioned to maximize operational reach. The evolving nature of command post theories in real-world conflicts, such as in Ukraine, underscores the importance of agile and efficient C2 nodes on the modern battlefield.

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MAJ Matt Coccia serves in 4th Squadron, 2nd Cavalry Regiment as the Executive Officer. His previous assignments include operations officer 4th Squadron, 2nd Cavalry Regiment, G-3 chief of operations, 7th Army Training Command Grafenwöhr, Germany; troop commander, Headquarters and Headquarters Troop, 316th Cavalry Brigade, Fort Benning; troop commander for both, Apache and Headquarters and Headquarters Troop, 3rd Squadron, 4th Cavalry Regiment, 3rd IBCT, 25th Infantry Division, Schofield Barracks, HI; assistant operations officer for both 3rd Squadron, 4th Cavalry Regiment and 2nd Battalion, 35th Infantry Regiment, 3rd IBCT, 25th Infantry Division, Schofield Barracks; executive officer for Bushmaster Troop, 6th Squadron, 8th Cavalry Regiment, 4th IBCT, 3rd Infantry Division; platoon leader, Charlie Company, 4th Battalion, 70th Armor Regiment, 170th IBCT, Baumholder, Germany. MAJ Coccia's military schools include Armor Basic Officer Leader Course, Fort Knox, KY; Maneuver Captains Career Course, Fort Benning; and Air Command and Staff College, Maxwell Air Force Base, AL. MAJ Coccia's awards include Bronze Star Medal, Meritorious Service Medal with three oak-leaf clusters, Army Commendation Medal with three oak-leaf clusters, and the Army Achievement Medal with four oak-leaf clusters. He has two combat tours: Operation Enduring Freedom 2013, and 2011.

Acronym Quick-Scan

ABCT – armored brigade combat team
ALOC – administrative/logistics operations center
ATP – Army Techniques Publication
C2 – command and control
CoA – course of action
COP – common operational picture
CPSOP – command post standing operating procedure
CTC – combat training center
EMS – electromagnetic spectrum
FLOT – forward line of own troops
FM – Field Manual
IBCT – infantry brigade combat team
ITN – Integrated Tactical Network
LSCO – large-scale combat operations
MUOS – Mobile User Objective System
REC-P – Regimental Enabler Command Post
RISE – regimental intelligence support element
SJ23 – Saber Junction 23
SOP – standing operating procedure
TI – Tactical Internet

Ukraine's Wooden Ships

by LTC Mitchell A. Payne

In 2022, Russia invaded Ukraine to prevent what Russian President Vladimir Putin claimed was the bullying and genocide of ethnic Russians and to act against Ukraine's alleged growing aggression.[1] The U.S. Army and its North Atlantic Treaty Organization (NATO) allies observed and supported the valiant efforts of the Ukrainian people to stand against the overwhelming tide of the Russian military. Observing patterns in the fog of war, however, can be difficult. While patterns repeat themselves, the continuously changing character of war can make it difficult for patterns to repeat themselves. It has been said, however, that while history may not repeat itself, it does rhyme.[2] Applying this to Ukraine shows a powerful rhyme from the past that resonates today.

Wooden Ships in Gallipoli

Early in World War I, Britain, France, and Russia suffered tremendous losses from Germany and its allies. Trench warfare bogged down the West, and the British were desperate to keep their Russian allies well-supplied to pressure Germany's eastern front.[3] Churchill's solution was to invade Turkey through Gallipoli by forcing a passage through the Dardanelles Straits to seize Istanbul and compel the Ottoman government to surrender.[4] Despite sea mines and fortifications in the Dardanelles,[5] a bold attack could bring a decisive strategic victory. Hinging on speed and audacity, Churchill's plan was a high-stakes gamble that could have turned the tide of the war.[6]

During this same time, a military revolution awakened the world to the realities of industrialized warfare.[7] This revolution introduced the better-equipped Dreadnaught-class battleship.[8] Dreadnaughts could move faster and shoot further than their wooden counterparts, making those ships obsolete.[9] Churchill planned to use those obsolete ships to clear the mines in the Dardanelles, allowing the Dreadnaughts to advance rapidly towards Istanbul.[10] Admiral Fisher, the most experienced British naval commander, voiced his concerns with this plan, arguing that "even if the old battleships were expendable, their experienced crews were not."[11]

Despite these objections, on March 18, 1915, an Allied fleet of 12 wooden battleships[12] and four British dreadnoughts attacked the Dardanelles.[13] The fleet withdrew seven hours later, losing three wooden battleships and damaging one dreadnaught and two other wooden ships, while the Ottomans held their positions.[14] Admiral De Robek, the fleet commander, did not press the attack,[15] calling instead for an amphibious landing four days later. The Gallipoli campaign became hopelessly mired, eventually costing 220,000+ British casualties while achieving none of its strategic objectives.[16]

Analyzing failure at Gallipoli

But how does a strategic failure in World War I relate to Ukraine today? The answer is leadership. Parker notes, "Whatever the strategic merits, the operational and tactical execution ... was abysmal."[17] The British admiral's inability to adjust his thinking divorced the operational planning from the tactical execution. While Churchill envisioned a decisive victory at the cost of a few obsolete ships, the naval officers executing the plan could not endure the loss of those ships or crews to gain a strategic victory.

Before the advent of the Dreadnaught, those wooden ships were the pride of the British Navy. Naval officers spent most of their adult lives and military careers on those wooden ships,[18] intimately knowing every splinter, rope, and nail. Those wooden ships were their home and a source of great pride. "To sailors of De Robek's generation, it was an appalling thing to lose battleships, no matter how old and out of date they were."[19]

The cautious initial attack is, therefore, understandable. All three wooden battleships lost in the initial attack were due to be scrapped,[20] but to lose them (and their crews) in battle was different. British naval tradition held that "the ship was more important than the man: no matter what the cost in lives the captain must always try to save his ship."[21] However noble, those were costly naval traditions. Rather than relying on speed and audacity, the naval leaders moved slowly to preserve their beloved wooden ships. The initial attack fizzled, and the failure at the Dardanelles blossomed into a colossal and deadly strategic blunder for Gallipoli.

The Army's Wooden Ships

As the Army shifts from fighting the Global War on Terrorism (GWOT) to near-peer threats in large-scale combat operations (LSCO), Gallipoli's lessons should cause Army leaders to pause and reflect. What patterns of thought, actions, or traditions do Army leaders hold on to so tightly that they risk losing the next war? If the character of war constantly changes, what outmoded ways of thinking exist in the Army? What are the Army's wooden ships? From tactical upwards, observations from Ukraine suggest at least five areas to consider.

1. Towed Artillery

Artillery dominates LSCO. Estimates from Ukraine indicate that in the first three months of the war, artillery caused 80-90 percent of the casualties.[22] Surviving an artillery-dominated environment requires artillery units to shoot and move quickly to avoid enemy counterfire.[23] Ukraine has shown that Russian towed artillery units lack the ability to displace rapidly. Open-source satellite imagery comparisons from May 2020 and March 2024 indicate that Russia has pulled roughly 60 percent of its towed artillery systems out of storage.[24] While this can signal many things, it strongly implies significant losses to those systems.

Towed artillery is highly mobile and necessary for joint forcible entry operations. Army leaders must balance those benefits with the potential costs in the lives of Soldiers operating those systems during enemy counterfire. The Chinese PLZ-05 can range targets out to 100km,[25] significantly outranging the U.S. Army's current towed artillery systems. While the Army is developing wheeled howitzers to potentially address this problem in the future,[26] towed artillery, as it currently stands in LSCO, could be a costly wooden ship.

2. Casualty Planning and Treatment

LSCO changes the paradigm for casualty planning and treatment – another wooden ship. On May 5, 2024, the British Broadcasting Corporation reported more than 50,000 Russian soldiers killed.[27] Other NATO estimates indicate 150,000+ Russian deaths and 350,000-400,000 casualties.[28] Russia's "human wave" tactics may contribute to those casualties,[29] but the harsh realities of LSCO against the U.S. Army's acute and pacing threats – China and Russia[30] - implies a need to prepare for casualty levels not seen in the last 50 years.[31] Throughout the GWOT, the U.S. military sustained 7,085 fatalities.[32] Those same numbers could occur in hours or days in LSCO against Russia or China, implying at least three things.

First, leaders must re-examine medical triage. The GWOT taught leaders to treat the worst patients first. Choosing between sucking chest wounds and broken ankles was relatively simple. Access to higher medical care in the GWOT meant critical casualties treated in the "golden hour" would likely survive. Ukraine tells a different story – battlefield care in LSCO must return as much combat power as quickly as possible back to the front. A broken ankle may take precedence over urgent casualties because that broken ankle can get back into the fight sooner.

A second implication is the importance of echeloned casualty planning. At the individual level, self-aid and buddy-aid will likely be the difference between life and death. Front-line units should never expect to receive medical evacuation flights. Companies and battalions must have well-rehearsed plans for casualty collection and ambulance exchange points. In LSCO, every combat operation is likely to be a mass-casualty event; units must practice non-standard casualty evacuation to maximize access to care.

Finally, a third implication is that the U.S. military lacks the infrastructure (refrigeration or transportation assets) to process, store, and move the anticipated fatalities that LSCO will bring. Russia solved this problem with mobile crematoriums in 2015[33] and during the current conflict.[34] Mass cremation is untenable for the U.S. military; LSCO casualty planning will likely involve battlefield cemeteries and burials until mortuary operations can recover the bodies after the war.[35]

3. Consolidating Forces

On June 14, 2023, members of the Russian 20th Combined Arms Army gathered by the front lines, remaining stationary for two hours as their general inspired them with a speech. The inspiration was short-lived when Ukrainian High Mobility Artillery Rocket System (HIMARS) rockets struck their open-air position, killing an estimated 100+ Russian soldiers.[36] Six months earlier, 63 Russian soldiers were killed, and hundreds were wounded in a New Year's Eve attack as they assembled to watch a televised speech from Putin.[37]

Unfortunately for Russian families, this is a repeat lesson. On Feb. 20, 2024, Russian soldiers from the 367th Guards Motorized Rifle Brigade were waiting for the arrival of MG Oleg Moiseyev when a Ukrainian artillery strike killed more than 60 of them.[38] On May 1, 2024, a single artillery rocket killed 100+ Russian soldiers as they waited for a visiting general.[39] Massing hundreds of people in open areas for several hours is a disastrous invitation for catastrophic artillery strikes.

Rehearsals. Brigade or division-level combined arms rehearsals (CARs) can mass hundreds of people in open areas for several hours as they analyze terrain models. Despite doctrinal warnings,[40] CARs often devolve into overly scripted productions with questionable returns. Leveraging existing technology to execute dispersed CARs is one way to prevent catastrophe.[41] With this in mind, leaders should practice dispersed rehearsals to minimize unnecessary consolidation.

Command Posts. The prevalence of drones and electronic warfare (EW) in LSCO has rendered large command posts (CPs) a risky proposition. According to U.S. Army doctrine, CPs are "extremely vulnerable to detection from air and space, as well as in the electromagnetic spectrum. Army forces must ensure their CPs are difficult to detect and dispersed to prevent a single strike from destroying more than one node."[42] When combined with the increase in AI and EW capabilities in the nation's acute and pacing threats, the Ukraine war "makes it clear that the electromagnetic signature emitted from the command posts of the past 20 years cannot survive against the pace and precision of an adversary who possesses sensor-based technologies, EW, and unmanned aerial systems."[43]

The slow displacement of large CP tent amalgamations and their attractiveness as enemy targets make them a liability in modern warfare. Large CPs are used because they promote collaborative planning associated with the military decision-making process (MDMP). Experience suggests that collaboration is significantly more complicated if staff personnel are dodging artillery. Dispersing CPs among existing structures/buildings increases concealment and can potentially mask electromagnetic signatures. Dispersal may degrade collaboration, but so will enemy artillery fire.

4. Laborious Planning Processes

The Russian invasion of Ukraine, which began with a three-axis attack, serves as a stark reminder of the critical need for rapid reaction to emergent changes in military planning. The successful eastern attack and subsequent Ukrainian counterattacks forced changes in Russian planning assumptions,[44] revealing gaps in the Russian military's command-and-control (C2) processes at multiple levels.[45] The absence of well-defined higher C2 structures left the subordinate units unable to react rapidly to emergent changes, underscoring the importance of such

structures in ensuring rapid and effective responses.

This implies another wooden ship for the Army - laborious MDMP planning. The MDMP is a collaborative process among staff and between echelons,[46] and it's the backbone of the U.S. Army planning processes from battalion to division levels. It plays a crucial role in professionalizing junior Army officers, as evidenced by the significant instructional time dedicated to teaching the MDMP in the captain's career course and at the Command and General Staff College.[47]

The MDMP is, therefore, necessary and beneficial due to its collaborative nature. As organizations face more complex problems, they are provided additional assets that require additional collaboration and synchronization to deliver the maximum combat power at a decisive place and time. Synchronizing these assets is necessary to achieve convergence in multi-domain operations,[48] but it often involves deliberation that slows the planning process at all echelons. When effective, the MDMP can be a thing of beauty – but wooden ships are also beautiful. The MDMP's downside – however collaborative - is that it is often unable to keep pace with rapidly changing situations.

The situation in Ukraine is a stark reminder that conditions in LSCO can change rapidly and significantly. This aligns with observations from the Army's warfighting exercises (WFXs)and combat training centers (CTCs). Key observations from recent WFXs indicate that when actions are directed in fragmentary orders that are desynchronized and inconsistent with the current enemy or friendly situation, tempo stalls and units fail to achieve their tactical objectives.[49] This underscores the critical need for organizational planning to remain agile, as failure to do so can lead to defeat. CTC trends show that subordinate battalions often receive their orders from their higher brigades within 24 hours or less before execution,[50] further highlighting the need for rapid and agile planning.

Army CTCs, WFXs, and analysis from Ukraine indicate that Army organizations cannot publish rapid and synchronized guidance to their subordinates in a way that keeps pace with LSCO. The gap in planning processes from the battalion to the division level has been consistent during the last 10 years. This begs the question: What is the root cause of this problem? Is there a gap in officer education, or is the process too laborious to be done effectively in a time-constrained fashion?

Another approach is the rapid decision-making and synchronization process (RDSP), a better alternative for time-constrained environments. The RDSP mirrors the MDMP,[51] but is truncated to meet the constantly changing demands of LSCO. If the MDMP is collaborative (i.e., meeting/briefing-focused), then the RDSP is a product-focused process. The RDSP focuses on producing the minimal necessary fighting products as rapidly as possible to give subordinates coherent and synchronized guidance.[52]

While the MDMP provides a foundation for Army planning, units must practice with RDSP to become more agile and adaptive in LSCO. Commanders must train their staff personnel to assess changing situations and produce coherent, synchronized orders in a timely fashion and with minimal products to maximize their subordinates' planning time.[53] Due to the fast-paced nature of LSCO, the decisions made within a brigade or division targeting decision board may be outdated by the time the meeting ends. Staff personnel must be experts with RDSP to remain agile and effective in LSCO; such expertise can only come through relentless training.

5. Complex Technology

The war in Ukraine has shown significant issues with the performance of Russian equipment. Poor maintenance led to Russian equipment failure, with some munitions and equipment reporting a daily failure rate of up to 60 percent.[54] While systemic maintenance discipline is itself challenging, more complicated technology adds seemingly exponential strain to maintenance and logistical systems.[55]

The Army loves the wooden ship of complex technology. The Army's continued march towards modernization often involves implementing the newest technological advances on its existing platforms. Each addition becomes reminiscent of the fictional Dr. Ian Malcom from Jurassic Park: "Your scientists were so preoccupied with whether or not they could, they didn't stop to think if they should."[56] Each addition of complex technology or equipment offers Soldiers a new capability – something new they "can" do. When those systems are fully mission-capable, they are incredible. However, every field training exercise has shown that Soldiers must accomplish their missions in less-than-optimal conditions and with equipment that may or may not work. The more complex the technology, the harder it is to fix, especially in the field. The M1A2SEPV3 Abrams tank and the command post computing environment (CPCE) are two examples of this wooden ship.

Abrams tank. The M1A2SEPV3 Abrams tank has thermal sights and a low-profile common remotely operated weapon station (CROWS) to fire the tank commander's M2 machine gun. The CROWS works excellently if the turret has power and is operational. If the CROWS is down or the turret power is out, the tank commander must open the hatch, pull pins, and fire the machine gun manually from a significantly exposed position. Additionally, fixing a CROWS requires specific electronic parts and a crane to lift it, inhibiting field-expedient repairs.

Contrast this with an earlier version of the Abrams tank. The M1A1 had a commander's weapon station that could easily be switched to manual mode, allowing the tank commander to engage the machine gun from a closed hatch position, even if all electrical systems went down. While that system did not have any thermal or limited visibility sight systems, the simplicity of the earlier system allowed the tank commander to engage targets from a closed hatch position using manual cranks, significantly reducing the risk from sniper fire or drone-dropped munitions, as evidenced in Ukraine.[57]

With the push towards even smaller crews and greater automation on the next generation of tanks, the wooden

ship of complicated technology introduces even more risk. The greater integration of artificial intelligence (AI) sensors and automation, coupled with the proposed reduction to the basic tank crew from four to three personnel,[58] have significant implications for crew stability, degraded operations, crew situational awareness, and basic vehicle maintenance. In an ideal scenario, integrating this technology would enhance crew capabilities, but what happens when a two- or three-person crew throws track? With the potential for no turret position,[59] how will the crew maintain situational awareness when onboard AI sensors fail due to enemy jamming? Such technological advances may provide incredible capabilities but may prove liabilities in less-than-optimal conditions.

Command post computing environment (CPCE). The CPCE is a cloud-based collaborative program and the current system of record for brigade and above CPs to facilitate briefings and real-time information-sharing. With unlimited bandwidth, this is a powerful collaborative tool. Unfortunately, bandwidth management is a challenge that significantly diminishes the CPCE's capabilities.[60] This forces many division commanders during WFXs to return to low-tech solutions such as paper maps with acetate overlays to visualize the battlefield and communicate their intent more clearly.

While maps and overlays may represent a different type of wooden ship to some leaders, collaborative planning technology is not meant to merely help a leader understand or visualize the problem. It's also meant to describe and direct that vision once they have understood the battlefield. The Army's overreliance on complex technology may hinder a leader's ability to understand, visualize, and describe as staff gets so focused on using the technology to direct subordinates.

The addiction to the wooden ship of complex technological solutions should cause leaders to ask several questions. Does this complex technological solution add actual combat power to our formations? Leaders should not be averse to incorporating new technologies, but those advances must be intuitive to use and either a) simple to fix in the field, or b) cheap and easy to replace quickly. Each new piece of complex technology is intended to add greater capability to units, but it cannot be so complex that it defies a field expedient fix.

Conclusion

The evidence from Ukraine suggests several areas that should challenge how Army leaders think about the next war. Artillery will dominate LSCO, with implications for towed artillery and casualty planning. Drones and EW in the next fight mean leaders must disperse their CPs and their forces. The pace of LSCO will necessitate rapid planning approaches and a need for simplified sustainment processes.

No one person can accurately predict all of what the next war will bring and the associated wooden ships that will warrant future examination. Predictive limitations aside, however, Army leaders can still anticipate some things. Those who fail to ask self-critical questions will be trapped in cognitive processes that may not work in the next war. Army leaders must examine the wooden ships that have served them faithfully in the past lest they lose tomorrow's war by holding on to yesterday's successes.

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Lessons Learned from Warrior Fortitude 23

by MAJ Devin Osburn

The challenges experienced during the deployment readiness exercise (DRE) "Warrior Fortitude 23" highlighted the importance of routinely conducting DRE exercises from the continental United States to the Korean Theater of Operations (KTO). Given that service in Korea is generally a short tour, ranging between 9 to 12 months, there is a high-rate of personnel turnover, which impacts unit continuity. Thus, Warrior Fortitude 23 and similar exercises should be conducted annually to ensure resilient systems and processes exist to rapidly generate and integrate combat power persist. The execution of Warrior Fortitude 23 presented unforeseen challenges in several areas, most notably in communications, mobility, and training area requirements and limitations. This article will capture lessons learned and provide recommendations for future Korea Rotational Force (KRF) units.

Eighth Army conducted a partial validation of the KTO's oprerational employment data in August 2023. 3rd Squadron, 61st Cavalry Regiment, 2nd Stryker Brigade Combat Team, 4th Infantry Division, supported the operation by accommodating training for a combined arms battalion minus (CAB (-)) from 3rd Armored Brigade Combat Team (ABCT), 1st Armored Division (AD), using equipment from the Army's Prepositioned Stock (APS). 3-61 Cavalry's mission was to facilitate reception, staging, onward movement and integration (RSOI) of 1st Battalion, 77th Armored Regiment, 3rd ABCT, 1 AD - the gaining tactical unit (GTU) - with a primary emphasis directed towards onward movement of equipment and integration responsibilities.

Communications and reporting procedures caused friction during the initial stages of the exercise due to the speed of trans-Pacific information without a defined PACE plan or specified reporting requirements. During the planning phase, all parties signed non-disclosure agreements (NDA), which limited coordination and collaboration. Due to the NDA and relative inexperience of the staff at echelon, reporting requirements were frantic after the first alert. The desire/need for information outpaced the capability of the GTU. With limited prior experience in the KTO, communications between 1 AD, III Corps, Eighth Army and subordinate commands required deliberate liaison officer emplacement. Future iterations of the DRE must include a clearly defined primary, alternate, contingency and emergency (PACE) plan and reporting requirements to mitigate communication shortfalls and to establish battle rhythm reporting requirements. By conducting a DRE annually, the staff at echelon will further optimize the information flow and enhance the efficiency and effectiveness of deployment operations. Since the exercise will be iterative, the staff can continue refining the required products to standardize RSOI.

The onward movement of equipment from Camp Carroll to Rodriquez Live Fire Complex (RLFC) was challenging due to the constrained timeline. Korea licensing requirements in armistice did not allow 1-77 Armor to conduct ground convoys. Therefore, all equipment required line haul and rail movement of APS equipment. Moreover, the Camp Casey Rail Yard has limited capability for a large influx of equipment, which constrains the generation of combat power. During rail operations, one train arrived with equipment facing the wrong direction, requiring a crane to offload each railcar and causing further delays to the timeline. Thus, when conducting rail operations in the KTO, it is imperative to understand the capabilities and timelines associated with planning the buildup of combat power on the Korean Peninsula. Furthermore, tactics, techniques and procedures need to be established at the outgoing railyard to ensure equipment is facing the correct direction at the receiving railyard to expedite the equipment transfer.

Figure 1. Cranes provide support to unload tanks at the Camp Caey Railyard, August 2023 *(U.S. Army photo by MAJ Devin R. Osburn, Operations Officer, 3-61 Cavalry, 2nd SBCT, 4th ID)*

Figure 2: Members of the Republic of Korea Army (ROKA); U.S. Forces Korea (USFK); 2nd Infantry Division; 2nd Stryker Brigade, 4th Infantry Division; and 1-77 Armor pose following the completion of Warrior Fortitude 23. *(U.S. Army photo by LTC Daniel R. Bell, squadron commander, 3-61 Cavalry, 2nd Stryker Brigade Combat Team, 4th Infantry Division)*

Training at RLFC has restrictions not typical to ranges in the United States due to impacts on surrounding communities. For instance, the live fire training timeline is 8 a.m. to 10 p.m., Monday through Saturday, unlike 24-hour training timelines allowed in the United States. This forced the GTU to adhere to a strict timeline to meet mission requirements.

To test and validate the readiness of the APS fleet, 1-77 Armor conducted tank gunnery and Bradley test fire at RLFC once the equipment arrived. Concurrently, 1-77 Armor conducted small arms qualification ranges and team/squad live-fire exercises at the Story Live Fire Complex – an adjacent training area about an hour from RFLC. 3-61 Cavalry provided 1-77 Armor with templates to facilitate their planning efforts based on their experience on the Peninsula. Due to the limited time to plan, resource, and execute the training, 3-61 Cavalry also established contacts and coordination for contracting, reserving training areas, and required life support. As the KRF-13 Unit, 3-61 Cavalry had direct contact with RFLC Range Operations to set conditions for the GTU to accomplish all U.S. Army Forces Command (FORSCOM) tasks and train with minimal distractions. Since KRF units change every nine months, there was a knowledge gap in KTO training requirements, which could be codified by conducting DREs annually and establishing standing operating procedures that could be transferred during relief in place/transfer of authority operations.

The lessons learned in communications, mobility, and training area requirements are enough to justify an annual DRE exercise in the Korean Theater of Operations. Warrior Fortitude 23 was a successful DRE exercise due to the tenacity of 3-61 Cavalry and all parties involved. Still, several lessons were learned at each echelon, from FORSCOM to the battalion level. Every obstacle encountered forced leaders to adapt and overcome to accomplish the mission. Continued and iterative DRE exercises are essential to validate capabilities and to develop leaders able to fight tonight and win in the Indo-Pacific.

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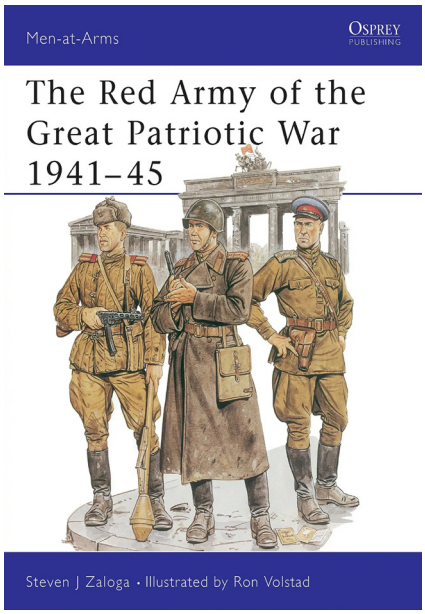
Acronym Quick-Scan

ABCT – armored brigade combat team
APS – army prepositioned stock
DRE – deployment readiness exercise
FORSCOM – U.S. Army Forces Command
GTU – gaining tactical unit
KRF – Korea Rotational Force
KTO – Korean Theater of Operations
NDA – non-disclosure agreements
PACE – primary, alternate, contingency and emergency
RFLC – Rodriquez Live Fire Complex

BOOK REVIEWS

The Red Army of the Great Patriotic War 1941-45 by Steven J. Zaloga, illustrated by Ron Volstad; New York: Osprey Publishing; 1989; 45 pages with index, color plates of uniforms, various charts on Soviet uniform details and photographs; ranges from $4 to $17.95 on eBay.



Less is often more, except when it isn't on certain subjects. Osprey Publishing in its various series is perhaps the best known of the "less is more" publishing genre or, more pointedly, their less at least gets you to the starting line of familiarity. Steven Zaloga's work The Red Army of the Great Patriotic War 1941-45 is but another in this series.

The back cover leads off with a typical teaser that this is going to emphasize the campaigns in the Ost Front but in its last sentence tells us "This title examines the organization, equipment and uniforms of the Red Army of the Great Patriotic War." This might be a bit deceiving to the casual buyer but seems unlikely for the readers of ARMOR magazine to not understand what this volume will entail.

No one is going to mistake this for an exciting or gripping account of the Great Patriotic War. But does the book achieve its purpose, and that to me was to provide an overview of the Red Army with an emphasis on enabling the reader to understand how to read the uniforms of the Red Army. The opening of the book is a brief overview of how the Red Army went into the Great Patriotic War. Of greatest interest is the rare picture of some Soviet sappers who, even in September 1941, are wearing the 1936 helmet that looks very Germanic.

One might have expected upfront that Zaloga would pay lip service to the change in Red Army officer uniforms, as the egalitarian post-Czarist trend in uniforms was done away with. Zaloga addresses the topic halfway through the book, noting how the Red Army clearly re-established the authority of its officer class, doing so by the reintroduction of rank and then shoulder boards. Zaloga scathingly notes that these uniform political decisions had come to be seen as preposterous, but political influences and ramifications were still seen as the Red Army struggled to avoid traditional Russian insignia and ranks.

But it's the uniform plates that are the stars of this book. Starting with the defense of the Brest Fortress, you will spend time looking at the details of this and other plates. The Brest Fortress plate is great, with a NKVD officer and a senior battalion kommisar looking tense, fatigued and a bit grimy, while clearly showing the difference in uniform classes. It's ironic that the Soviet Union, which had strived to be a classless society, reintroduced the concept of class by clearly delineating the branches and ranks in such detail. (Consider how when the U.S. Army went to a more egalitarian uniform that eliminated branch insignia on it to make everyone equal, making it harder to rapidly identify someone by a branch if you needed them for that specific purpose.)

In Plate C, we even see the budenovka cap of the early Red Army, which traces its lineage back to the "cap of Jericho" helmet worn by bogatyrs, the legendary heroes of Russian folklore. The Cossack plate is great in its detail. But in irony of ironies, we end with a plate of a NKVD internal-security officer, just like how the plates started, reflecting the control the Party wielded within the Red Army.

It is easy, as I did, at first to dismiss this as a thin book, meant more for modelers and re-enactors. Instead, I came to appreciate what Zaloga managed to cram into the volume. It is indeed a useful addition to East Front aficionados, as many of the war history works don't drill down to this level of basic organization. My favorite factoid was Zaloga's noting how the Red Army had special captured-weapons detachments that collected the large number of captured panzerfausts and reissued them, with particularly devastating effect for the Battle of Berlin.

All in all, The Red Army of the Great Patriotic War 1941-45 is both an entertaining and informative buy.

RETIRED LTC (DR.) ROBERT G. SMITH

172nd CAVALRY REGIMENT

The distinctive unit insignia was originally approved for the 172d Infantry Regiment on 14 August 1923. It was redesignated for the 172d Armor Regiment on 20 February 1970. The insignia was redesignated for the 172d Cavalry Regiment on 10 October 2006.

The shield depicts Mt. Mansfield and the Camel's Hump , the characteristic portion of the Green Mountains, recall not only the popular name of the State but also the record of the "Green Mountain Boys" in all the wars of the country and particularly in the Revolution. The silver cross was the badge of the old "Vermont Brigade," 2d Division, 6th Corps, one of the most famous Brigades of the Civil War. The motto is General Sedgwick's famous order to the 6th Corps on 1 July 1863, when it started on its 32-mile march from Manchester to Gettysburg "Put the Vermonters ahead and keep the column closed up." Crest: The crest is that of the Vermont Army National Guard.

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