Infantry

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Jungle Operations

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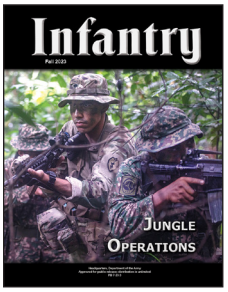
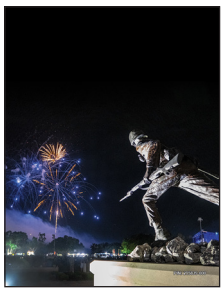


FRONT COVER:

Soldiers from the 3rd Infantry Brigade Combat Team, 25th Infantry Division and Malaysian Armed Forces patrol the jungle during a field training exercise for Keris Strike 22 on 14 June 2022 in Malaysia. (Photo by PFC Wyatt Moore)

BACK COVER:

The Infantryman statue in front of McGinnis-Wickam Hall on Fort Moore, GA, is pictured during the installation's Independence Day Celebration on 24 June 2023. (Photo by Patrick A. Albright)



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Commandant's Note

BG LARRY BURRIS

After highlighting Arctic operations in our Spring issue, in this edition of *Infantry*, we leap to the opposite end of the spectrum and head into the jungle. While the Army has an extensive history of conducting operations in this environment, the two decades of operations in the Middle East, as part of the Global War on Terrorism, drew our attention elsewhere. As the Army refocuses on near-peer challenges, the Indo-Pacific region has emerged as a key area of importance, and it is imperative the force continues to learn and master the fundamentals of jungle operations.

Throughout its 82-year existence, the 25th Infantry Division has spent most of its time operating in the challenging terrain and climate conditions typical of jungle environments. The Division continues to build on its reputation as the Army's premier jungle experts as it operates the branch's only Jungle School and carries out its mission to "deter adversaries by building, sustaining, and forward-posturing ready forces alongside allies and partners in the Indo-Pacific area of responsibility."

This edition opens with a foreword from the Tropic Lightning Division's Commanding General, MG Joseph Ryan, who provides an overview of the division's history and introduces the themes of our featured articles. These subsequent seven articles highlight division leaders' experiences and lessons learned from participating in numerous Operation 'Pathways' exercises, Joint Pacific Multinational Readiness Center rotations, and Jungle Operations Training Course (JOTC) iterations.

A key lesson is stated in one of the article's titles: "The Jungle Is Neutral." This environment shows no partiality, and its harsh conditions can frustrate and humble even the most seasoned Soldiers. The 12-day JOTC is an important tool to provide service members from across the force with the critical skills needed to survive and thrive in this environment. In his article on the critical role of JOTC, CPT Mac Lalor makes an excellent point that Infantry Soldiers are not the only ones who will benefit from attending the course. It is also imperative for leaders and non-combat arms Soldiers to receive the training as it will help them understand the risks and challenges of all activities they can or will face in the jungle.

One function that faces immense challenges in this environment is sustainment. CPT Wells Rugeley's article, "Prolonging Operational Reach in Contested Jungle Environments," discusses the need to adapt and modernize forward support companies in order to conduct successful tactical-level sustainment operations in the Indo-Pacific. He lists several recommended solutions to these challenges, which include fielding additional utility task vehicles, aerial resupply vehicles, modular fuel tanks, and water purification equipment.

Another of our featured articles, "IBCT Distributed Command and Control," discusses a series of command and control experiments the 25th Infantry Division's 2nd Infantry Brigade Combat Team recently completed during four training events. The authors share four concepts that were either taught or reinforced during these events, including the importance of masking sight, heat signatures, electronic signals, and sound; focusing on employing the capability not deploying the capability; expanding leaders' concept of the rear area; and constantly aligning the "sight picture" to ensure mission command principles maintain a clear sense of purpose.

As this will be my final Commandant's Note, I also want to take the time to thank all those who are assigned and support the U.S. Army Infantry School. Among these individuals are some of the most professional, determined, and passionate leaders I have had the privilege to learn from and grow alongside as a leader, friend, and mentor. I am proud to have served alongside the dedicated drill sergeants, instructors, staff, Department of the Army Civilians, and leaders who so expertly continue to mold the next generation of Infantry Soldiers, and I thank them for the vital impacts they continue to make every day towards building the most capable Infantry force possible.

In closing, Fort Moore is where tomorrow's Soldiers are born and trained, and where those returning are eager to hone-in that cutting edge for more. Being a small part of their journey — watching them grow into the leaders and teammates they will become within their career — is the most rewarding part within this seat. Helping others, just as I've been helped before, with letters of recommendation, problem solving, getting the correct POC on the line, are just a few of the most invaluable qualities this uniform has allowed me to pay forward. Remember that leadership is a gift, a gift given by those whom we lead, and this job is rooted in servitude. It has been a privilege to serve as an Infantryman in our Army for the last 28 years. I can think of no greater privilege that's provided me with lifelong friends, teammates, and memories. And for one final time, Bayonet 6, signing off.

I am the Infantry! Follow me!

An Introduction

Jungle operations dominate the history of 25th Infantry Division. Formed on 1 October 1941, two months before the attack on Pearl Harbor, the Division went on the offensive against Japanese forces on Guadalcanal, in the Solomon Islands, in early 1943 during some of the war's earliest engagements in the Indo-Pacific. The Division's tactical successes in the jungles across the Solomons and into the Philippines over the next two and a half years earned us our nickname, "Tropic Lightning." To this day, citizens of the Philippines recognize the 25th Infantry Division and our iconic shoulder sleeve insignia for enduring 165 days of fierce Japanese resistance in the thick jungle that covered the Filipino Caraballo Mountains and at the strategic Balete Pass.

Following the Korean War, the Army established a jungle training course at Schofield Barracks, the home of the 25th Infantry Division. The Tropic Lightning Division sent Soldiers to the jungles of South Vietnam as early as 1963, on a more massive scale in 1965, and engaged in various campaigns during the war through 1971. Over 1,716 consecutive days in combat, 25ID Soldiers fought in campaigns at Cu Chi, Tay Ninh, Pleiku, in the defense of Ton Son Nhut during the Tet Offensive, and in Cambodia. Despite advances in technology, fighting in the jungle required specialized knowledge reminiscent of the Division's first fights in World War II.

After Vietnam, the Tropic Lightning Division refocused to work with allies and partners in the Indo-Pacific. Exercises like "Cobra Gold" in Thailand became the Division's priority, solidifying our relationships with Armies across the region and bolstering our jungle operations expertise. After 10 years of fighting in Afghanistan and Iraq during the Global War on Terror, 25ID again returned to its roots in the jungle as the United States pivoted to the Indo-Pacific. Then-Commanding General MG Kurt Fuller established the 25th Infantry Division's Lightning Academy and the Jungle Operations Training Course (JOTC) in 2014, manned by cadre who had attended several foreign jungle schools, from Malaysia to Gabon, over the years. For the last 10 years, JOTC trained thousands of U.S. Soldiers, Joint Service Men and Women, and allies and partners.

JOTC skills are invaluable as Tropic Lightning Soldiers work alongside regional allies and partners across the Indo-Pacific today on Operation Pathways and at the Joint Pacific Multinational Readiness Center. The jungle can be a harsh teacher — with this in mind, I asked Leaders and Soldiers across the 25th Infantry Division to contribute articles for this special edition of *Infantry*. The articles explore four central themes: personal monographs and experiences from 25ID Soldiers, joint and combined operations in a jungle environment, medical and sustainment operations in the jungle, and innovation and experimentation for jungle operations. The articles should assist leaders across the Infantry, the Army, and the Joint Force to better understanding the Indo-Pacific and its unique challenges and opportunities. As this region continues to grow in importance for the United States, land forces will play an important role in defending national sovereignty, building relationships, and implementing deterrence. I hope you enjoy reading them and learning a little bit — and we will see you in the jungle soon! Tropic Lightning!

— MG Joe Ryan
54th Commanding General of the 25th Infantry Division and U.S. Army Hawaii

A Soldier with 2nd Squadron, 14th Cavalry Regiment, 2nd Infantry Brigade Combat Team, 25th Infantry Division, provides security alongside the 3rd Radio Battalion, III Marine Expeditionary Force recon team during an exercise at Bellows Air Force Base, HI, on 24 August 2022. (Photo by SGT Daniel Proper)

The Critical Role of JOTC in Preparing Soldiers for Combat in a Jungle Environment

CPT MAC LALOR

In April 1943, British Brigadier General Orde Wingate wrote a critical 61-page report on jungle warfare after leading the legendary Chindit units, combined British and Gurkha battalions, against the Japanese in Burma. General Wingate's long-range penetration units were used in Burma to cut supply lines and communications to harass the Japanese. The formations had to operate in small units far behind enemy lines. Wingate lost almost one-third of his combat power, from 3,000 troops down to almost 2,100 due to disease, starvation, and fighting a hostile Japanese enemy.[1] In the report, Wingate lists four main takeaways:

1. "Soldiers should be suitably equipped and trained: Training is more important than physical hardiness." He added that "much thought had to be given to basic jungle fighting including ambushes and close-quarter combat."

2. Formations need to be trained in river crossings, "otherwise the operation easily becomes a shemozzle."

3. Liaison officers "had to work in tandem with column commanders to coordinate supply drops and air strikes." The formations had been supplied entirely by airdrops.

4. Long-range penetration is an offensive weapon and should be employed as a vital part of the major plan of conquest. He added these tactics are only possible when the force is "extremely mobile and can live off the land."[2]

The honest and critical report on his operations in Burma caught the attention of Winston Churchill, who called Wingate "a man of genius and audacity" for pursuing innovative ways to fight in the jungle. His methods inspired the Allies to organize a new force to re-enter Burma. This led to the formation of the 5307th Composite Unit, more popularly known as "Merrill's Marauders," the predecessor to the 75th Ranger Regiment.[3]

Even after 80 years since Wingate wrote his report, one could argue the aforementioned lessons remain relevant to forces operating in a jungle environment. Anyone who has attempted a river crossing with their unit using a one-rope bridge or conducted expeditionary water resupply for a large formation knows the challenges of applying these basic skills.

In 2023, as the U.S. Army faces a dynamic security situation in the Indo-Pacific, units must learn these lessons and master the fundamentals of jungle operations. As the commander of the 25th Infantry Division's (ID) Lightning Academy, which includes the Army's only Jungle School, my team and I conduct the Jungle Operations Training Course (JOTC) to teach the basic skills necessary to fill critical capability gaps. As a recipient of jungle training while serving as a platoon leader in the 2nd Ranger Battalion in 2018 and now as the commander of JOTC, I've learned the importance of the fundamentals that Brigadier General Wingate outlined in his report. JOTC accomplishes two major tasks for the Department of Defense. First, it provides a unique skillset to thrive in hostile jungle environments. Second, JOTC creates a shared understanding by spreading knowledge back to the joint force. As strategic competition only increases in the U.S. Indo-Pacific Command (INDOPACOM) region, JOTC invests in the force by delivering the knowledge, skillset, and shared understanding to operate effectively in unforgiving, hostile jungles around the globe.

The JOTC is physically and mentally challenging and requires a unique skillset to operate effectively. The terrain in jungle environments is difficult to navigate and will surprise, humble, and frustrate Soldiers as they adapt to the dense vegetation, drastic terrain changes, thick canopy, and limited visibility. The skills required include techniques for navigation, unique battle skills, waterborne operations, and survival techniques. For example, while navigating in the jungle, terrain association becomes an increasingly important skill since "shooting an azimuth" and pace counts become less reliable in rugged terrain and impenetrable vegetation. Survival skills become necessary as roads and logistical supply routes are less frequent in a jungle. JOTC provides the knowledge and skillset for Soldiers to use the jungle to their advantage.

In addition to equipping Soldiers with necessary skills, JOTC exists to create a shared understanding across the

force. Because jungle training in not currently prevalent throughout the Army and the joint force, 25ID opens JOTC to all services, ranks, and occupational specialties. We want our junior and senior leaders, combat arms and low-density military occupational specialties (MOS), and members from our sister services to attend JOTC and spread the knowledge gained across the joint force. For example, we need our logisticians attending the course to appreciate the challenges regarding resupply in a jungle environment, and we want senior leaders to attend the course because we want them to understand the risks involved with Soldiers operating in the jungle.

Each class of the 12-day course consists of between 60-95 students with six to 12 instructors. Common culprits behind student failure include the jungle 5-kilometer run, land navigation course, and the combat water survival assessment.

Due to the difficulty and importance of this training, the instructors must ensure that the skills are taught in the most efficient and effective way possible. JOTC instructors are constantly looking for innovative ways to improve and modernize the course. The Lightening Academy regularly works with partner nations and conducts instructor exchanges at jungle training courses throughout the Indo-Pacific. JOTC sends its instructors to various partner nations to learn and improve their own skills and tactics as well as refine teaching techniques. In addition to the instructor exchange, JOTC also conducts training in various countries throughout the Indo-Pacific, including most recently in the Philippines.

Personal Experience

Almost five years before I took command of the Lightning Academy and JOTC, I learned firsthand the value that the course provides to the joint force. In 2018, I was serving as a rifle platoon leader in B Company, 2nd Battalion, 75th Ranger Regiment, and our company flew to Hawaii for two weeks of training with the Lightning Academy and the Jungle School cadre. For a force of almost entirely Ranger-qualified Soldiers with immense combat experience and countless deployments to the Middle East, JOTC would present new, unknown challenges that would change the way we expected to operate in a jungle environment.

To prepare the company for the upcoming training event, the company leadership sent a weapons squad leader to attend JOTC to bring back lessons learned. After graduating the course, the NCO returned and gave several leadership professional development (LPD) sessions on how the company can best prepare for operations in the jungle. A month later, the entire company traveled to Hawaii for what the Lightning Academy calls “menu-based training” (MBT). MBTs are tailored training programs provided to units outside of our JOTC schedule and curriculum. These MBTs are mainly for special operations units to prepare for upcoming real-world missions or training events with partner forces.

During week one, we learned land navigation, waterborne operations, rope-based mobility training, and survival skills. Some of the unique skills included crafting ruck rafts for

Students in the 25th Infantry Division Lightning Academy’s Jungle Operations Training Course perform waterborne operations on 15 October 2022 at Schofield Barracks, HI. (Photo by SPC Daniel Proper)

riverine operations and medical evacuations (MEDEVACs) in a jungle environment. A ruck raft includes securing a group of water-proofed rucks together in such a fashion as to transport a casualty through a body of water while keeping the casualty dry and afloat. One block of instruction included a refresher on riverine crossings utilizing a one-rope bridge for river or ravine crossings. Other skills included fire craft and expeditionary water procurement.

During week two of the training, the company executed three days of platoon full mission profiles (FMPs), or situational training exercises. These included long movements through the jungle culminating in a raid or a movement to contact. JOTC cadre worked with us to plan lanes to integrate necessary skills taught the week prior.

During FMPs, I watched my platoon meet new challenges and adapt to overcome them in real time. This jungle environment was unlike any we'd operated in before. We quickly learned we couldn't rely on the familiar standard operating procedures (SOPs) forged in the Central Command (CENTCOM) area of responsibility. The dense, impenetrable vegetation forced us to adapt our SOPs and overcome these new challenges. For example, the typically simple task of establishing a support-by-fire position became a new trial as dense vegetation prevented M240B gunners from observing the objective in the prone. In this instance, I watched my weapons squad quickly manipulate our issued aircraft retention lanyards to nearby trees and an M240 to construct a secure, adjustable shooting platform to suppress an objective from both standing and kneeling positions. Training in the jungle forced us to adjust our SOPs to be successful.

While conducting long dismounted movements through the jungle, we learned the importance of expeditionary water resupply. Resupplying a platoon with water from a river using commercial filters can take hours if not rehearsed and conducted efficiently. These small lessons allowed us to gain larger insights into operating in a jungle environment. The most important lesson learned was that we had to ruthlessly train the fundamentals and be willing to learn as an organization.

Overall, this new environment forced us to think differently. We learned hard lessons and left Hawaii a better, more ready fighting force. This was the best training we could've received because had we deployed to the Indo-Pacific in crisis or conflict before training at the Lightning Academy, we would've learned much harder lessons. Training in jungle environments similar to potential combat zones in the Indo-Pacific allowed us to experience and adapt to the physical environment. Training in a jungle environment forced us to apply our knowledge and utilize those skills in creative and expeditionary ways.

CSM Thinh Huynh crosses a river while attending the Jungle Operations Training Course at Schofield Barracks in January 2021. (Photo by 1LT Angelo Mejia)

As the strategic importance of jungle operations continues to grow, the role played by the Lightning Academy becomes increasingly important for training both conventional and special operations units across the Department of Defense. Just as Brigadier General Wingate focused on small-unit fundamentals, we must remain committed to applying these lessons learned in our training. Through our comprehensive training programs with JOTC and MBTs, the jungle instructors prepare Soldiers to face the unique challenges of jungle warfare with confidence. By teaching basic, essential skills, the Lightning Academy supports the readiness and lethality of the joint force in the nation's most significant and consequential theater.

Notes

[1] Gavin Mortimer, *Merrill's Marauders: The Untold Story of Unit Galahad and the Toughest Special Forces Mission of World War II* (Minneapolis, MN: Zenith Press, 2013), 2.

[2] Ibid.

[3] Ibid, 3.

CPT Mac Lalor currently serves as the commander of the 25th Infantry Division's Lightning Academy at Schofield Barracks, HI. His previous assignments include serving as a planner and rifle company commander in 1st Battalion, 27th Infantry Regiment, 2nd Infantry Brigade Combat Team (IBCT), 25th Infantry Division. He also served with the 1st Battalion, 503rd Infantry Regiment, 173rd Airborne Brigade, and 2nd Battalion, 75th Ranger Regiment. CPT Lalor is a graduate of the Infantry Basic Officer Leaders Course, Maneuver Captain's Career Course, Ranger School, Ranger Assessment and Selection Program II, Jungle Operations Training Course, Air Assault Course, and Rappel Master Course. He earned a bachelor's degree in management from the U.S. Military Academy at West Point, NY.

The Jungle is Neutral:
Four Lawyers in Jungle School

COL CHRIS MARTIN
MAJ WILL ROTHSTEIN
MAJ NICK ALLEN
CPT CODY WAAGNER

Four 25th Infantry Division military lawyers recently spent 12 days in the Lightning Academy's Jungle Operations Training Course (JOTC), a course that emphasizes squad-level infantry tactics and jungle survival.[1] Why? For the same reason that our classmates included Infantry Ranger lieutenants, finance clerks, intelligence specialists, medics, and at least one environmental science officer: because understanding the operational environment in which we are called to train and, if necessary, fight, is a task for every rank, background, and military occupational specialty (MOS). The jungle, as we learned, is neutral.[2] It plays no favorites and imposes its challenges on the Infantryman and the lawyer alike, and all must be ready. While the practice of law is our lens for interpreting this experience, we are confident that our lessons learned extend, by analogy, to any Soldier called to be ready for jungle operations.

Our roles in the division include serving as the commanding general's senior legal advisor (staff judge advocate), the senior operational law advisor (national security law [NSL] chief), a brigade legal advisor (brigade judge advocate), and a prosecutor (trial counsel). The fact that all four of us found that jungle training enhanced our ability to perform our specialized legal roles within the division underscores the broad value of this training. Regardless of MOS, we think the benefits boil down to three tangibles: character, credibility, and competence.[3]

As to character, any course that poses mental and physical challenges hones desirable traits like tenacity and endurance. We found this to be true in JOTC. Even seasoned operators frequently comment that the jungle is no joke. The same strength of character that helped us have our wits about us and persevere while conducting land navigation in dense terrain, or laboring up and down ravines with ropes and rucks, is the same strength we can draw upon when called to resolve a late-night legal issue for a commander or assemble a closing argument in a contentious court-martial. Thankfully, jungle operations are not a solo sport. Most JOTC tasks are performed as a squad. Solving challenges like setting up an overnight shelter using only scavenged materials requires teamwork and team building, which develops leadership and followership traits.[4] All of us benefit by practicing the art of being better leaders and followers.

As to credibility, the lawyer's perspective is simple: know your client. As military lawyers, our client is the Army. The Army, to repeat the harsh rhetoric, kills people and breaks things. The Army in Hawaii, spearheaded by the 25ID, operates in the most consequential region in the world today alongside a multitude of Indo-Pacific partners and allies across harsh and varied terrain.[5] An NSL chief who has experienced the on-the-ground realities of jungle operations

A Soldier in the Jungle Operations Training Course crosses a water obstacle using a one-rope bridge on 24 September 2022. (Photo by SGT Daniel Proper)

is better equipped to introduce legal planning considerations into large-scale combat operations in a way that the G3 team is likely to understand and accept. A brigade judge advocate who has trained the same way that his or her unit fights is more likely to gain respect and recognition during tactical-level working groups with the brigade staff. A prosecutor who has earned a Jungle tab operates with more credibility when he or she is advising a commander or recommending case disposition regarding a Soldier who's trained in that same environment. Sharing common ground helps foster shared understanding. This leads to increased trust.[6] While our examples are lawyer-focused because that is what we know, we again believe that these takeaways can apply to any MOS.

Credibility, as the examples above make clear, segues into competence. None of the lawyers writing this article are Infantry officers.[7] None of us are likely to take point during a clearing operation or ambush in actual combat. As lawyers, we want to be better at our jobs and understand as much as possible what it is really like for the Soldiers and leaders who do take point, plan the movement, or command the operation. The jungle plays no favorites and does not differentiate between the lawyer and the Infantryman. Success in the jungle requires both physical and mental preparedness. The judge advocate who has personally experienced exhausting movements through jungle terrain, and the difficulty of spotting the enemy in dense brush, is better equipped to advise on more sensible rules of engagement, gauge the application of the Laws of Armed Conflict, effectively advise joint air-ground integration centers, and weigh and advise on risk.

As lawyers to a combat division, we don't practice in office high rises because that's not where our Army fights. We must be ready to advise leaders, administer legal support, and pursue justice in the conditions in which we may be called to train and fight. Part of that includes enduring realistic training to experience being "comfortable with being uncomfortable" in the wet, the cold, and the austere. Does knowing how to set up a one-rope bridge, rappel down a cliff, or execute squad ambushes in jungle terrain make us better Army lawyers? Our unequivocal answer is "yes." As a lawyer, I may not need to know how to tie a double figure-eight knot in the courtroom. Then again, I might — if an investigation or case involves, for example, an accident during training or combat.[8] Or, if a forward command post that includes a judge advocate comes under enemy attack, all hands must engage.[9] Judge advocates are Soldiers, too.[10] We think this analogy applies to every MOS and specialty skillset: The better we each understand our common operating environment, the more we can learn to use that environment as a force multiplier rather than a distractor — working with the jungle, as opposed to against it.

A 25th Infantry Division Soldier briefs his squad before conducting a patrol lane during the final week of the Jungle Operations Training Course at Schofield Barracks. (Photo by 1LT Angelo Mejia)

Certainly, not every lawyer or paralegal in our division has attended JOTC, nor has every medic, squad leader, logistics officer, or even infantry leader. Not everyone may have the opportunity. Our suggestions here take nothing away from the fact that these leaders of varied experiences and backgrounds can no doubt perform their roles brilliantly without JOTC. But we remain convinced, for those able and willing to partake, that jungle training has immeasurable benefits for anyone called to operate in this unique environment.

Notes

[1] The four authors did not all attend at the same time; this article reflects our collective experiences across three JOTC iterations spanning just over 12 months.

[2] F. Spencer Chapman, *The Jungle is Neutral* (NY: W.W. Norton 1949).

[3] We gleaned these traits as related, but not identical to, the Army Ethic which expresses "character, competence, and commitment" as moral principles that guide the Army profession. Army Doctrinal Publication (ADP) 6-22, *Army Leadership and the Profession*, July 2019, Figure 3.

[4] See ADP 6-22, 1-90 through 1-104 (discussing the role of both leadership and followership).

[5] The 2022 National Security Strategy remarks that in the "decisive decade" of the 2020s, the "pacing challenge" of the United States is the People's Republic of China and that the Indo-Pacific region will be the "epicenter of 21st century geopolitics." White House, National Security Strategy 6, 20, 37 (October 2022). Among numerous other recent statements by U.S. leaders, Secretary of Defense Lloyd Austin remarked in a May 2023 interview that "no region is more consequential in shaping the world we live in today — and the course of the 21st century." Ryo Nakamura, "Indo-Pacific Is Most 'Consequential' Region for 21st Century: Austin," NikkeiASIA, 31 May 2023, accessed from https://asia.nikkei.com/Editor-s-Picks/Interview/Indo-Pacific-is-most-consequential-region-for-21st-century-Austin.

[6] See, e.g., Chaplain (MAJ) Jared L. Vineyard, "Trust: A New Formulation of a Fundamental Principle," *Infantry* (Fall 2022) (urging a renewed emphasis on trust as a fundamental principle of Army leadership).

[7] Though not currently employed as Infantry officers, there are numerous former Infantry officers and Rangers, as well as many other branches, among the ranks of judge advocates, who are recruited for the unique value they bring to the Army JAG Corps. See the Funded Legal Education Program at https://www.jagcnet.army.mil/GoArmyJAG/Funded-Legal-Education-Program.

[8] Military trial law allows, for example, the use of in-court demonstrations when they will help the factfinder to better understand evidence or testimony.

Students attending the Jungle Operations Training Course execute the course's culminating event, the Green Mile, on 23 September 2021 at Schofield Barracks, HI. (Photo by SPC Jessica Scott)

[9] The war in Ukraine provides a clear-eyed view of how modern intelligence, surveillance, and reconnaissance (ISR) and weapons render traditional command posts easy and effective targets, requiring every member of a command post to be ready to move and defend themselves on a moment's notice. For a thorough analysis of modern command post vulnerabilities, see LTG Milford Beagle, BG Jason Slider, and LTC Matthew Arrol, "The Graveyard of Command Posts: What Chornobaivka Should Teach Us About Command And Control In Large-Scale Combat Operations," *Military Review* (May-June 2023), accessed from https://www.armyupress.army.mil/Journals/Military-Review/English-Edition-Archives/May-June-2023/Graveyard-of-Command-Posts/.

[10] No one better describes the Soldier-legal dual professional role better than the JAG Corps' own Regimental Command Sergeant Major: "As dual professionals, we need to leverage our experiences, training, and technical expertise — as well as our education — to support lethality… Regardless of our technical Military Occupational Specialty (MOS), our field craft is our foundation for service. We serve to fight and win our Nation's wars." CSM Michael J. Bostic, "Tactically and Technically Proficient: Balancing Lethality with Technical Competence in a Comprehensive Field," Order of the JAGWAR, 16 June 2021, accessed from https://orderofthejagwar.com/news/csm-bostic-dual-profession.

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Fire Support in the Jungle

COL JOSEPH KATZ
MAJ RYAN YAMAUCHI
1LT DAVID J. BLOCK
1LT RUVI SIRMANS

"If you want to keep alive in the jungle, you must live as the jungle does."

– John Wyndham

Introduction

Dense vegetation, limited visibility, thick canopy, and highly restricted mobility corridors create significant challenges for the integration of fires in a jungle environment. The 25th Infantry Division (ID) trains and experiments to effectively overcome these challenges and integrate fires into the combined arms jungle fight. As light fighters tactically traverse the jungle floor to secure an objective, the thick, tangled, overgrown vegetation limits mobility and places a heavy emphasis on support from indirect fire and combat aviation units. Division Artillery (DIVARTY) and Combat Aviation Brigade (CAB) units across the 25ID understand and embrace the requirements to deliver integrated surface-to-surface and air-to-surface fires, to include:

- Proper positioning of ground and aerial observers in locations that offer line of sight on priority targets and enable effective tactical communications;
- Locating mortars, howitzers, or rocket systems in unmasked locations that can range enemy targets and penetrate jungle canopies effectively;
- Employing munitions that penetrate/burn canopy and then destroy targets within that opening; and
- Appreciating the relentless impact the jungle environment has on metal and the intense maintenance required for helicopters and fire support systems.

While jungle Soldiers are faced with physically demanding, austere, and rugged terrain that limits both target observation and communication from sensor-to-shooter, 25ID Soldiers consistently train in this harsh environment to be best prepared for fighting and winning throughout the Indo-Pacific. This article will discuss this training, environmental considerations, employment methods, and training opportunities for DIVARTYs and CABs with a jungle mission.

Environmental Considerations for Artillery and Aviation

While challenging, the effective integration of combined arms fire remains as necessary in the jungle as in all other operational environments. Maneuver commanders must synchronize towed artillery, organic mortars, rocket artillery,

A Soldier in Alpha Battery, 2nd Battalion, 11th Field Artillery Regiment, 25th Infantry Division, pulls security during training as part of Joint Pacific Multinational Readiness Center 23-01 on the island of Oahu, HI, on 2 November 2022. (Photo by SFC Sean K. Harp)

close air support, and aviation assets to suppress hostile adversaries and enable ground force freedom of maneuver. Based on years of training together not only in the jungles of Hawaii, but also in partner nations such as the Philippines, Indonesia, Malaysia, Thailand, and Australia, 25ID fire supporters, aviators, and maneuver Soldiers have become adept at fires integration.

The Indo-Pacific is dominated by thousands of hot and humid islands, open oceans, rugged mountains, and densely packed urban centers. This environment is challenging but also presents opportunities. One often assumes that artillery and aviation assets are limited by jungle and archipelagic operations; however, the challenging terrain features can be mitigated through careful preparation, training, and integration of the targeting process.

The difficulty in locating and observing jungle targets makes dynamic targeting much more common than deliberate targeting. Dynamic targeting involves the process of finding, fixing, tracking, targeting, engaging, and assessing the enemy — requiring the audio and visual identification of tire or boot tracks, broken brush, human intelligence (HUMINT) and signal intelligence (SIGINT) collection, open area oversight, and effective signal support to communicate these efforts. Quickly acquiring accurate target data in the jungle can be challenging for both ground and air elements.

Flying in the jungle is also a significant challenge with unique risks to the pilots in command. The dense foliage of the jungle severely restricts flight visibility, making it difficult for pilots to navigate and identify potential hazards. The biggest challenge for an Apache pilot is putting sensors and eyes through the canopy. The reduced visibility also hampers situational awareness, increasing the risk of collision with trees or other obstacles. Two key strategies for mitigating risks include staying proactive in mission planning and maintaining effective communication with ground forces during operations.

Soldiers from the 25th Infantry Division's 3rd Battalion, 7th Field Artillery Regiment, fire an M777 howitzer during training at Pohakuloa Training Area, HI, on 7 November 2022. (Photo by 1LT David Block)

Employment of Artillery in the Jungle

The jungle is extremely conducive for light, towed artillery. The maneuverability of the M119A3 (105mm) howitzer makes it the ideal weapon system for soft jungle floors, tight maneuver corridors, and the air assaulting of howitzers deep into restricted jungle terrain. Similarly, organic 120mm, 81mm, and 60mm mortars are tremendous indirect fires assets within the challenging confines of jungle terrain, and while they lack the range of the M119A3, they prove to be outstanding in the close fight. The M777A2 (155mm) is effective for increased engagement range, but due to weight and the requirement to be towed by M1083/1084 Light Medium Tactical Vehicles (LMTVs), it lacks the nimbleness of the M119A3 in jungle operations. Self-propelled M109 Paladins (155mm) are even heavier, less maneuverable, and lack the air assault capability of an M119A3 or M777A2 and therefore are not suitable for jungle operations.

Rocket artillery is effective in jungle operations, not because of its maneuverability, but because of the significant range it offers and the ability to engage targets within the jungle from a significant distance away. The M270 Multiple Rocket Launch System (MLRS) and M142 High Mobility Artillery Rocket System (HIMARS) are capable of engaging targets within the jungle canopy from hundreds of kilometers away — with the Army Tactical Missile System (ATACMS) missile ranging to over 400 kilometers and lesser munitions still providing at least 32 kilometers of range per rocket. The MLRS and HIMARS artillery systems are great for the division and higher to shape deep targets prior to maneuver forces entering the jungle. And while precision munitions such as the GMLRS reduce target error, these rocket systems do have significant danger-close restrictions that can limit their employment as maneuver forces progress through the jungle and into the close fight.

Regardless of the indirect fire system utilized, the heights and density of vegetation, limited lines of sight, poor signal

quality, and lack of Global Positioning System (GPS) accessibility will have significant impacts on achieving first round fire for effect (FFE). As maneuver forces establish extended security halts (ESH) or a hasty patrol base, forward observers (FOs) must maneuver into positions that provide optimal line of sight to identify accurate target location and size. The masking of trees, thick vegetation, and intervening crests often limits the effectiveness of observation and necessitates adjust fire missions.

When adjusting fire in a jungle environment, FOs may leverage a technique known as adjustment by sound. While lacking the precision of standard observation and needing to be clearly approved in the rules of engagement, this method allows suppressive fires on a hostile enemy when that enemy is concealed by dense vegetation or jungle canopy. Similar to utilizing resection during land navigation, the basic concept for adjustment by sound is with a known distance and direction to the enemy target, the FO calculates the distance and direction to the sound of the explosion from their impacting round. The FO then compares the impacting point to the target location and makes the subsequent adjustment for the next round (see Figures 1 and 2 from Army Techniques Publication 3-90.98, *Jungle Operations*).

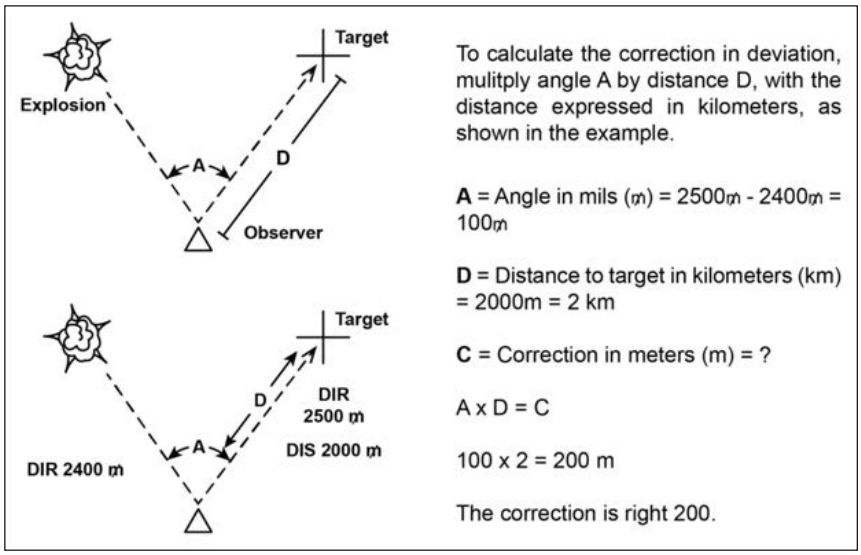

Figure 1 — Computing the Correction in Deviation

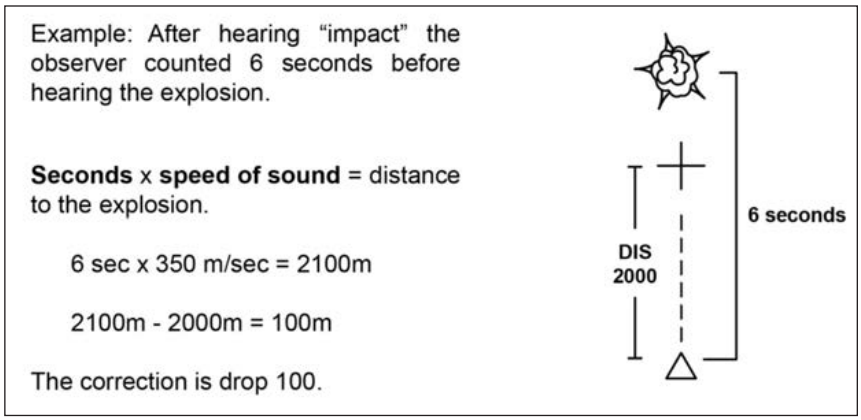

Figure 2 — Computing the Correction in Range

Additionally, utilization of appropriate ammunition for a designated target is vital in jungle operations. With enemy forces often utilizing heavy canopy for cover or concealment, FOs must consider the employment of proper shell/fuse combinations to penetrate or burn obstructive canopy. This includes airburst and delay fuses coupled with high explosive (HE) rounds to open windows within the canopy, followed by destructive HE to inflict casualties and damage below to achieve the desired effect on the target. Airbursts can also cause havoc with shrapnel raining through different canopy levels, increasing enemy casualties. Delay fuses enable munitions to detonate after entry through the canopy, exploding right above the target through synchronized time and sensing.

Sustainment of Aviation in the Jungle

Preventive maintenance is required to ensure the function and longevity of the aircraft in a jungle environment. For example, the presence of saltwater in archipelagic and jungle environments demand increased maintenance to prevent corrosion on aircraft. According to SFC Keith Sallee, a maintenance supervisor in the 25ID CAB, corrosion inspections of aircraft occur every 90 days. After each flight, the aircraft undergoes a freshwater rinse, known as the "bird bath." Before shutting down the aircraft, an "engine flush" is conducted to remove any saltwater contaminants that may have settled on the engine. Through combining these various approaches, maintenance operations can be optimized, even in demanding operational environments. These are important maintenance considerations that maneuver units must understand and consider because they affect aircraft readiness and availability for operations.

In a jungle environment, there are unique challenges and logistical considerations involved in supplying aircraft fuel. Depending on sea port of embarkation, roads, or rail systems, aerial bulk fuel delivery may be the only viable option. This problem is exacerbated when operating on smaller islands. To ensure a supply of aircraft fuel in resource-limited island environments, coordination and planning are vital. Department of Defense petroleum planners work closely with the division supply and operations sections to determine the requirements for location, equipment, fuel grade, and quantity. They also collaborate with the Defense Logistics Agency-Energy (DLA-E) Southwest Pacific representative which assists in identifying local fuel vendors or contracted airports for military-grade aviation fuel supply. In remote locations, U.S. Army fuel equipment such as tanks and fuel bags are deployed to store and distribute fuel. Additionally, military

petroleum pipelines and pumps can be set up to receive fuel from Navy fuel barges or civilian vessels.

Artillery and Aviation: A Symbiotic Relationship

This symbiotic relationship between ground-based artillery and aerial support enables the division to maneuver and adapt to dense jungle settings, gaining a significant advantage over adversaries. Being able to air assault the M119A3 or M777A2 through the jungle via Chinook or Black Hawk helicopter gives us reach in the jungle that our adversaries don't possess. Additionally, the firepower of Army Attack Aviation has the lowest risk estimated distance (RED) compared to artillery, mortars, or rockets, and with most engagements being at close proximity, this brings a significant advantage in the combined arms fight. Attack and lift aircraft each enable the division to maintain tempo in the jungle while maintaining fires capability.

The aforementioned efforts require continuous training to overcome numerous challenges. The dense foliage of the jungle can make it difficult to navigate and locate suitable landing zones for aircraft. Chinook pilots possess extensive training in navigating complex environments, allowing them to identify clearings or areas suitable for helicopter landings. Their expertise in assessing landing zones is crucial in ensuring the safe and efficient transport of heavy artillery. Once a suitable landing zone is identified, Chinook pilots use their exceptional flying skills to maneuver the aircraft in tight spaces. The agility and versatility of the Chinook helicopter enables it to hover and land in confined areas, accommodating the limited clearings in the jungle. This capability is particularly important when moving large artillery pieces like the M777A2 and M119A3 howitzers, which are heavy and require adequate space for loading and unloading. By working hand-in-hand, DIVARTY and CAB ensure that 25ID maintains a dominant and agile presence in the jungle, ensuring success in their mission and securing victory on the battlefield.

A CH-47 Chinook from the 25th Combat Aviation Brigade carries a sling-loaded M777 howitzer during a training mission on Pohakuloa Training Grounds, HI, on 7 November 2022. (Photo by SPC Wyatt Moore)

Aside from transporting equipment and personnel, the 25th CAB provides close combat attack (CCA) and close air support (CSA) to aid artillery and infantry troops during combat operations. While both mechanisms involve aerial assets, their roles and methods differ significantly. CCA involves close-range air support, typically provided by attack helicopters equipped with sophisticated weaponry. These helicopters are specifically designed to engage enemy forces near friendly troops. CAS missions focus on direct fire support, precision strikes on enemy positions, and engaging threats that are immediately threatening ground forces. The agility and versatility of attack helicopters allow for rapid response and flexibility on the battlefield.

AH-64 Apaches provide support to Soldiers during a capabilities exercise conducted by the 25th Infantry Division at Schofield Barracks, HI. (Photo by PFC Matthew Mackintosh)

Opportunities

Operation Pathways has given the DIVARTY and CAB a unique opportunity to train in the jungle environments of the Indo-Pacific, operating in countries such as the Philippines, Indonesia, Australia, Japan, and many more. Incorporating jungle training into Operation Pathways not only improves units' capabilities for specific scenarios but also enhances overall readiness and adaptability for jungle operations. Engaging with foreign allies who have expertise in jungle warfare can be mutually beneficial for all parties

involved. Foreign partners may have years of experience navigating through dense (but familiar) foliage, understanding the local flora and fauna, and recognizing enemy tactics in the jungle environment. Sharing these invaluable insights and techniques enable improved home-station training and better preparation for future conflict in the Indo-Pacific region. Through joint exercises and training sessions, units can exchange knowledge, tactics, and best practices. This collaboration fosters cross-cultural understanding and strengthens military partnerships, increasing readiness for both nations.

Back in Hawaii, the local environment affords the 25th CAB with the unique opportunity of practicing what is known as "deck landings" to remedy the challenge of jungle terrain. Deck landings have become a powerful and specialized tool used to overcome some of the challenges posed by the geography and operational requirements of the region. Deck-landing capabilities enable Army helicopters to rapidly land and redeploy from naval vessels. As previously mentioned, the Indo-Pacific's vast maritime expanses and diverse island terrain require rotary-wing aircraft to have extended operational reach. Deck-landing capabilities provide greater range and endurance to helicopters by allowing them to refuel and rearm at sea, without the need to return to land-based facilities. The 25ID utilized deck landings to maneuver ground forces aboard the USS Miguel Keith, a U.S. Navy Expeditionary Sea Base, which extended our operational reach during Exercise Balikatan in the Philippines. Operating with the USS Miguel Keith allowed the ground maneuver force to initiate operations much closer to a dispersed archipelagic island chain and mitigate terrain challenges.

Conclusion

Combat operations in a jungle environment are likely to be tough multidomain operations that rely heavily on ground and aerial fire support to be successful. Both artillery and combat aviation must consciously prepare for large-scale combat operations (LSCO) in a jungle environment by conducting training; studying tactics, techniques, and procedures; and procuring necessary equipment. As dense jungle terrain restricts the movement of many supporting vehicles, the mission success of maneuver forces will be highly dependent on the synchronization of indirect fire and air support. To do so, mortars and towed artillery will often rely on air movements for positioning and sustainment operations. FOs will need to know the type of jungle environment they are fighting in to use the correct shell/fuse combination. When observation is unavailable, FOs need to rely on adjustment of fire by sound. Due to its low REDs, attack aviation will remain tremendously effective during danger-close combat engagements. These tactics can be trained not only at home station but with allies and partners throughout the Pacific during Operation Pathways and beyond. Collaboration and teamwork between fires and aviation units are required to achieve success in any challenging operational environment. The jungle is certainly a challenging environment, and the effective synchronization of fires and aerial maneuver will enable ground forces to overcome the diverse obstacles of the jungle and accomplish mission success.

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Soldiers from 1st Battalion, 27th Infantry Regiment and 25th Combat Aviation Brigade conduct a ship-to-shore air assault from the USS Miguel Keith during Balikatan 23 off the coast of the Philippines on 21 April 2023. (Photo by 1LT Alex Choy)

IBCT Distributed Command and Control:

Where I Command Is Not Where I Control

COL GRAHAM R. WHITE
MAJ JUSTIN E. JAMES
MAJ RICHARD EATON

As one of two of the U.S. Army's most forward-postured infantry brigade combat teams (IBCTs) in the Indo-Pacific area of operations (AOR), the 2nd IBCT (Warriors), 25th Infantry Division (ID), conducted a series of command and control (C2) experiments as part of four seminal training events between August 2022 and May 2023.

The first training event was 2nd IBCT's internal field training exercise (FTX), Operation Nakoa Fleek, which took place in August 2022 on the island of Oahu as a validation exercise before execution of Joint Pacific Multinational Readiness Center (JPMRC) Rotation 23-01. The second training event was JPMRC Rotation 23-01 itself and occurred on the islands of Oahu and Hawaii in late October-November of 2022. The third and fourth training events were Salaknib and Balikatan – two Philippines-based partnered training exercises that took place March-May 2023 as part of Operation Pathways, the U.S. Army Pacific's (USARPAC's) primary contribution to campaigning in the Indo-Pacific.

With an emphasis on distributed C2, the experiments conducted by 2/25ID as part of these training events taught or reinforced the following four concepts:

Concept #1: C2 survival requires masking in the optical, thermal, electronic, and acoustic realms.[1] Key Idea — Masking is "all-domain camouflage" and is everyone's responsibility.

Concept #2: Focus on employing the capability instead of deploying the capability. Key Idea — If you want to reduce your logistical tail and remain alive, you must change your default setting and determine who deploys based on what the mission requires instead of who is on the team.

Concept #3: Expand your concept of the "rear area" to include "in sanctuary" nodes and the home-station headquarters. Key Idea — Your "rear area" is likely still way too close to the fight.

Concept #4: Constant alignment of "sight picture" is the key to maintaining distributed C2 unity of purpose. Key Idea — Holding the battle rhythm "hostage" and making disciplined but full use of the communications primary, alternate, contingency, emergency (PACE) plan is essential to maintaining the unity of purpose.

Scene-Setter and Background

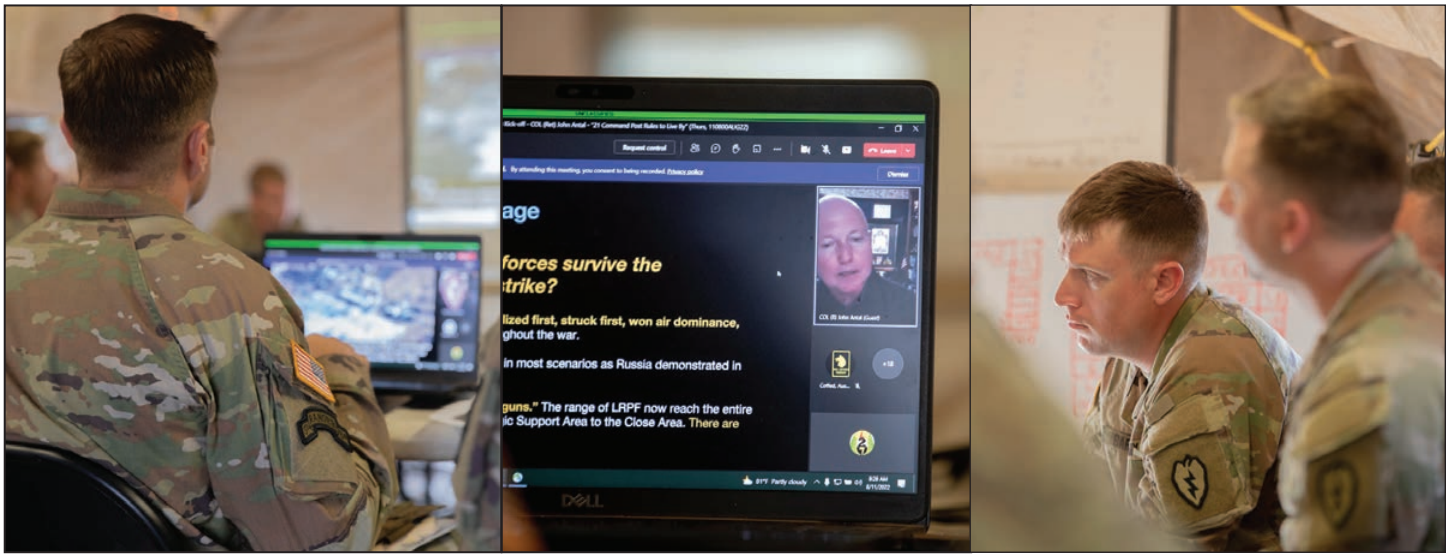
In the lead-up to Nakoa Fleek, it was a foregone conclusion that — naturally — everyone in 2/25ID would "deploy" into the field as part of the FTX. After all, this was our validation exercise prior to JPMRC, and it was essential that we be able to physically test all people and systems in person. However, while still in our self-designated intermediate staging base (ISB) just prior to commencing the exercise, two events took place that challenged this long-held conclusion:

1) A tactical operations center (TOC) and tactical action center (TAC) "open house," which afforded every battalion/squadron key leader to see the physical form and function of each other's C2 nodes, and

2) A leader professional development (LPD) session with author COL (Retired) John Antal as our guest speaker via Microsoft Teams.

The purpose of the TOC open house was to enable leaders to "steal reps" from one another in an effort to accelerate C2 learning before the FTX began. The idea was that if units could see how each other's C2 nodes were configured and planned to be used, then they would be encouraged to steal best practices from one another and employ them in upcoming training during Nakoa Fleek. The open house was perfectly timed and achieved the intended effect, as more than one battalion/squadron TOC/TAC modified its C2 node from its original design.

Next, a mere hours after this open house, COL Antal led a virtual LPD for all company, troop, and battery command teams and above on "Lessons Learned from the Second Nagorno-Karabakh War," along with an introduction to his "21 Command Post Rules to Live By" and "Top Warfighting Disrupters."[2] To say COL Antal's LPD opened up our eyes and left an impression is a gross understatement, as it fundamentally changed a key training objective of Nakoa Fleek and — in fact — led to a series of C2 experiments in the months that followed. Now, instead of simply validating 2/25ID units for JPMRC and "fighting our TOCs" as we had



In August 2022, COL (Retired) John Antal led a virtual leader professional development session on lessons from the Second Nagorno-Karabakh War for leaders in the 2nd Infantry Brigade Combat Team, 25th Infantry Division. (Photos courtesy of 2/25ID)

always done, the goal was to apply our newfound knowledge from COL Antal's presentation, and this brings us to our first concept.

Concept #1: C2 survival requires masking in the optical, thermal, electronic, and acoustic realms.

As COL Antal explained, the Second Nagorno-Karabakh War reinforced the importance of masking sight, heat signature, electronic signals, and sound. It was no longer good enough to simply throw a camouflage tarp over a TOC or TAC in the hope of being less detectable by enemy scouts or aerial platforms. Instead, on today's battlefield every Soldier has a role to play in the application of "all-domain camouflage" (our phrase, not COL Antal's) — a lesson that continues to be reinforced in the ongoing Russia-Ukraine conflict. In an example of failed electronic masking by the Russians, a recent *Washington Examiner* article explained how, "Ukrainian forces intercepted a [Russian] general's call, locked in on his location, and killed him and his staff."[3]

As the title of this article implies, distributed C2 is perhaps the most essential way to mask the existence and intentions of a C2 node, particularly for battalion/squadron and higher echelons in the jungle and littoral regions of the Indo-Pacific. During Nakoa Fleek, 2/25ID deployed to the field and established the doctrinal "main" command post (CP), or TOC, with an option to detach a smaller redundant C2 node in the form of a TAC.[4] Like most BCTs, under this configuration the 2nd IBCT executive officer (XO) and staff conducted "control" of warfighting functions and planning processes from the TOC, while the brigade commander provided "command" from the TAC whenever necessary. To maintain redundancy, assume control of combat operations, and displace if required, the TOC and TAC remained operational with matching digital and analog common operating pictures (COPs), regardless of the commander's location on the battlefield.

Energized by COL Antal's presentation and eager to both maximize masking and disaggregate our TOC, in our first C2 experiment of Nakoa Fleek we broke the main CP into the following five nodes (a total of 44 vehicles, 132 personnel, not counting security elements):

1. Administrative and logistics cell (ALOC) — S1, S4, S6, medical operations — five vehicles, 20 personnel
2. Current operations (CUOPS) — Kill-chain essential personnel such as S2, fires, BCT aviation element, and legal — five vehicles, 30 personnel
3. Plans — Planners from all warfighting functions — three vehicles, 20 personnel
4. Brigade intelligence support element (BISE) — 25 vehicles, 45 personnel
5. TAC element — six vehicles, 17 personnel

Nodes 1-4 were each housed under a medium Deployable Rapid Assembly Shelter (DRASH) tent and placed about 300 feet from one another, the max distance supported by Ethernet cable, to minimize the effectiveness of enemy artillery. In addition, the 2nd IBCT S6 officer in charge (OIC) invested time and effort to run Ethernet cables instead of primarily implementing line of sight (LOS) radios to reduce unnecessary electromagnetic emissions that the opposing force (OPFOR) could quickly and lethally target. In conjunction with physically disaggregating the nodes, 2nd IBCT also implemented an emission control (EMCON) standard operating procedure (SOP) that further reduced electromagnetic emissions dynamically based on mission requirements and assessed threat levels during each phase of the operation. The EMCON SOP emphasized many foundational methods of emission control such as operating radio equipment at reduced power levels, using directional instead of omnidirectional antennas when possible, turning off radio equipment when not in use, and limiting radio usage to mission-essential communications.[5] The EMCON SOP was also accompanied by a commander's policy that prohibited personal electronic devices of all types anywhere on the battlefield. In the case

of the TAC element, we removed the DRASH and replaced it with a commercial off-the-shelf (COTS) pop-up picnic tent at the center of five corralled High Mobility Multipurpose Wheeled Vehicles (HMMWVs), all under camouflage netting. The TAC consisted of 17 personnel, including the 2nd IBCT commander, S2 OIC, S3 OIC, BCT fire support officer, and Advanced Field Artillery Tactical Data System (AFATDS) operator. For the remainder of Nakoa Fleek, we did our best to fight distributed from our five nodes.

Concept #2: Focus on employing the capability instead of deploying the capability.

During the two months following Nakoa Fleek before our JPMRC rotation, we focused heavily on reducing our deployed footprint further. Five C2 nodes — as dispersed as they might be — still felt like too many vehicles to maintain (44) and mouths to feed (132). Upon reflection, we realized the determining factor we had used to decide who deployed to Nakoa Fleek was simple — if you were on the 2nd IBCT staff, you would deploy unless you were non-deployable. This mindset is common among Army staffs at all echelons, yet it is devoid of any analytic rigor as it falsely implies that everyone on the staff is "mission essential" and therefore must deploy. And if they must deploy, then they must be fed, housed, and protected. Perhaps this default way of thinking needed an upgrade on the modern large-scale combat operations (LSCO) battlefield of the future, where masking, dispersion, and agility are king.

In retrospect, why were we trying to C2 this way? After all, for more than 20 years the United States fought wars in Iraq and Afghanistan from TOCs and joint operations centers (JOCs) that never left the wire or the confines of the forward operating base (FOB) they were on. As the global war on terrorism (GWOT) taught us, TACs can thrive in the close fight "outside the wire," but the thought of a TOC/JOC fighting this way is laughable. Why then, were we taking our TOCs "into the box" at combat training centers (CTCs) and hoping for a different outcome? Of course, our TOC would be discovered and killed; it is the largest entity on the battlefield! This epiphany led us to a critical decision prior to JPMRC: Employment of the capability — not deployment of the capability — would lead us to who (people) and what (assets) should deploy. By backward planning from the fighting echelon needing our support, we would determine what C2 nodes would be physically present at JPMRC.

Concept #3: Expand your concept of the "rear area" to include "in sanctuary" nodes and the home-station headquarters.

Field Manual (FM) 3-94, *Armies, Corps, and Division Operation*s, outlines the operational framework for commanders to organize their AOR, using deep, close, rear, and support areas.[6] Absent from FM 3-94, however, is the notion of a commander organizing for operations utilizing their home-station headquarters or other non-battle zone protected areas "in sanctuary." Despite modern technology

As the global war on terrorism (GWOT) taught us, TACs can thrive in the close fight "outside the wire," but the thought of a TOC/JOC fighting this way is laughable. Why then, were we taking our TOCs "into the box" at combat training centers (CTCs) and hoping for a different outcome?

making it entirely possible, Army doctrine does not account for C2 nodes to be employed in this manner. This, then, would be our second major experiment: After applying Concept #2, we would expand our "rear area" and place three of our five major C2 nodes "in sanctuary" at the 2nd IBCT headquarters.

After gaining approval from the 25ID Commanding General, 2/25ID deployed to and fought JPMRC 23-01 with only a CUOPS element and TAC "forward" — roughly 70 personnel "in the box," one DRASH tent, and approximately 15 vehicles. All other nodes' personnel — the ALOC, Plans, and BISE — remained in sanctuary under one roof, thereby cutting our logistics tail in half without degradation of our warfighting capabilities. Outside the long-range enemy fires range and supported by a fiber optic communications backbone, the 2/25ID XO enforced a disciplined battle rhythm for all forces and led our sanctuary elements through the military decision-making process (MDMP), targeting, personnel tracking, logistics planning, spectrum support, cyber defense, and intelligence analysis. Since the sanctuary elements remained out of harm's way and were capable of disciplined shift work, we were able to leverage their analytic bandwidth to help manage a fight spanning two islands (Oahu and Hawaii), nearly 3,700 Soldiers, multi-nodal transport (ground, air, and sea), three Indo-Pacific partner nations, and eight battalion-size elements.

Meanwhile, the forward CUOPS element enjoyed the freedom and agility gained by the removal of 42 Soldiers (who were now in sanctuary), improved optical and audible masking, and reduced logistical burdens of transportation and Class I/III resupply. CUOPS personnel consisted of kill-chain essential personnel who had to be forward due to technical limitations such as the aviation element's shelter and counterfire that still relied on LOS communications. Also, on the CUOPS floor was the field artillery battalion commander, who serves as the fire support coordinator in LSCO. Always geographically separated from the CUOPS element in the spirit of dispersion, the TAC maintained the same general configuration it had during Nakoa Fleek but removed the point of presence (POP) key leader vehicle (KLV), which had been mounted on an audibly loud and physically large Mine-Resistant Ambush Protected (MRAP) All-Terrain Vehicle. Replacing the KLV's upper tactical internet with a

Transportable Tactical Command Communications (T2C2) Ground Antenna Transmit and Receive (GATR) ball improved the TAC's position significantly.

Concept #4: Constant alignment of "sight picture" is the key to maintaining distributed C2 unity of purpose.

The final C2 experiment pertained to the content or quality of the information being shared and involved the latter part of JPMRC 23-01 and both Salaknib and Balikatan in the Philippines. As alluded to above, we found that by holding our own battle rhythm "hostage," combined with a reliable and robust PACE plan, we could align our operational "sight picture" dozens of times a day to ensure mission command principles remained nested within a clear unity of purpose. We did this, primarily, through reliance on a robust Secure Internet Protocol Router (SIPR) network supported by low earth orbit (LEO) assets, which enabled 24/7 Secure Voice Teleconferencing (SVTC) and a SIPR strike bridge over Secure Voice Over Internet Protocol (SVOIP). Not only did SVTC and SVOIP facilitate late-night MDMP briefings and commander's update briefs (CUBs), but they also facilitated instant two-minute/seven-minute drills as significant actions occurred. Reliable voice communications also allowed the commander to maneuver closer to the enemy and front lines in the TAC without making frequent trips to CUOPS.

Soldiers from the S6 section of 1st Battalion, 21st Infantry Regiment, 2nd Infantry Brigade Combat Team, 25th Infantry Division, give a class on Integrated Tactical Network equipment and capabilities during Nakoa Fleek in August 2022. (Photo courtesy of 1-21 IN)

As our experiment expanded into the Philippines in the spring, we found ourselves relying even more heavily on technology to stay connected with our rear and sanctuary elements. If leadership is the linchpin of distributed C2, communications is undoubtedly the foundation. Capability Set 21 (CS21) and the Integrated Tactical Network (ITN) enabled 2nd IBCT and battalion CPs across the Indo-Pacific via smaller beyond line-of-sight (BLOS) internet capabilities, such as the T2C2 and Scalable Class of Unified Terminals (SCOUT). These satellite terminals require less power, are easier to hide and use, and provided 2nd IBCT with high bandwidth feeds, like live unmanned aircraft system (UAS) footage. When SVTC or Microsoft Teams was not available, we held CUBs over the reliable mobile user objective system (MUOS) tactical satellite radio, which is fielded down to platoon level. Additionally, the Windows Tactical Assault Kit (WINTAK) provided real-time position location information and an intuitive chat function for all. In all, the systems described above resulted in a "self-healing" PACE, affording 2nd IBCT the luxury of never being without communications during any critical part of JPMRC or Operation Pathways — including while conducting C2 aboard a Navy vessel. Of note, while using these techniques, the 2nd IBCT TAC was never discovered by the OPFOR during JPMRC.

Final Thoughts and Conclusion

Since they are so fitting, and since we deliberately attempted to apply them in multiple large-scale FTXs, it is useful to return to COL Antal's "21 Command Post Rules to Live By" once more. We found this paraphrased/combined list of six to be most applicable in 2nd IBCT:

1. Every command post can be located, targeted, and hit. What is your battle drill to react?
2. Reduce/mask signatures to survive (optical/thermal/electronic/acoustic).
3. Train every command post to take over the fight and C2 on the move.
4. Have a plan to occupy a hardened structure and C2 from existing towns and cities.
5. Know what your command post looks like from above. Adjust accordingly.
6. Employ decoys across the signature spectrum to give the enemy false positives.[7]

For distributed C2 concepts to truly work, leaders must embrace the Army's mission command philosophy, including

competence, mutual trust, shared understanding, commander's intent, disciplined initiative, mission orders, and risk acceptance.[8] It is understandable for there to be reluctance to fully embrace the idea of not deploying with one's full complement of capabilities, but remember — importance is not measured by proximity. Some of our nation's most precious and advanced warfighting technologies have never left the confines of our own protected borders, because there is no need for them to do so. The same might be said of how we choose to fight while distributed on a LSCO battlefield of the future. Those hesitant to change are reminded of the words of former Army Chief of Staff General Eric Shinseki: "If you don't like change, you're going to like irrelevance a lot less."[9]

Notes

[1] COL (Retired) John Antal, "21 Command Post Rules to Live By," 3 August 2022, accessed from https://community.apan.org/wg/tradoc-g2/mad-scientist/m/articles-of-interest/419062.

[2] COL (Retired) John Antal, "Top Attack: Lessons Learned from the Second Nagorno-Karabakh War," 1 April 2021, accessed from https://madsciblog.tradoc.army.mil/317-top-attack-lessons-learned-from-the-second-nagorno-karabakh-war/; "21 Command Post Rules to Live By;" and "Top Warfighting Disrupters," 27 May 2022, accessed from https://www.canada.ca/en/army/services/line-sight/articles/2022/05/col-ret-john-antals-top-warfighting-disrupters.html.

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[6] FM 3-94, 2-19.

[7] Antal, "21 Command Post Rules to Live By."

[8] Army Doctrine Publication 6-0, *Mission Command: Command and Control of Army Forces*, July 2019, x, accessed from https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN34403-ADP_6-0-000-WEB-3.pdf.

[9] Stephanie Eidelmanm, "If You Don't Like Change, You're Going to Like Irrelevance a Lot Less," insideARM (1 October 2019), accessed from https://insidearm.com/news/00045509-if-you-dont-change-youre-going-irrelevanc/.

COL Graham R. White currently commands the 2nd Infantry Brigade Combat Team, 25th Infantry Division (ID) at Schofield Barracks, HI. He commissioned as an Infantry officer in 2000 after graduating the U.S. Military Academy (USMA) at West Point, NY. As a junior officer, COL White served in multiple company, battalion, and brigade-level positions in 3rd Battalion, 504th Parachute Infantry Regiment (PIR), 1st Brigade Combat Team (BCT), 82nd Airborne Division, Fort Bragg, NC, and 3rd Battalion, 75th Ranger Regiment, Fort Benning, GA. He then served as a rifle company commander in 1st Battalion, 9th Infantry Regiment, 2nd BCT, 2nd Infantry Division, Fort Carson, CO, followed by Ranger company commands in 2nd Battalion, 75th Ranger Regiment, Fort Lewis, WA, and the Regimental Special Troops Battalion, 75th Ranger Regiment, Fort Benning. As a field grade officer, COL White served as the executive officer (XO)/S3 for 2nd Battalion, 35th Infantry Regiment and BCT S3 in 3rd BCT, 25ID, followed by service at Joint Task Force Bravo, Honduras as the J5, and U.S. Army Pacific, Fort Shafter, HI, as a strategic planner. Most recently, COL White commanded 2nd Battalion, 505th PIR, 3rd BCT, 82nd Airborne Division, served as the assistant chief of staff, G3, 82nd Airborne Division, and commanded 3rd Battalion, 75th Ranger Regiment. In addition to the Bachelor of Science degree from USMA, COL White also earned a Master of International Public Policy from Johns Hopkins University and a Master of Strategic Studies from the Army War College.

MAJ Justin E. James currently serves as the S6 for 2/25ID. His previous assignments include serving on the division G6 staff with the 10th Mountain Division at Fort Drum, NY and as a platoon leader with the 173rd Airborne Brigade in Bamberg, Germany. MAJ James is a graduate of the Command and General Staff College (CGSC) at Fort Leavenworth, KS; the Signal Captain's Career Course at Fort Gordon, GA; and the Basic Officer Leadership Course at Fort Sill, OK. He earned a Bachelor of Arts in history from the University of Delaware and a Master of Business Administration from the University of Maryland.

MAJ Richard Eaton currently serves as the cyber electromagnetic activities (CEMA) officer for 2/25ID. He earned a Bachelor of Arts in East Asian studies from the University of Delaware, a Master of Science in cybersecurity from Wilmington University, and a Master of Operational Studies from CGSC.

A 25th Infantry Division Soldier conducts field reconnaissance during Joint Pacific Multinational Readiness Center 23-01 on 31 October 2022 on Hawaii's Pohakuloa Training Grounds. (Photo by SGT Daniel Proper)

Jungle Medicine Course Trains for the Austere

LTC BRANDON GROOMS
DR. (MAJ) KAITLIN HARPER
CPT KYLE MOGENSEN
1SG WAYLON K. WREN

Deep in the jungle, covered in mud and sweat, a U.S. Army combat medic rushes to apply critical medical interventions to a grievously wounded Infantry Soldier who is rapidly losing blood. Ignoring exhaustion, stress, and the incessant biting from jungle insects, the combat medic knows that every second counts. This may sound like a scene from a Hollywood movie; however, it's from a hyper-realistic training event recently conducted in the Hawaiian jungles on the island of Oahu. As the Army transforms to prepare for large-scale combat operations (LSCO), it must develop innovative medical training that will expand freedom of action, extend operational reach, and ensure prolonged endurance on a multidomain battlefield against a near-peer adversary.

Soldiers from 3rd Squadron, 4th Cavalry Regiment use a rope and z-pulley system to move their simulated casualty during the Jungle Medicine Course on Schofield Barracks, HI, on 25 January 2023. (Photos courtesy of 3rd Infantry Brigade Combat Team, 25th Infantry Division)

Throughout the course of repeated deployments and exercises across the Indo-Pacific and Asia, combat medics reported a knowledge and capability gap in providing care in jungle environments. The way the U.S. Army conducted medical training in the past is not sufficient for future operations on a contested battlefield and austere jungle environment. The U.S. Army's 325th Brigade Support Battalion (BSB), 25th Infantry Division (ID) created the Jungle Medicine Course at Schofield Barracks, HI, to train combat medics in the medical knowledge they will need to use to preserve the fighting force in a jungle environment.

The 25ID is the U.S. Army's premier jungle warfare expert and America's Pacific Division. Combat units across the division and the broader U.S. Army regularly come to Hawaii to train on special techniques to survive, fight, and win in jungle terrain, which is prevalent across the Indo-Pacific region.

As the division prepares for LSCO, it is essential that medical professionals rethink how treatment is provided on a modern battlefield. Considering the added difficulties that only a jungle environment can present, such as prevalent disease, limited mobility, and extremely rugged terrain, the need for specialized medical training is required. Over the course of two weeks, medical professionals from the 3rd Infantry Brigade Combat Team, 25ID trained Soldiers from more than 11 conventional Army units, the 3rd Special Forces Group, the 75th Ranger Regiment, and U.S. Navy corpsmen in what was clearly among one of the largest and most dynamic conventional medical training events in recent history at Schofield Barracks.

An Undeniable Combat Threat

The U.S. Army has been fighting wars in jungle terrain since the Spanish-American War. The 25ID honed its jungle warfare skills fighting in Guadalcanal and New Guinea during World War II, the Korean War, and the Vietnam War. History has taught us that often the biggest threat to the U.S. Army is disease and non-battle injuries (DNBI), as jungle warfare introduces many different hazards, diseases, insects, animals, and environments that threaten the health

of the fighting force. During World War II, malaria and dysentery were significant contributors to the eventual surrender of U.S. forces in the Philippines. In the jungles of Vietnam and the Pacific theater in World War II, DNBI accounted for more than 65 percent of battlefield admissions. During Operation Iraqi Freedom and Operation Enduring Freedom, the fatality rate from combat injuries decreased from 19.1 to 9.4 percent, reinforcing the importance of medical training to continue this downward trend.[1]

Studies involving all U.S. conflicts in the Pacific Theater note the greatest impact on American combat strength was the cumulative effect of disease. Combat medics are proficient in Tactical Combat Casualty Care and treating traumatic injuries but receive minimal training regarding jungle medical threats such as malaria, waterborne illnesses, snake envenomation, or pharmacology outside of traumatic injury treatment.[2] These threats can drastically reduce the combat effectiveness of a warfighting formation and lead to its eventual defeat. Prolonged field care performed by medics will be critical in the LSCO environment because it will keep maneuver forces healthy and able to engage and prevail over adversaries.

Medics in a jungle environment need to consider and address the impact of the austere and arduous environment on patient care. During prolonged field care, patients may require blood products, which may not be readily available via traditional methods. Combat medics must understand the risks and considerations of blood transfusions and show proficiency in initiating a walking blood bank, the tactic of mobilizing Soldiers to donate blood in real time for immediate transfusion needs. To prepare for future conflicts, combat medics must understand how to move a casualty from the point of injury, through thick vegetation and the variable, unforgiving jungle terrain, to reach a higher level of care. This is no walk in the park.

Soldiers attending the Jungle Medicine Course carry their simulated casualty through uneven terrain on 25 January 2023.

In the jungles of Vietnam and the Pacific theater in World War II, disease and non-battle injuries accounted for more than 65 percent of battlefield admissions.

Fourteen-Day Remote, Intense Preparation

The jungle environment is unique, arduous, and unforgiving, presenting its own set of challenges, which cannot be replicated effectively elsewhere in the continental United States. The Jungle Medicine Course was created to train combat medics in the conditions they are most likely to experience in crisis or conflict. Although at times the scenes were unsightly, the training was unparalleled. Spanning two weeks, the course started with a week of classroom instruction and hands-on training facilitated by 25ID doctors and physician assistants. The second week consisted of intensive field training and additional robust hands-on exercises. The 3/25ID originally developed and implemented the first Jungle Medicine Course in 2022 and oversaw its significant expansion in 2023. To date, more than 300 medical personnel have participated in the course. For the 2023 course, the pass rate for the initial classroom teaching portion totaled more than 95 percent.

During the classroom portion of the course, medics received lectures from physicians and advanced practice providers on malaria and mosquito-borne illness, jungle dermatology, envenomation, environmental threats, and common orthopedic injuries. Medics were taught how to purify water, jungle pharmacology, prolonged field care, and recognize and treat diarrheal illness. The classroom lectures were followed by hands-on training. The 25ID Lightning Academy Jungle School instructors, Special Forces medics, and 75th Ranger Regiment medics taught the students evacuation methods in the jungle and highly restricted terrain to assist them in their role of medic. The students must demonstrate proficiency in evacuation methods using ropes including mechanical advantage, high-angle extraction, z-pulley, and one-rope bridge to transport casualties over water and uneven terrain. Medics then performed autologous blood transfusions and learned the importance of walking blood banks.

“In my 13 years in the Army, I can honestly say this is some of if not the best training I’ve seen,” said SFC Bryan Essig, a medical platoon sergeant assigned to 3rd Squadron, 4th Cavalry Regiment, 3/25ID. “Soldiers that participated in this training are hands down more prepared for any type of combat situation.”

After the first week, a 50-question test was administered for medics to prove retention and proficiency in jungle medicine. The second week of the Jungle Medicine Course consisted of training with perfused cadavers in a simulated

combat environment. The cadavers were "re-animated" using a pulsatile pump and bovine blood to simulate hemorrhaging. The value of training with cadavers compared to other training aids (i.e., mannequins or other simulators) is the realism of sensory and tactile feedback from conducting medical interventions. In the field environment, students practiced placing advanced airways, needle decompression of a pneumothorax, chest tube placement, intubation, junctional tourniquet uses, and cricothyroidotomy. The use of cadaveric training measures provided medics with a unique experience only offered through the 25ID Jungle Medicine Course, ensuring U.S. Army Soldiers are trained well above the standard and ready to respond to any future conflict.

The training focused on the continuum of care from the point of injury to the medical treatment facility using helicopter landing zones and static Role I facilities, which consisted of primary healthcare such as specialized first aid, triage, and stabilization, and Role II facilities, where advanced medical care is continued away from combat operations. The dynamic training included the medics on the ground, flight medics conducting extractions and coordinating patient handoffs, and further coordination from the flight crew to combat medics and physicians at the Role II facility. Although the course is focused on combat medic education, it is also applicable for advanced training in any medical military occupational specialty (MOS). The current training support package was recently approved for an 18.5-hour course in coordination with the Combat Medic Sustainment Division at Fort Sam Houston, TX, to provide continuing education units for licensed medical providers and combat medics attending the course.

Jungle Medicine Training Scenario

The course's training scenario began with combat medics conducting a combat patrol. During the patrol, students came under enemy fire and noticed a casualty on the ground. The medics conducted care under fire and worked their way through tactical field care and initiated a 9-line medical evacuation (MEDEVAC) request. The team then prepared the casualty for transport on a sked litter and extricated the casualty out of the harsh jungle terrain using a high-angle extraction and a z-pulley rope system to the MEDEVAC hoist site. Once the MEDEVAC arrived, the flight crew hoisted the simulated casualty into the helicopter, performed en-route care, and transported the casualty to a Role II facility. The Brigade Support Medical Company set up a company command post to track medics and relay MEDEVAC requests as well as casualty locations. The 8th Forward Resuscitative Surgical Detachment was co-located with Role II to provide repetitions for working patients into surgery as well. After being treated and stabilized by the students at the Role II facility, the casualty was transported to a Role III medical facility for division-level care provided by surgical and medical specialists.

"Our contract with each other in the brigade is to provide every Soldier with the most realistic training experience possible to prepare for combat," said COL Rob Shaw, commander of 3/25ID. "The Jungle Medicine Course does exactly that, and that is why we're committed to making it an annual event."

History Critical to Sustainment Readiness

History shows that quality healthcare in a jungle environment is crucial to conserving the fighting force and maximizing combat power.[3] The jungle environment is incredibly challenging and can quickly deplete a fighting force's combat

At the medical evacuation hoist site, Soldiers assigned to 3rd Squadron, 4th Cavalry Regiment wait with their simulated casualty during the Jungle Medicine Course on 25 January 2023.

power. Maximizing combat power requires quality healthcare, which cannot be understated. While the United States is not currently at war, training is paramount for the development and skill maintenance of combat medics. For the 25ID to continue to be America's jungle warfare experts, combat medics must learn the jungle-specific medical skills provided by the Jungle Medicine Course to save lives. The first time a combat medic treats a casualty in the jungle should not be on the battlefield.

Notes

[1] Glenn Barnett, "The U.S. Army Medical Corps: Caring for the Casualties in World War II," *WWII History* (October 2008), accessed at https://warfarehistorynetwork.com/article/the-u-s-army-medical-corps-caring-for-the-casualties-in-world-war-ii/.

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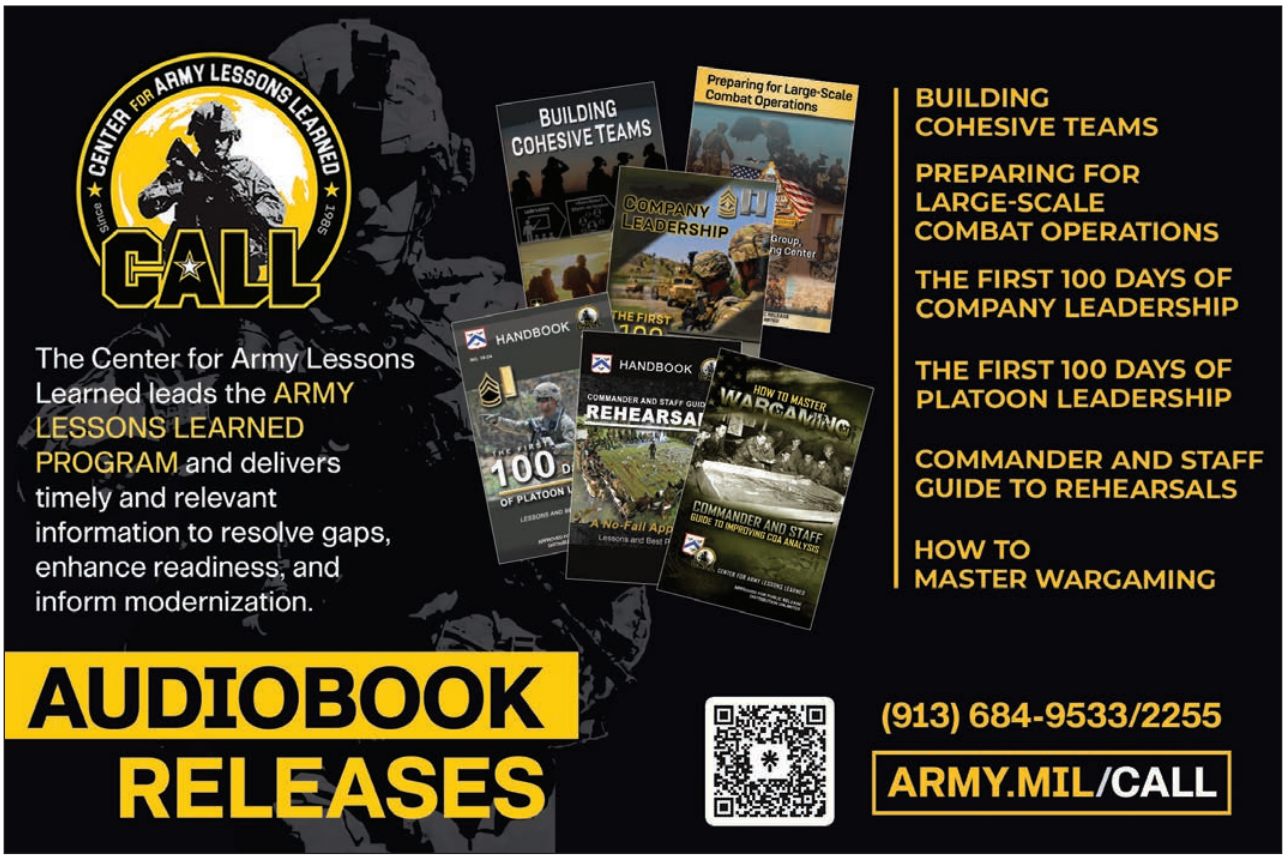
[3] Barnett, "The U.S. Army Medical Corps."

LTC Brandon Grooms currently commands the 325th Brigade Support Battalion (BSB), 3rd Infantry Brigade Combat Team (IBCT), 25th Infantry Division (ID), Schofield Barracks, HI. He has field grade operational experience in the 25th Infantry Division serving as a support operations officer and battalion executive officer; he also served as the military assistant to the Army G4 in the Pentagon and completed joint time with the Defense Logistics Agency, Fort, Belvoir, VA. LTC Grooms graduated from the Army Command and General Staff College and Joint Combined Warfighting School in Norfolk, VA. He was named Distinguished Military Graduate from Hampton University and has a Bachelor of Science in Business Management. He also earned a Master of Science in management of technology from Murray State University.

Dr. (MAJ) Kaitlin Harper currently serves as the regimental surgeon for the 3rd U.S. Infantry Regiment (The Old Guard) at Fort Myer, VA. She previously served as an emergency physician with the 325th BSB, 3/25ID. She is a graduate of the Uniformed Services University of the Health Sciences Tropical Medicine Course, U.S. Army Medical Department Captain's Career Course, and Tactical Combat Casualty Care Course. Dr. Harper earned a Bachelor of Science in biomedical science from Auburn University, a Doctor of Medicine from Mercer University School of Medicine, and Emergency Medicine Residency, Board-Certified Emergency Medicine Physician from the Medical College of Georgia.

CPT Kyle Mogensen currently serves as the battalion physician assistant for the 325th BSB, 3/25ID. His previous assignments include serving as the battalion medical operations officer and medical platoon leader in 2nd Battalion, 505th Parachute Infantry Regiment, 82nd Airborne Division, Fort Bragg, NC. He is a graduate of the Small Unit Ranger Tactics program, Tactical Combat Medical Care Course, Interservice Physician Assistant Program, Air Assault School, and Airborne School. CPT Mogensen earned a Bachelor of Science in health sciences from Bloomsburg University as well as a Bachelor of Science and a Master of Science in physician assistant studies from the University of Nebraska Medical Center.

1SG Waylon K. Wren has served as a senior line medic, evacuation sergeant, treatment sergeant, platoon sergeant, brigade medical operations sergeant, observer-controller, Department of Health Education and Training NCOIC, Department of Family and Community Medicine NCOIC, and first sergeant. He has completed two deployments in support of Operation Iraqi Freedom and Operation Enduring Freedom. 1SG Wren has been assigned to the 4th Squadron, 4th Cavalry Regiment, 610th Brigade Support Battalion, and Irwin Army Community Hospital at Fort Riley, KS; 1st Battalion, 15th Field Artillery Regiment in the Republic of Korea; 4th Battalion, 5th Air Defense, 69th Air Defense Artillery Brigade at Fort Hood, TX; 1-345 Engineer Battalion (Training Support) at Camp Atterbury, IN; Carl R. Darnall Army Medical Center at Fort Hood; and 130th Engineer Brigade at Schofield Barracks, HI. He earned a bachelor's degree in health science from Purdue University (Global).



Prolonging Operational Reach in Contested Jungle Environments:

Lessons Learned and Recommended Solutions from Recent Operation Pathways Exercises

CPT WELLS RUGELEY

Contested logistics in the Indo-Pacific area of operations is an acknowledged complex and unsolved problem set. Though the problem is known, the defined scope is frequently focused on the strategic level flow of commodities from the industrial base to forward staging areas in the operational theater. While significant discussion and solutions are needed to solve the tyranny of distance and inter-theater flow, emphasis must also be placed on the tactical level. The tactical "last mile" presents noteworthy challenges for brigade support battalions (BSBs) and forward support companies (FSCs) that are not designed or adequately equipped to execute in austere jungle environments. The current sustainment force design lends few favors to formations primarily operating in a jungle environment. Successful tactical-level sustainment operations in the Indo-Pacific require adaptation and modernization of the FSC's posture, methods, and equipment. Without adjustments, support organizations may struggle to consistently sustain maneuver formations in a jungle environment.

Observed Challenges during Execution of Exercises Salaknib and Balikatan 2023

Through years of counterinsurgency conflict, the modern American warfighter has grown accustomed to on-demand sustainment and become reliant on contracted solutions. The jungle environment proves this infeasible with the present sustainment design and capabilities within infantry brigade combat teams (IBCTs). The inability to provide prompt and consistent support becomes problematic due to relentless terrain and dense foliage limiting the warfighter's range and endurance. Observing the Armed Forces of the Philippines (AFP), coupled with hard-learned lessons in the jungle terrain, maneuver commanders directed Soldiers to reduce the overall weight of their packs. As a result, Soldiers were limited to only carrying survival and mission-essential items

U.S. and Philippine Soldiers conduct a training mission in support of Balikatan 23 at Fort Magsaysay, Philippines, on 21 April 2023. (Photo by LCpl Joseph E. DeMarcus, USMC)

and equipment. Reliance on traditional military rations and contracted purified drinking water reduced operational reach in the jungle. Individually carried rations such as Meals, Ready to Eat (MREs) or First Strike Rations (FSRs) fill valuable pack space and increase the overall weight and Soldier strain. Thus, while conducting tactical movements in unforgiving climates and terrain, there is a considerably higher demand for replenishment of both rations and water. The resupply of purified bottled water from the FSC to maneuver units is cumbersome, slow, and creates an oversized signature. Organic water purification equipment does not exist within an infantry battalion, and individual water purification solutions are inadequate for filtering heavy metals that pollute and flow within some host nation water sources.

BSBs and FSCs are primarily postured and focused on utilizing ground lines of communication (GLOCs), and they are not adequately equipped or trained to pivot to multi-modal means of resupply. Multidomain environments require sustainment operations to support through the air, on waterways, and over the ground. Without posturing to conduct multi-model resupply during conflicts, resupply operations will become predictable and solely dependent on one or two lines of communication. This will hamper and potentially cease resupply operations if enemy capabilities deny the given mode. Sustainment formations in their existing state are not capable of minimizing signature. Large, slow-moving vehicle platforms with robust storage and hauling capacity do not allow for maneuverability in restrictive terrain. Further, sizeable noise and heat signatures nearly ensure detection and interdiction from enemy forces. Competitor advances in long-range precision fires, loiter munitions, and unmanned aerial surveillance will lead to consistent and accurate targeting of sustainment forces, which will likely be a favored course of action, as seen in the Russo-Ukrainian War.

Achieving extensive disruption of supply trains pushing to the front line of troops, the enemy merely needs to outsurvive friendly forces. Given this reality, the ability to mask signature, reduce footprint, and operate multi-modally will increase the survivability of sustainers and the warfighters they support. With the broad implementation and use of the Integrated Tactical Network (ITN) and associated communications systems, power generation and distribution weigh heavily on operational reach and endurance. This problem set further compounds with each additional Soldier-wearable technology and fielded sensor system. Solar-power generation solutions are lightweight and portable; however, they require direct and prolonged exposure to sunlight, which can be limited under a jungle canopy. When the jungle environment allows, utilization of vehicle platforms will naturally result in a demand for refueling operations. On its face, this seems to be a simple mission; however, it is likely not the case. Infantry companies within a light infantry battalion predominantly possess High Mobility Multipurpose Wheeled Vehicles (HMMWVs) or smaller platforms, apart from a few Light Medium Tactical Vehicle (LMTV) variants. The FSC and BSB fuel assets are either integrated into, or carried by, the Heavy Expanded Mobility Tactical Truck (HEMTT) platform, which is considerably heavier, larger, and less maneuverable. Therefore, current organic fuel assets cannot be guaranteed to traverse the same path or terrain to reach the required destination. While the unit can shuttle fuel cans or tactically retrograde to conduct refueling operations, this requires pulling Soldiers, weapons, and equipment away from the line and from their primary mission and objective.

Successful tactical-level sustainment operations in the Indo-Pacific require adaptation and modernization of the FSC's posture, methods, and equipment. Without adjustments, support organizations may struggle to sustain maneuver formations in a jungle environment.

Recommended Solutions to Remedy Challenges

Jungle sustainment is a multi-faceted problem set. Numerous equipment acquisitions, training adjustments, and role implementations will profoundly increase our sustainers' effectiveness and survivability in the jungle. Overall, the FSC mission outlook and posture must be forward "pushing." Employing a predominately "pull" system will result in maneuver companies expending their limited on-hand resources faster, drastically interfering with mission focus and accomplishment. Anticipatory resupply and predesignated cache hides will be essential due to the limited capability to conduct emergency resupply. Reimagination and modernization of sustainment-focused equipment will ensure that logistics operations remain unpredictable, and that maneuver does not outpace sustainment. Below is a compiled list of existing products on the market with the potential for immense impacts. These products are available now and offer potential opportunities to fill capability gaps across the sustainment enterprise. None of the statements on the below-listed products stand as or are intended to endorse the associated manufacturer or distributors. Discussion of any product is provided for informational purposes on the types of capabilities needed for success in a jungle environment.

• **Utility Task Vehicles (UTVs):** Acquisition and fielding of smaller, more mobile UTVs, such as the Polaris MRZR-A or the General Motors Infantry Squad Vehicle (ISV), outfitted and modified for sustainment operations will drastically enhance the reach of sustainment formations. Having the smaller wheelbase capability will bolster the transportation abilities of GLOCs and allow maneuver companies to remain as far forward in the fight as possible while conducting resupply operations and casualty evacuation. This does not suggest a total abandonment of fielded sustainment platforms, as they still have their place in the overall equation. However, utilizing the smaller UTV platforms for pushing forward to

the maneuver units, and reserving the larger traditional platforms for hauling bulk commodities and resupply operations with the BSB, will allow for a more dispersed footprint and signature.

• **Tactical Resupply Vehicle/ Joint Tactical Autonomous Aerial Resupply System:** Utilization of unmanned aircraft systems (UAS) that are designed and configured for autonomous or semi-autonomous sustainment operations allows for increased sustainer survivability and prompt, effective delivery of commodities to the point of need. Incorporation of these systems would enable agile multi-modal forward-pushing sustainment and provide a swift employment capability for reactive emergency resupply delivery. Products such as the Tactical Resupply Vehicle family from SURVICE Engineering and Malloy Aeronautics are among the many embodiments of this concept.

Acquisition and fielding of smaller, more mobile utility task vehicles will allow maneuver companies to remain as far forward in the fight as possible while conducting resupply operations and casualty evacuation. (Photo by SGT Daniel Proper)

• **Small Multipurpose Equipment Transports (S-METs):** S-METs at the company level would significantly bolster dismounted endurance if the environment permits their use. The additional transportation and hauling capacity can be mission configured to maximize needs. Potential implementations include casualty evacuation (CASEVAC), hauling secondary sustainment or fuel loads in a TransCube Tactical 250, and command and control (C2) platforms.

• **Battery Banks/Power Packs:** Battery technology is constantly improving; however, the power required to operate communications equipment and Soldier-wearable technology is a considerable burden. Batteries needed for an extended patrol or mission will inevitably become a hindrance and limit maneuver independence and reach.

• **Modular Fuel Tanks:** Bulk fuel storage and distribution requirements are unlikely to decrease; instead, they have the potential to increase with the procurement of newer, smaller vehicle platforms that can operate in restrictive terrain. The need for vehicles that can pass through the jungle environment and deteriorated road networks is critical for C2, CASEVAC, and resupply operations. Given this, providing fuel to the point of need is necessary for sustainment formations. Existing systems are large and cumbersome and require transportation by HEMTTs with load-handling systems. Not only is the likelihood of reaching the desired destination infeasible due to vehicle size and maneuverability, but the probability of being detected and targeted is also higher based on confinement to main supply routes and road networks. Procurement and use of modular fuel tanks, such as the Western Global TransCube Tactical (TCT), allow for various implementations and delivery methods. The TransCube family of tanks ranges in capacity from 250-1,000 gallons. All variations are sling-load capable and double-walled for internal secondary containment. Based on the decreased tank capacity, the required cubic space is minimal, allowing system secondary loading onto several maneuver company vehicle variants. The added benefit of sling-load capabilities allows for swapping fuel units utilizing air assets when required based on ever-changing conditions and current enemy posture.

• **Water Purification:** Potable water will consistently be the notable limiting factor in jungle operations. Contracted solutions are not guaranteed to be available during a crisis or conflict. Additionally, bottled solutions are not conducive for the warfighter due to bulky configurations and excess plastic waste that is noisy and must be retrograded with the unit to avoid leaving an environmental signature. Therefore, purification needs to be the primary course of action. The FSC should possess purification systems similar to the Lightweight Water Purification System (LWPS) from HDT Global. The system allows up to 300 gallons per minute and can scale up to 900-plus gallons per minute based on the mission set. The primary intention for FSC water purification is to create potable water and fill organic water buffalos and camels. Once potable water exists, distribution can utilize sling-load operations or cross-load in 5-gallon water cans and individual water sources. Furthermore, each warfighter should be issued personal water purification devices similar to the LifeStraw, even if the water quality in host nations may not be suitable due to hard metals that individual devices

cannot filter. However, personal devices will suffice in emergency situations until potable replenishment is achieved.

Enhancing Training

Successful employment of sustainment forces in a jungle environment also requires specific training and certification to employ all capabilities fully. Increasing the number of sustainers who are air assault, pathfinder, and Sling Load Inspector Certification Course (SLICC) qualified opens the full range of aerial resupply options. Drilling and honing the skills for standard and non-standard sling-load operations must be commonplace and occur regularly. While all three of the above military courses teach Soldiers proper rigging and inspection of sling loads, SLICC also trains and certifies Soldiers on rigging and inspection of low-cost, low-altitude (LCLA) loads. Expanding the aerial resupply repertoire will inherently lead to increased sustainment planning options. While certification and training to achieve multi-modal methods of resupply are necessary, above all, the sustainment community needs to master fundamental Soldier and sustainment skills.

Commanders at all levels must emphasize the importance of tactical proficiency and the practice of analog systems. With a high probability of contested or denied supply lines across all domains, the likelihood of digital failure and the necessity of analog/mechanical systems will be paramount. Technological advances have made sustainers, now more than ever, incredibly vulnerable to targeting. Refocusing FSC training plans to encompass aspects requiring sustainers to step outside their military occupational specialty (MOS) and perform tactical tasks, understand enemy capabilities, and innovatively problem-solve solutions is vital to survival.

Soldiers conduct low-cost, low-altitude aerial resupply training on Schofield Barracks, HI. (Photo by SGT Sarah D. Sangster)

An air assault student examines equipment during sling-load training on Schofield Barracks. (Photo by SGT Valencia McNeal)

Conclusion

The problem set facing sustainers in a jungle environment is complex and will not be solved by any single equipment acquisition or military course/certification. Innovative thinking and breaking sustainment organizations' traditional roles and responsibilities, while enhancing and tailoring sustainment capabilities to the anticipated conflict environment, will undoubtably lead to a higher mission success rate. Problems and challenges will continue to materialize, but solutions will arise through a culture of problem-solving and boundary-pushing. Contested supply lines require unpredictable sustainment across the full spectrum of multi-modal supply methods. The challenges and solutions presented here are far from all-inclusive. However, increased discussion and innovation are required to ensure warfighters and sustainers can traverse the austere jungle environment and reach their objective with the supplies and equipment needed to decisively win and exploit success.

CPT Wells Rugeley currently serves as commander of Golf Forward Support Company (FSC), 1st Battalion, 27th Infantry Regiment, 2nd Infantry Brigade Combat Team (IBCT), 25th Infantry Division (ID). His previous assignments include serving as support operations deputy, Headquarters and Headquarters Company, 225th Brigade Support Battalion, 2/25ID; aide-de-camp to Commanding General of the 3rd Expeditionary Sustainment Command/Assistant Commanding General-Support of the XVIII Airborne Corps; S4 OIC, HHC, 1st Battalion, 508th Parachute Infantry Regiment (PIR), 3rd IBCT, 82nd Airborne Division; executive officer for Juliet FSC, 1-508th PIR; and maintenance control officer/platoon leader in Juliet FSC, 1-508th PIR. CPT Rugeley graduated from the Ordnance Basic Officer Leader Course, Airborne School, Ranger School, Pathfinder School, Logistics Captains Career Course, Sling Load Inspector Certification Course, and Low-Cost, Low-Altitude Certification. He earned a bachelor's degree in political science from the University of Kentucky and project management professional certification from Cornell University. He deployed to Afghanistan in 2019 with 1-508th PIR and to Iraq and Kuwait in 2021 with the 3rd Expeditionary Sustainment Command/1st Theater Sustainment Command.

Lightning Labs:
Innovation and Experimentation

MAJ JASON HINDS
CPT MAHDI AL-HUSSEINI
1LT EMILIANO CONCHA-TORO
1LT COREL MARQUEZ

CPT Jon Voss had a problem. Serving as the embedded behavioral health specialist in the 25th Infantry Division (25ID) Division Sustainment Brigade (DSB), he observed Soldiers missing major training events due to in-person behavioral health appointments. CPT Voss thought that 25ID Soldiers should be able to receive important medical care regardless of their location in the world at their time of need. He walked into Lightning Labs with a simple idea to develop and grow a telehealth network, a model regularly practiced in the civilian medical world. Lightning Labs connected CPT Voss with medical student teams at the University of Hawaii at Manoa and coordinated for the students to work alongside him to refine the solution, conducting field research during a combined and joint exercise in the Philippines that resulted in a Soldier solution to a Soldier-identified shortfall.

Lightning Labs Mission, Priorities, and Process

Lightning Labs is 25ID's first innovation and modernization program, dedicated to promoting Soldier-driven innovation while strengthening relationships with academia and industry partners. Innovation and modernization activities require time, effort, and investment to be successful. Lightning Labs is fortunate to possess all three. Our innovation facility was established in a command that supports risk-taking and strives to advance land power in the Indo-Pacific. Our mission is shaped by the unique geography of the Indo-Pacific region, its vast expanse, and its disconnected nature. With complex terrain, massive urban areas, rough mountains, and extensive jungles, our challenges to building readiness are different from other Army divisions.

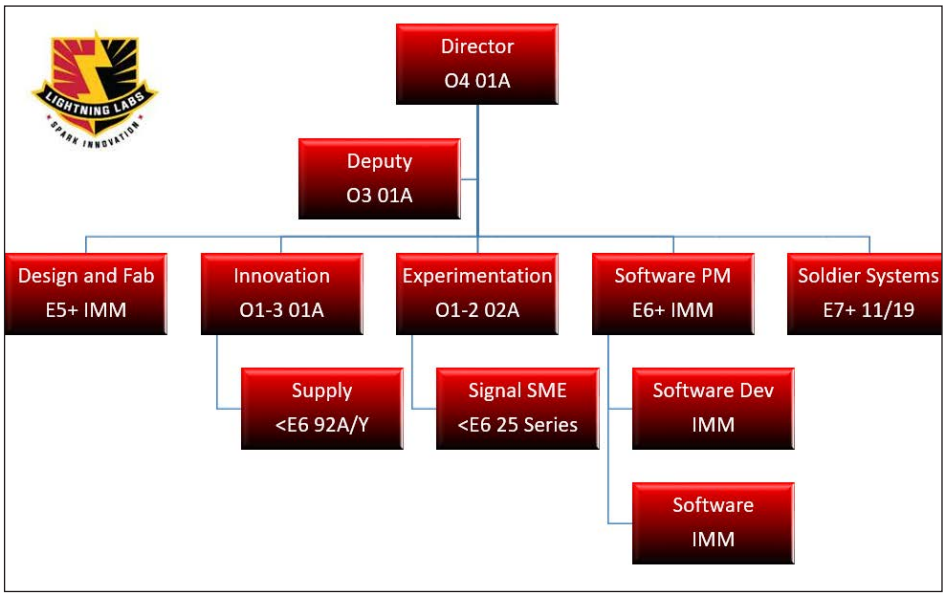
Lightning Labs' priorities are defined by the challenges our theater presents. In crisis or conflict, we expect to be isolated for significant periods of time. This operational assumption drives senior leader risk calculus and shapes our desire to possess capabilities that increase endurance, reduce supply consumption, and disaggregate capabilities to lower levels, ultimately providing effective ground forces ready to fight and win if needed.

Lightning Labs' priorities focus on:

1. **Joint sensor-to-shooter integration and battlefield visualization**, such as our work to enhance joint targeting with other Department of Defense partners
2. **Diversified data transport**, like our work with Secure Transit through Untrusted Networks (STUN), which provides subordinate units another resource to protect their communications
3. **Distributed and disaggregated command and control (C2)**, like our work to expand the communications bubble using an RQ-7 Shadow
4. **Distributed sustainment**, like our work with the U.S. Army Combat Capabilities Development Command (DEVCOM) to develop a zero water footprint
5. **Multidomain effects**, like our work on the electromagnetic "Tripwire" sensing system
6. **Soldier systems**, like our work on a jungle-specific Fighting Load Carrier

Lightning Labs encourages talented Soldiers to use their unique skills to solve problems. Examples include power storage and generation, software development, and evaluation and testing of emerging systems from the U.S. Army

Figure 1 — Future Lightning Labs Force Structure



25th Infantry Division Soldiers test mount the Shadow Echo, a partnered project with the 225th Brigade Support Battalion's Allied Trades Shop. The Shadow Echo hopes to expand infantry brigade combat team command and control bubbles through vertical relays.

Futures Command (AFC). Talented Soldiers, leaders, equipment, and funding must be secured from inside the division, and this comes with an opportunity cost.

Talented Soldiers exist in every formation, and cultivating a culture where these unique talents can be applied to solve complex or discrete challenges is critical, especially when the manpower comes from within.

The Lightning Labs structure is entirely developed and funded by 25ID and outside support from the Army's broader innovation enterprise. Expanding integration and resourcing from the AFC enterprise benefits everyone and can help take tactical-level innovation and experimentation to new heights. We've embedded DEVCOM Field Assistance in Science and Technology (FAST) advisors at the division level. These advisors help align the tactical challenges we identify to broader AFC efforts. Connecting to the AFC innovation enterprise is critical to empowering and synchronizing efforts, ultimately spreading successes across the broader Army.

Process

When 25ID Soldiers identify a challenge or unique problem, they are encouraged to present it to Lightning Labs. This direct interaction with 25ID stakeholders and Soldiers is critical to supporting tactical innovation. Before a problem's solution can be identified, we must first identify the problem's root cause to ensure we're solving the correct issue.

Soldiers serve as our subject matter experts (SMEs). We work with the SME and develop a succinct problem statement. Lightning Labs shares the problem statements with the AFC innovation enterprise because other organizations may have solved this exact or a similar problem — or have key insights to share. Additionally, sharing these problem statements often allow us to access the AFC enterprise's resources, which can close the gap between tactical problems and institutional solutions. If we're lucky, a solution for the Soldier's problem already exists, and Lightning Labs is able to help identify sourcing and implementation solutions for the Soldier or identifying unit.

Sourcing Solutions

If a solution to solve a problem doesn't exist, Lightning Labs will work with the Soldier SME to solicit solutions internally, within the Army and DoD, and then to external entities. Every avenue has benefits and limitations, and Lightning Labs helps guide the active stakeholder to the correct approach.

Innovative Soldiers

It's important to note that divisions naturally possess many innovators throughout our formations. At Lightning Labs, we employ a logistical specialist and an Army musician as software developers, a medical evacuation (MEDEVAC) pilot as an intellectual property expert, and an Infantry officer as an engineering project lead. 1LT Emiliano Concha-Toro, an Infantry officer, joined the Lightning Labs team with a wealth of recent field and jungle experience. He identified operational limitations with the Integrated Tactical Network (ITN) system of systems, which directly led to the development of a solution using an RQ-7 Shadow Echo and division-organic machine shops. This solution will eventually increase C2 for a ground maneuver force in the jungle. Innovative individuals, such as 1LT Concha-Toro, help shepherd Soldier SMEs and their problem to potential solutions.

One resource Lightning Labs successfully integrated into our endeavors is the division's support battalion Allied Trade Shops. The Soldiers in our Allied Trade Shops are experts in machining and welding and often possess industrial certifications and real-world experience. In the previous case, 1LT Concha-Toro worked with the Allied Trade Shops to manufacture the AN/PRC-171 Leader Radio mount to an RQ-7 Shadow. This simple solution, while still in final testing, is easy to replicate and has negligible financial and manpower costs.

Tactical Partnerships

One of Lightning Labs' partnerships is with the 3rd Infantry Division Marne Innovation Center. A recent example of this collaboration, originally identified by 1LT Ross Barber, a cyber officer assigned to 25ID's 2nd Infantry Brigade Combat Team, is the Lightning Labs' Tripwire program. This system scans for passive and active electromagnetic signals and produces an electromagnetic "heat map," allowing commanders to visualize the electromagnetic output of their formations that could be exploited and targeted in future conflicts. Our partnerships with the Marne Innovation Center allow both innovation organizations to focus on their strengths and collaborate to improve the overall product. Inter-division interoperability allows organizations to share solutions and experimental findings, benefiting the broader Army.

DoD Enterprise-Level Partnerships

While division innovation labs regularly collaborate, it's impossible to discuss Army innovation without addressing the impacts of AFC and DEVCOM. These close relationships benefit all involved parties. Lightning Labs advocates on behalf of jungle and Indo-Pacific problem sets, while AFC and DEVCOM provide enterprise-level oversight, resources, relationships, and years of experience. Regular meetings with the Maneuver Battle Lab from Fort Moore, GA, help Lightning Labs inform the AFC enterprise of our tactical requirements and aid us in finding viable and vetted solutions. Lightning Labs recently partnered with Program Executive Office (PEO) Soldier and the office of the Assistant Secretary of the U.S. Army for Installations, Energy and Environment to field test the All-Terrain Electronic Mission Module (ATeMM), which is a battery charging trailer that can be towed behind the Infantry Squad Vehicle (ISV). The ATeMM may significantly reduce battery storage and power consumption challenges experienced by light maneuver formations. Testing will continue into the summer of 2024.

Academic Partnerships

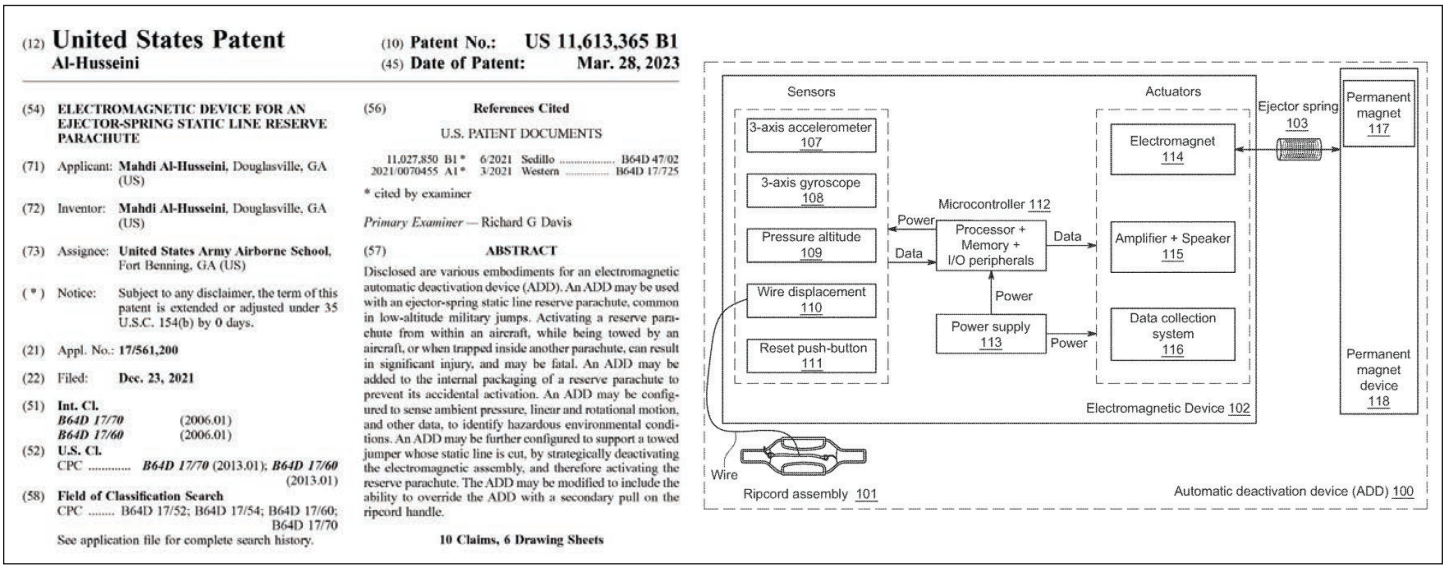
The National Security Innovation Network, a DoD-sponsored program, provides a conduit for military problem sets to receive university resourcing. A multitude of academic resources exist, often providing fully funded options that can attempt to solve a unit's problem. As an example, Lightning Labs' Educational Partnership Agreement with the University of Hawaii aligns local research capacity towards tactical problems, regularly providing us potential solutions and support. Simply put, a problem identified by an Army division could feasibly end up being solved by university students via a DoD-funded program.

To date, 16 Lightning Labs problem sets became academic research projects through Hacking for Defense (H4D), graduate capstone projects, and X-Force internships. Public, private, and military universities supporting Lightning Labs research efforts include Stanford, the University of Chicago, Arizona State, and the Naval Post Graduate School. The University of Hawaii at Manoa remains 25ID's primary academic partner, supporting 11 problems sets since 2022. Some of these recent partnerships include work on our Expeditionary Tele-Behavioral Health (ETBH) initiative and a flight scheduling and maintenance software program. These solutions are still prototypes; however, they will solve real challenges identified by our Soldiers and will increase 25ID's combat readiness.

Sharing Innovative Ideas

Lightning Labs protects intellectual property. Through collaboration with the Army Research Lab, Lightning Labs filed and paid for nine patent applications over the last year, with six more in development. Examples include a retrofittable power mirror system for the Heavy Expanded Mobility Tactical Truck (HEMTT) ground fleet, an intelligent aircraft formation flight heads-up display (HUD) system, and a military freefall grouping visualization tool. Documenting

Figure 2 — Patent No. 11,613,365 - Lightning Labs Support to the U.S. Army Airborne School



(12) **United States Patent**
Al-Husseini

(10) **Patent No.: US 11,613,365 B1**
(45) **Date of Patent: Mar. 28, 2023**

(54) **ELECTROMAGNETIC DEVICE FOR AN EJECTOR-SPRING STATIC LINE RESERVE PARACHUTE**

(71) Applicant: **Mahdi Al-Husseini**, Douglasville, GA (US)

(72) Inventor: **Mahdi Al-Husseini**, Douglasville, GA (US)

(73) Assignee: **United States Army Airborne School**, Fort Benning, GA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **17/561,200**

(22) Filed: **Dec. 23, 2021**

(51) **Int. Cl.**
B64D 17/70 (2006.01)
B64D 17/60 (2006.01)

(52) **U.S. Cl.**
CPC ***B64D 17/70*** (2013.01); ***B64D 17/60*** (2013.01)

(58) **Field of Classification Search**
CPC B64D 17/52; B64D 17/54; B64D 17/60; B64D 17/70
See application file for complete search history.

(56) **References Cited**
U.S. PATENT DOCUMENTS
11,027,850 B1 * 6/2021 Sedillo B64D 47/02
2021/0070455 A1 * 3/2021 Western B64D 17/725
* cited by examiner

Primary Examiner — Richard G Davis

(57) **ABSTRACT**

Disclosed are various embodiments for an electromagnetic automatic deactivation device (ADD). An ADD may be used with an ejector-spring static line reserve parachute, common in low-altitude military jumps. Activating a reserve parachute from within an aircraft, while being towed by an aircraft, or when trapped inside another parachute, can result in significant injury, and may be fatal. An ADD may be added to the internal packaging of a reserve parachute to prevent its accidental activation. An ADD may be configured to sense ambient pressure, linear and rotational motion, and other data, to identify hazardous environmental conditions. An ADD may be further configured to support a towed jumper whose static line is cut, by strategically deactivating the electromagnetic assembly, and therefore activating the reserve parachute. The ADD may be modified to include the ability to override the ADD with a secondary pull on the ripcord handle.

10 Claims, 6 Drawing Sheets

and publishing Soldier innovation initiatives through patents and papers further provide Soldiers with tangible and lasting recognition of their ingenuity.

A Way Forward

Division innovation organizations, such as Lightning Labs, provide valuable insight at the tactical and operational levels. This helps connect them with the broader AFC innovation enterprise, but they require funding and resources to truly be successful. Lightning Labs will continue pursuing academic and partnerships to streamline logistical hurdles, focusing on the tactical and operational challenges in the Indo-Pacific. A stronger connection to the AFC innovation enterprise is absolutely necessary; for example, we have asked DEVCOM and AFC to consider deploying dedicated liaisons to work with division- and corps-level innovation labs to connect Army-level resources to grass root problems. This partnership can further streamline actions and ensure that unit-identified problems receive enterprise level support.

Conclusion

The Indo-Pacific region has many unique challenges not shared by Army formations outside of this region. Lightning Labs is a valuable resource for 25ID Soldiers and leaders to innovate and solve unit-identified problems, regardless of the scale. As a dedicated innovation facility, Lightning Labs connects to the broader Army innovation and modernization enterprise, gaining efficiencies and tapping into additional resources which can be applied to solve some of these challenges. Lightning Labs' proximity to the Soldiers who identify problems, and its ability to connect to the broader innovation and modernization enterprise, provide tailored solutions to land forces and enhance realistic options for readiness. Lightning Labs is a big part of the Army's future in the Indo-Pacific and will undoubtedly play a key role for 25ID in years to come.

MAJ Jason Hinds currently serves as the director of Lightning Labs, the 25th Infantry Division's Innovation and Experimentation Element focused on advancing tactical capabilities through employment of new technology and novel concepts in a realistic environment with end-users. His previous assignments include serving with the Research Analysis Center, U.S. Army Garrison Wiesbaden, the 101st Airborne Division, and 3rd Armored Cavalry Regiment. MAJ Hinds is a graduate of the Command and General Staff Officer Course; he earned a Bachelor of Science in aerospace engineering from Embry-Riddle Aeronautical University and a Master of Science in operations research from Kansas State University.

CPT Mahdi Al-Husseini is an HH-60M Black Hawk pilot currently serving as an active-duty aeromedical evacuations officer stationed at Wheeler Army Airfield, HI. He graduated with his Bachelor of Science in biomedical engineering and Master of Science in computer science from Georgia Tech, and is further enrolled at Stanford and Purdue, where he studies aeronautics and electrical engineering respectively. CPT Al-Husseini is a registered patent agent, professional engineer, and inventor with more than 30 patents and patent applications, several of which have been acquired by the military and industry. He further supports 25ID as its director of innovation.

1LT Emiliano Concha-Toro currently serves as the Lightning Labs innovation and outreach officer, specializing in maneuver-centric problem sets. He previously served as a platoon leader in A Company, 1st Battalion, 27th Infantry Regiment, 2nd Infantry Brigade Combat Team, 25ID, which provided him the necessary experience to understand the demands of maintaining mission readiness at the Soldier level. His purpose at Lightning Labs is to solve maneuver Soldier issues and to advocate for a better understanding of the limitations power consumption at the tactical edge. 1LT Concha-Toro is currently on assignment to the 3rd U.S. Infantry Regiment (The Old Guard). He earned a Bachelor of Science in physics from the U.S. Military Academy at West Point, NY.

1LT Coral Marquez currently serves as a brigade intelligence support element platoon leader with D Company, 65th Brigade Engineer Battalion, 2/25ID. She earned a Bachelor of Science in mechanical engineering from the University of Texas at San Antonio.

Keris Strike

Soldiers from 3rd Squadron, 4th Cavalry Regiment, 3rd Infantry Brigade Combat Team, 25th Infantry Division and Malaysian Armed Forces conduct an assault somewhere in the jungle during Keris Strike 22, Malaysia, on 16 June 2022. Keris Strike is a bilateral Army-to-Army military exercise between the Malaysian Army and United States Army Pacific that increases interoperability operations that reassure shared security commitments in the Indo-Pacific region. (Photo by PFC Wyatt Moore)

M10s to Transform Light Infantry Forces

LTC GARY FLOWERS
DAN HEATON

For more than 200 years, from the American Revolution to the battlefields of Iraq and Afghanistan, the American Infantry has utilized its agility to maneuver through arduous terrain to gain an advantage on its adversary. However, the light infantry, although powerful, has limitations in precision firepower and protection, leading to the natural question of how best to fill that capability gap. Fighting on foreign soil, in a multidomain operational environment, the capability to quickly penetrate fortified areas becomes even more important for the light infantry. The Army's new combat vehicle, the M10 Booker Combat Vehicle, will be the tool that exponentially enhances the light infantry's lethality. With the Booker in the formation, infantry will increase its ability to penetrate an adversary's defenses while retaining offensive freedom of maneuver. Put simply, the introduction of the M10 into the light infantry brings new opportunity as we become the Army of 2040. The M10 was previously known as the Mobile Protected Firepower (MPF), or M10, until named after two heroic Soldiers during an announcement as part of the Army Birthday celebration in June.

Firepower in the Formation

In 1967, the Army addressed the capability gap in light formations by developing and fielding the M551 Sheridan. By the early 1990s, the Sheridan had been utilized by a couple generations of Soldiers, building on lessons learned in the jungles of Vietnam and elsewhere. By the time of the First Gulf War in 1990-91, the Sheridan was an integral part of the fighting power of the light infantry. When the 82nd Airborne Division advanced into Iraq in January 1991, the Sheridan was the ground precision firepower platform supporting the charge. Still, the Sheridan had its limitations, specifically surrounding survivability and reliability. These limitations ultimately led the Army to invest into the M8 Buford Armored Gun System, which was not produced due to cost constraints. Then, in 1997, the Army retired the Sheridan. The departure of the Buford and Sheridan from the scene meant that light forces no longer included an intrinsic long-range precision fire capability. That gap in the light formation has gone unfilled for more than two decades. Until now.

The M10 Booker Combat Vehicle was previously known as the Mobile Protected Firepower. (U.S. Army photo)

Enter the MPF. An approximately 42-ton tracked armored combat vehicle equipped with a 105mm gun, the M10 will be fielded to our light infantry forces and be able to press the attack, disrupting the enemy's intentions while still providing the speed and agility that have been the hallmark of light infantry since the days of the Marquis de Lafayette's service alongside George Washington in the American Revolution.

As the M10 begins to enter the operating force in Fiscal Year (FY) 2025, the Army will take a key step along the path that will lead to the Army of 2040.

The 82nd Airborne Division will become the first unit equipped when

M10s enter Fort Liberty motor pools in late FY25. The 82nd will initially field a battalion of M10s, divided into three companies. The M10s will be controlled as a divisional asset. Commanders will determine, based on mission objectives, which infantry brigade combat teams (IBCTs) will be supported by the M10-equipped battalion. The armored vehicles might be spread out evenly among the division's IBCTs, or two companies might be assigned to a single IBCT with another company held in reserve, or some other combination. As the Army transitions to the division as the tactical unit of action, it will be the division commander who will have the flexibility to configure the force to take advantage of all the division's capabilities — retaining a tactical overmatch to the adversary that can be tailored to a specific battlefield scenario. Ultimately, the Army is set to procure up to 504 M10s, all of which will be allotted to light divisions in the active duty and National Guard.

The Case for the M10

The need for a mobile, protected, precision heavy weapon has been seen throughout the history of modern warfare. Consider the last World War II movie you saw on late night television. A squad of infantry is advancing through the countryside or cautiously moving through an old village of stone houses, churches, and shops. Up ahead, an enemy machine gun, sniper, or mortar operating from a protected position begins taking shots at our heroes, wounding several and stopping their forward progress. The enemy's superior position robs the light infantry of the capability that makes it most lethal — its agility.

One of two things must happen to remove the obstacle and allow the infantry to resume its advance. Either an Audie Murphy-like Soldier must arise, at great potential for personal harm, and somehow flank the opposing position, or the company must stop and call in artillery or aviation assets to support them. In either case, the infantry must pause its advance until one or the other of these assets becomes available and moves into position to support.

As a single platoon on the move, that wait for support may be uncomfortably long. Air power or other assets are likely to be tasked to other larger elements and not immediately available. Meanwhile, opposing forces are equipped with man-carried munitions that can defeat the airpower that the infantry may have called upon for support in the past. In a competition against a peer adversary, air superiority is no longer an option. This makes the need for increasing lethality for the light infantry formation even more pressing.

Currently, light infantry teams carry M72 Light Anti-Armor Weapons (LAW) and/or the FGM-148 Javelin Advanced Anti-Tank Weapon System-Medium (AAWS-M) as its heaviest weapon system. Both are soldier-carried systems that provide no protection for the Soldier who fires the weapon. While the Javelin is an effective anti-tank weapon, the obstacles most likely to impede an infantry formation — bunkers, machine guns, older generation mounted weapons — do not require the expenditure of a precious Javelin.

But… what if the formation had access to its own heavy mobile weapon? What if it had access to longer range, precision firepower that is both mobile and protected? These are the very attributes that gave the M10 its working title of "mobile protected firepower."

The M10 is an armored vehicle crewed by four Soldiers. At a top speed of over 40 miles per hour, the M10 can move quickly to support its infantry. And its 105mm gun has the ability to engage targets at a much greater distance than any weapon now carried by light IBCTs. The M10 can travel in the same environment in which light infantry are able to find and retain cover in a tactical engagement. Dismounted Soldiers remain the strength of an infantry unit, but now they have additional support provided by the M10. Distance fires from the M10 will force the enemy to make decisions before originally intended, creating opportunities for friendly infantry to press their advantage. M10 fires may also serve as a diversion, allowing infantry the freedom of movement to seize a desired terrain objective. The M10 operates in support of infantry, helping to enable infantry to use its tactical advantages to maximum effect.

Not only can the M10 move quickly under its own power, it offers the potential of faster movement to a contested location. Two M10s can roll-on and roll-off a single Air Force C-17. This means M10s can be included in an airlift package infilling into enemy territory, providing the light infantry options and flexibility — an armor platform to move on the offense or protection to a defensive position as forces infiltrate into a combat theater.

Sustainment and Beyond

By August 1944, the U.S. Army had advanced well beyond the beaches of Normandy following the D-Day invasion of France during World War II. The Third Army, under command of GEN George S. Patton, was in the vanguard. The Third Army's advance ground to a halt, however, when Patton's tanks ran out of fuel. The breakdown in the supply chain stopped Patton's advance. "My men can eat their belts," Patton famously told his superior, GEN Dwight D. Eisenhower, "but my tanks gotta have gas."[1]

For five days, Patton's tanks sat idle — a stall that the beleaguered Nazi forces fortunately were not able to fully use to their advantage. Patton could only sit and fume as he waited for the supply to catch up. "Give me 400,000 gallons and I'll go all the way to Berlin," he told Eisenhower.[2]

While Patton's push into Germany was ultimately achieved, one can easily imagine how a five-day respite may have allowed the opposing force to reconstitute and counterattack to their own advantage.

While the M10 brings new capabilities to light forces, it does also bring new challenges. Fuel is a big one. And so is ammunition. The light infantry does not typically have a sustainment package that requires fuel in such large quantities. While fuel can potentially be scrounged from local sources or captured from the enemy, large-caliber ammuni-

tion will be a new requirement and can only come from resupply efforts. Not only do both of these critical resources take up a lot of space, but they are also large and heavy — a full complement of ammo for a single M10 weighs in at above 330 pounds. And these stores are flammable, explosive, and intrinsically dangerous. Introducing these resupply needs will add a new level of battlefield calculus for infantry commanders.

To avoid the frustrations that Patton endured during World War II, today's M10-equipped formation commanders will need a more refined understanding of logistics. Sustainment of the M10 will be critical to success or failure on the battlefield. Commanders will have to be well versed in understanding the likely pace of the fight in determining the when and where of delivering fuel and ammunition. One factor that will help alleviate part of this challenge is that the M10, similar to the Bradley Fighting Vehicle, can operate for approximately 72 hours before requiring refueling.

Equipped with a 105mm gun, the M10 will be fielded to light infantry forces and be able to press the attack, disrupting the enemy's intentions while still providing the speed and agility that have been the hallmark of light infantry. (U.S. Army photo)

Introducing a major new capability such as the M10 into the formation will require commanders and NCOs to not only understand the specifics of the vehicle's impact but also to understand how to employ the vehicle to best be able to tap into its full capability. Examples given above suggest how the M10 may allow a unit to gain an advantage during an offensive maneuver, but there are obviously also ways the M10 may be used to strengthen the light infantry's defense as well. The M10 enhances a formation's lethality in all phases of armed conflict.

Conclusion

When an armored vehicle enters the battlefield, there is a psychological impact that is induced. There's an impact on the unit firing the round and certainly an impact on the adversary receiving the round. The challenge before the Army's IBCTs is how to maximize those impacts. Weighing roughly half of what an Abrams main battle tank weighs and less long, wide, and tall than an Abrams, the M10 can go places a main battle tank cannot. All the questions about how to maximize the capability that an M10 brings to the fight have not yet been answered. But several points have become clear: An M10 can be airlifted into battle and speed across open terrain or maneuver in a contested, close-quarters urban environment. Yet, it still packs a punch and provides lethal and precise long-range fires.

Ultimately, the M10 is bringing overmatch to the battlefield. It will provide the necessary capability our light forces can use to gain and sustain the initiative necessary to win our nation's wars in the future.

Notes

[1] Roberto Guerrero, "4 Reasons Why Fuel Threatens Our Lethality — and What We Can Do About It," *Defense News* (11 November 2019), accessed from https://www.defensenews.com/opinion/commentary/2019/11/11/4-reasons-why-fuel-threatens-our-lethality-and-what-we-can-do-about-it.

[2] Gary Heartsill, "George S. Patton, Jr, General Third Army California Dec. 21, 1945," 28 July 2016, accessed from http://www.gheart.net/PATTON%20PAPER.pdf.

LTC Gary Flowers serves as a requirements officer with the Next Generation Combat Vehicles Cross Functional Team (CFT) where he leads the Mobile Protected Firepower and Armored Multi-Purpose Vehicle signature efforts. He received his commission through the Officer Candidate School in October 2005. As a lieutenant, LTC Flowers served as a Bradley platoon leader, a scout platoon leader, and a detachment commander with 2nd Battalion, 6th Infantry Regiment, 1st Armored Division. He deployed with Task Force 2-6 Infantry to Salmon Pak, Iraq, from 2008-2009 before transitioning to the Maneuver Captain's Career Course (MCCC). Following MCCC, LTC Flowers reported to Fort Campbell, KY, in May 2010 where he commanded Charlie Company, 2nd Battalion, 502nd Infantry Regiment, 2nd Brigade, 101st Airborne Division (Air Assault). While assigned to the 101st, LTC Flowers deployed to Southern Afghanistan from 2010-2011, commanding his company in support of Operation Dragon Strike. Upon redeployment, he deployed to East Afghanistan as a security force assistance brigade (SFAB) team commander from January to November 2012 in support of the Army's advise and assist mission with the Afghan security forces. At the conclusion of command, LTC Flowers employed his combat experience and leadership as an assistant professor of Military Science for Hampton University Reserve Officer Training Corps before being selected to attend the Command and General Staff Course. He was then assigned as an operations and executive officer for 3rd Brigade Combat Team, 1st Armored Division at Fort Bliss, TX. In 2019, LTC Flowers was assigned as the United Nations Command Military Armistice Commission Secretariat's Chief of Operations where he facilitated negotiations, inspections, and the Korean Armistice Agreement enforcement between North and South Korea. LTC Flowers earned a bachelor's degree in organization management and communications from Concordia University (Saint Paul, MN) and a Master of Business Administration from Webster University (Kansas, MO).

Dan Heaton is the director of communications for the Next Generation Combat Vehicles CFT, which is based at the Detroit Arsenal, MI. Heaton became an Army Civilian and joined the CFT in 2020 after a long career in the media and in local government service. Heaton serves as a senior master sergeant public affairs specialist in the Michigan Air National Guard's 127th Wing and has more than 30 years of total military service. He holds a master's degree in marketing from Walsh College, MI, and a bachelor's degree in human resource management from Spring Arbor University, MI.

Vehicle Honors 2 Heroes

The U.S. Army's newest fighting vehicle honors two Americans who gave their lives in service to their nation — and in support of their fellow Soldiers — during two different conflicts.

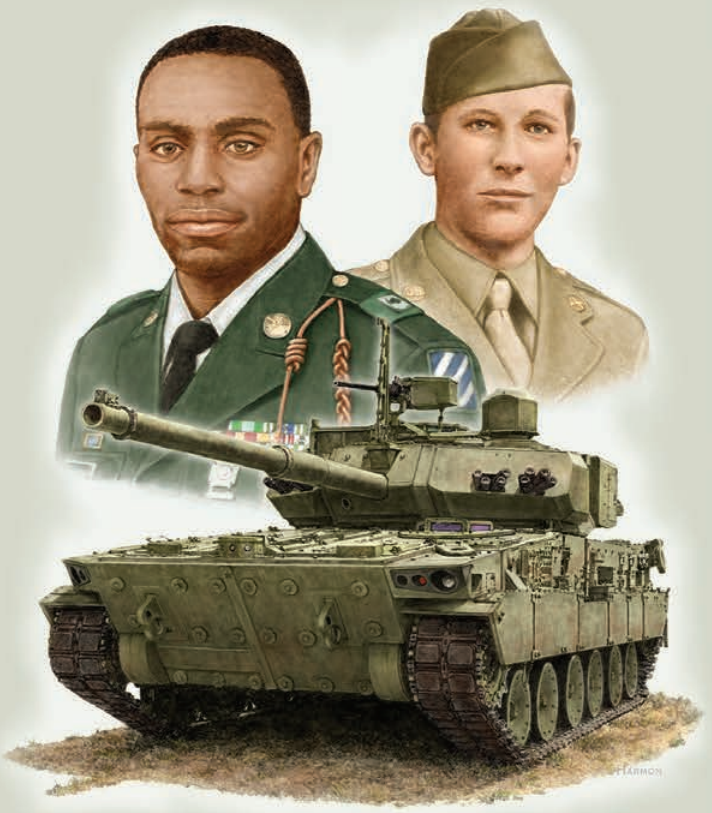
The M10 Booker Combat Vehicle honors:

SSG Stevon A. Booker, an Armor Soldier and recipient of the Distinguished Service Cross, who was killed in the line of duty on 5 April 2003 in Baghdad, Iraq; and

PVT Robert D. Booker, an Infantry Soldier and Medal of Honor recipient, who was killed in the line of duty on 9 April 1943 in Tunisia, Africa, during World War II.

SSG Booker, the first post-9/11 Soldier for whom a major Army system is named, was born in Apollo, PA. A veteran of the 1991 Gulf War, Booker was serving with the 3rd Infantry Division at Fort Stewart, GA, when his unit was deployed to Iraq.

He was posthumously awarded the Distinguished Service Cross for his actions while serving as a tank commander with Company A, 1st Battalion, 64th Armored Regiment, 2nd Brigade Combat Team, 3rd Infantry Division (Mechanized), on 5 April 2003. On this day, SSG Booker's platoon led a task force in a movement to contact along Highway 8 towards Baghdad International Airport. Two kilometers after the line of departure, the platoon came under heavy small arms and rocket-propelled grenade fire from an enemy element. He immediately communicated the situation to his chain of command, encouraged his crew, and returned fire with his tank-mounted machine gun. When both his and his crew's machine guns malfunctioned, SSG Booker, with total disregard for his personal safety, exposed himself by lying in a prone position on top of the tank's turret and accurately engaged the enemy forces with his personal weapon. While exposed, he effectively protected his platoon's flank and delivered accurate information to his command during a critical and vulnerable point of the battle. SSG Booker's fearless attitude and excitement over the communications network inspired his platoon to continue the attack and assured them and leadership that they would defeat the enemy and reach their objective safely. As he remained exposed, SSG Booker identified an enemy troop carrier which was attempting to bypass his tank, but within seconds engaged the enemy vehicle and destroyed it prior to the enemy troops dismounting. Along the 8-kilometer route, he remained exposed and continued to engage the enemy with accurate rifle fire until he was mortally wounded.



The M10 Booker Combat Vehicle is named after SSG Stevon A. Booker and PVT Robert D. Booker. (Artwork by Jody Harmon)

PVT Booker was born in Callaway, NE, and joined the Army in June 1942, with World War II already well underway. After basic training, Booker was assigned to the 133rd Infantry Regiment, 34th Infantry Division and was with that unit at the time of his death.

PVT Booker was posthumously awarded the Medal of Honor for his actions on 9 April 1943 in the vicinity of Fondouk, Tunisia. While engaged in action against the enemy, PVT Booker carried a light machine gun and a box of ammunition over 200 yards of open ground. He continued to advance despite the fact that two enemy machine guns and several mortars were using him as an individual target. Although enemy artillery also began to register on him, upon reaching his objective he immediately commenced firing. After being wounded, he silenced one enemy machine gun and was beginning to fire at the other when he received a second mortal wound. With his last remaining strength, he encouraged the members of his squad and directed their fire. PVT Booker acted without regard for his own safety. His initiative and courage against insurmountable odds are an example of the highest standard of self-sacrifice and fidelity to duty.

The two names recognize both the Armor and Infantry Soldiers who will work together to fight and win on future battlefields.

Junior Leaders in the Age of Experimentation

MAJ ADAM NORDIN

Why should Soldiers outside of the U.S. Army Futures Command (AFC) bother thinking about the future of innovation and technology? After all, battalions and companies are often busy enough conducting training events while keeping up with new equipment fieldings and getting rid of the old equipment.

Any Soldier who has ever fielded the new Enhanced Night Vision Goggle-Binocular (ENVG-B) or a Puma unmanned aircraft system (UAS) can attest to their utility on the battlefield, but those technologies did not arrive by accident. Their concepts were meticulously researched, designed by teams of scientists and Soldiers, and went through rigorous testing before landing on any company commander's property books. As the character of war evolves at the pace of technological advancement, and without a raging war to spur technological advancement, the Army is investing in AFC's Project Convergence. Experimentation will be key to the Army's ability to evolve with new concepts and technologies, adapt to those changes, and integrate devices and systems to win on the next battlefield.

A 10th Mountain Division Soldier adjusts his Enhanced Night Vision Goggle-Binocular in preparation for a land navigation exercise as part of the device's reliability growth test in June 2020. (Photo by Bridgett Siter)

The fundamentals of fire and maneuver and the force's ability to adapt to a changing landscape will always be important. Still, we must remember that technological advancements are not unique to the United States — our adversaries are adopting their own experimentation programs to aggressively compete on a global scale, and the U.S.'s lead as the world superpower is being contested. All said, the fundamentals of soldiering will likely stay untouched. Very few envision a Terminator-like landscape with clashing drones while the humans remain hidden from sight. Wars will be fought — and won — with people, and those people need to be trained and prepared to close with and destroy their enemy. Training this force will be increasingly complex, and leaders need to not only understand their role in training lethality to fight tonight but also embrace the requirements to be relevant tomorrow.

Imagine the maneuver company commanders of 2040. For the most part, they will look similar to company commanders of today: physically fit and both Ranger and Airborne qualified. They'll wear body armor adorned with fighting tools; be bogged down by an array of wires, batteries, and antennas; and carry a rifle that is likely still the 6.8mm Next Generation Squad Weapon. The main difference is their access to information. They'll probably be carrying an advanced version of the Integrated Tactical Network (ITN) that gives them portable data and voice communications transport to both over-the-horizon nodes and shorter-range networks. A device that resembles a cell phone on their chest will give them access to sensors, shooters, and command and control centers in their network. With the support of artificial intelligence (AI) software, they'll be able to communicate their company's situation more efficiently and contribute to the generation of offensive and defensive actions. The company's structure may look much the same as today except for a larger headquarters platoon to manage a small fleet of drones and offensive cyber and communications specialists.

Consider the stature of the Army in which those company commanders serve, possibly as much as 20 years removed from counterinsurgency and full-scale combat operations. Years of successful competition and deterrence could keep threats to the U.S. and its allies in check. Thanks to the degradation of Russia in Ukraine, the shrinking of a Chinese work force, and economic and domestic pressure on North Korea and Iran, the typical big four adversaries might not

cross the threshold of armed conflict. Heavy investment in strengthening partnerships and alliances, and a nimble counterterrorism force, might keep threats on the homeland manageable. Despite occasional immediate response force (IRF) deployments for noncombatant evacuation operations (NEO) in unstable states across the Baltics and Africa, the low demand on the U.S. Army's divisions would allow its experimentation culture to accelerate. Since technology tends to advance most rapidly during combat operations, the absence of armed conflict will necessitate the focus on rigorous, deliberate military development. The challenges of managing an effective training plan would be complicated by the consistent introduction of new equipment or experiments to refine the understanding of the battlefield of 2040.

If war breaks out in 2040, the roles of company commanders may look much like today's, though the character of war will look different. Their primary mission will still be to close with and destroy the enemy in close combat. A multi-dimension battlefield will be second nature to those companies. They'll be well-versed in signals collection and disruption, likely have the means to launch limited cyberattacks on local objectives, and be able to deploy ground and air unmanned systems. Their enemy will have the same capabilities. Should these company commanders find themselves as the objective of an enemy attack, their advanced communications, drones, and cyber weapons could be disabled or disrupted, meaning their ability to fight in an analog environment will be important for survival. The training and attention they put into the fundamental fighting skills that are cherished today will still be the root of their success on a later battlefield. Ultimately, the force that can survive in a contested environment, protect its advanced capabilities, and mass all of its power in a narrow window of opportunity will win the day.

What is Experimentation?

Experimentation is ubiquitous in most Army formations, and it allows leaders to learn what they don't already know.

What exactly is experimentation? This might sound like an easy answer. Many may have taken high school chemistry and remember the reaction when baking soda was mixed with vinegar. But some might not remember what made that event an experiment. After all, the reaction of the mixture is well-known and unsurprising. Most likely, the teacher had the students write a hypothesis: I believe that adding vinegar to baking soda will create a fizz in the solution. A controlled environment was likely prepared for the experiment that included a clean classroom, a graduated cylinder or a scale for measuring the variables, and a sterile glass cylinder to mix everything together. The students repeat the experiment using different amounts of the variables or by adding additional variables like water or food coloring. Students probably recorded the size of the initial reaction as the control, then measured the size of the reaction when different amounts of the variables were added. Finally, over time, the experimenters not only answered their hypothesis but also learned the exact ratios of vinegar and baking soda required to make the biggest reaction, the speed that they must be added, and how non-reactive ingredients like water affect the reaction.

The Department of Defense defines experimentation as testing a hypothesis, under measured conditions, to explore unknown effects of manipulating proposed warfighting concepts, technologies, or conditions. It is not an end but a tool to explore unknown relationships and outcomes that result from new disruptive technologies and concepts, new

Soldiers from the 3rd Brigade Combat Team, 82nd Airborne Division train with the Integrated Visual Augmentation System on 11 October 2022 as a part of Project Convergence 22 at Camp Talega, CA. (Photo by SGT Thiem Huynh)

applications of existing capabilities, or emerging threats.[1] Experimentation is more about learning what isn't known or understood rather than proving what already exists.

In recent years, an evolution in individual soldier technology landed in the hands of some of the most junior combat arms troops. Some examples include the ITN, a brick-style radio that utilizes both FM and cellular networks to transport voice and data through a relay-style mesh network; ENVG-B, the dual-tube, thermal-enabled night-vision devices that incorporate picture in picture views of the user's geo-position and weapon optic and can be linked to the ITN; and the Infantry Squad Vehicle (ISV), a GMC-designed vehicle that can rapidly transport a nine-person squad without the cumbersome weight of armor and large-caliber weapons. These enhancements are a result of experimentation, prototyping, and assessment. They went through years of development, withstood the durability tests of the Defense Advanced Research Projects Agency (DARPA), and were tested by Soldiers at numerous Soldier touch points before fielding. Through the research and development cycle, these products tangentially informed the capabilities of the future force. Innovation breeds more innovation, and that is the power of experimentation.

The Army Futures Command

Conceptualize the future battlefield through the lens of today's technology.

AFC is already researching the challenges, capability gaps, and requirements that must be overcome to achieve the future operating concept. It is a multidomain effort, and artificial AI and machine learning are at the forefront to accelerate problem solving. A key objective is to build networks from powerful processors that can digest data from sensors of any service, provide actionable information to a designated command node, distribute an effects solution to available systems, and inform a logistical action for resupply or maintenance. Multinational partners and the joint services make up a portion of the solution since the U.S. will rely heavily on others for things like penetration, mobilization, and basing in any conflict.

It might sound like the problem is not necessarily revolutionary, and many might be surprised the U.S. military doesn't already have such a system. Unfortunately, its focus for the last 20 years has been based on defeating a shape-shifting adversary — the ideological foot soldiers of various terrorist networks in the Middle East who used their ability to vanish within the local population as their primary means of survival. From the 1980s through the wars in Iraq and Afghanistan, the U.S. military focused on platforms to give it a competitive and lethal edge on the battlefield.[2] Some of the platforms that gave U.S. troops a tactical advantage in the Middle East included the Mine Resistant Ambush Protected (MRAP) vehicles, the 155mm M777 howitzer, the Javelin weapon system, the M142 High Mobility Artillery Rocket System (HIMARS), and the AH-64 Apache helicopter. Key defensive platforms include the Counter Rocket, Artillery, and Mortar (C-RAM) and the Patriot missile system. All of these platforms brought much-needed technological leaps to the battlefield, but none revolutionized the character of war.

AFC's Project Convergence is focused on conceptualizing the design of the future force through an experimentation plan to pursue and integrate the technology and capabilities needed to dominate a future conflict.

These platforms often showcased a major enhancement of an old problem but lacked an improvement to the decide, detect, deliver, assess (D3A) targeting process, sometimes referred to as the kill chain or kill web.[3-4] The M777 or HIMARS brought longer range precision fires and the Apache brought advanced targeting, but a human was still required for much of the targeting process. Humans are required to determine if a target observed through an Apache's forward-looking infrared (FLIR) is friend or foe, to decide the best munition to attack the target, and consider whether that target could be passed to a different platform, such as a howitzer, so the Apache could preserve its ammunition for deeper targets. Should this tactical scenario play out on a current battlefield, a cumbersome process of verbal communication would fill the radio net to precisely describe the problem. Then, the information would get translated into an Advanced Field Artillery Data System (AFATDS) to determine if the target is in range before sending a message to the gun line to prosecute. A well-trained team might take minutes before a commander would be in a position to approve the plan. Iterated dozens of times per day, the consequence translates to fuel burned and exposure for the Apache, mental fatigue for the staff, and a potential temporary reduction in situational awareness for the commander.

AFC's Project Convergence is focused on conceptualizing the design of the future force through an experimentation plan to pursue and integrate the technology and capabilities needed to dominate a future conflict. Every two years, AFC holds its Capstone event (formerly called Project Convergence). Industry partners such as Raytheon, Lockheed Martin, and Palantir join Army research and development teams and active Army units to test the force's ability to fight on a conceptualized future battlefield. Special operations troops, naval fleets, fighter aircraft, Marines, Space and Missile Defense, and Army Soldiers, along with international partners such as the UK and Australia, attempt to link their sensors, shooters, and command and control nodes to reduce the time of the D3A process in complex scenarios. Drone swarms, ballistic missile barrages, unmanned vehicles, and cyberattacks are typical problems that complicate the network during this experiment. A difficult balance of imagination, probability, and technology takes place in a six-week conceptualization of the future company

commander's battlefield to identify shortcomings and gaps that must be addressed.

At a very high level, AFC, the Army Service Component Commands, and even the Army corps are hosting experiments with consequential results. Aside from Capstone, the Futures and Concepts Center, a three-star directorate within Army Futures Command, designs experiments within annual training events held by the U.S. Army Pacific Command and U.S. Army Europe and Africa. Not only are these experiments tailored to a particular region, but they also harness the thoughts and knowledge of Soldiers who live outside the continental United States, actively participate in partner force operations, and are focused on deterring and defeating a specific adversary. The data taken from these experiments inevitably feeds future experiments, including Capstone as well as smaller-scale experiments hosted by the Army's warfighting functions.

A solution to link the existing and new platforms to cut down on the D3A process to speed target prosecution in narrow opportunity windows will be the means to dominate the next battlefield. Advances in processing power, software, and algorithms are leading to computation solutions that improve a leader's ability to make decisions based on impossible volumes of data. In turn, computer-assisted command and control means decisions can be made faster, orders can be distributed and synchronized more rapidly, and precision effects can be delivered to multiple targets at a much higher rate. Those future company commanders will be in the throes of this high-intensity and fast-moving kill chain. Their companies will be collecting data through their sensors, refining unclear data, or acting on data collected by other sensors. The information they transmit or act on will lead to decisions that will be computed in milliseconds, and the pace of their battlefield will move far faster than today. Unlike many other military innovations, these advances are occurring off the battlefield in digital labs and in experiments like Capstone.

Innovations in Practice: How Innovations Intersect with Junior Soldiers in the Field

The junior leaders of today will have to embrace technological developments to be relevant on the battlefield of tomorrow.

Without question, the higher-level focus on experimentation is important to the Army as a force, but it does not overhaul what tactical-level leaders need to be thinking about day-to-day. AFC is experimenting with solving problems at the three-star, joint task force level. Ballistic missiles, deep sensing, drone swarms, and multidomain operations are common themes at that level. At the tactical edge, Soldiers still need to be competent at their core skills of fire and maneuver. Leaders should embrace opportunities to participate in experiments, be mindful of ways to innovate within their own formations, and to become experts with, and provide feedback for, newly fielded equipment.

Company leaders today have an important responsibility in bridging the counterinsurgency force with the multidomain force. The future battlefield will have drones, hypersonic missiles, a mind-blowing network architecture, and Soldiers. With a 10-20-year time horizon for implementation, the transition will take root slowly. In that time, Soldiers and leaders will be subjected to testing and training with new equipment. Technology will continue to advance in and out of the Department of Defense sphere, and there will be several force design updates. Soldiers from across the force are often requested to take part in these experiments where they are mixed with industry leaders, scientists, and innovators to test prototypes and inform concepts. Their participation and feedback provide steering guidance for those shaping the force's understanding of the character of warfare.

British soldiers from C Company, 2nd Battalion of the Yorkshire Regiment take part in an experiment as part of Project Convergence 22 on 4 November 2022. (Photo by Army Futures Command)

Soldiers are natural innovators and experimenters, and formations should, when practical, take opportunities to learn from each other. There isn't an Infantry or Armor Soldier who isn't the beneficiary of a good tactic, technique, or procedure (TTP) that will never be found in any Army publication. Often these TTPs are honed by an individual or group striving to make their lives a little better. Finding the best position for a magazine pouch for shooting from

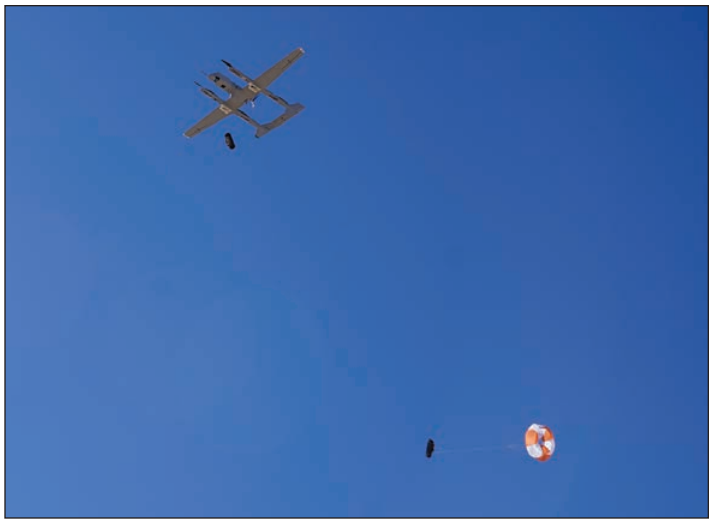
the prone, the best antenna setup to use for a dismounted radio, or a smart way to quickly establish voice communications after a combat equipment static-line jump are all examples of these experiments that resulted in a useful TTP. Often the proprietors of these TTPs aren't sure if they're going to like a particular configuration, but they experiment in a training environment and decide if it works for them. Often a squad leader or team leader will make his or her team follow the same TTPs, beginning a micro-propagation of an experiment that will inevitably be refined by those who use it. The more our leaders are able to nurture this culture, the better our formations will be at applying critical reasoning when testing and evaluating new equipment.

In pursuit of furthering its understanding of the next battlefield, training exercises would add another flavor of conceptualized warfare that underscore the value of adaptive leaders. For echelons above brigade (EAB) at combat training centers, in warfighter exercises, and in regionally aligned ASCC exercises, experiments will be integrated into training events. They will incorporate concepts and prototypes of yet-to-be-fielded technologies and capabilities, and Soldiers across the force will be subject to far-fetched ideas that, seemingly, have no chance of becoming reality. Those company commanders will likely find themselves navigating the complexities of technology dependency, adapting their formations to new technology, and training their companies to fight austere — without battery power and radio waves. Collectively, the force's ability to rapidly assimilate new capabilities into its arsenal and scale their usage at the exact right moments might become a critical competency.

Leaders in brigades do not need to make a hard pivot toward innovation, especially given the challenges already on their plate, but they do need to be prepared to adopt and assimilate new innovations within their ranks. For starters, individual skills competency should be the highest priority at the lowest level. Amateurs train to get the task right; professionals train until they can't get the task wrong.[5] New technology and equipment will not replace the requirement for Soldiers to be experts at their craft. With technology comes new burdens, such as a heavy dependency on batteries and more devices that transmit and receive communication signals. Adversaries will have capabilities to detect signal communications, and batteries will almost always be a commodity — China, for instance, is the world's largest manufacturer of battery-grade lithium — meaning digital technology cannot replace fighting with analog systems.[6] Soldiers will always need to live, and be expected to succeed, in analog environments. Innovation does not reduce the importance of fieldcraft and core competencies, and formations will have to learn to be effective in all conditions.

Putting It All Together

The Army is deliberately planning for a fast-paced, integrated, and technologically assisted future battlefield. Today's junior leaders will be the catalysts of a highly sophisticated Army.



A U.S. Army Group 3 Medical Drone delivers a payload during Project Convergence 22 on 28 October 2022. (Photo by SGT Thiem Huynh)

Predicting the future is almost impossible, especially when it comes to uncertainty in geopolitical tensions, economics, and the strength of a nation's fighting force. Trends and patterns provide indications and clues to what the future might look like, but nothing is certain. Despite these challenges, AFC is making a well-educated estimate of the threats the Army will face in the next two to three decades. Project Convergence is the professional, scientific, and war-focused process to continuously refine its understanding of the future while simultaneously learning through experimentation. Soldiers from across the Army will be in increasing demand to support such experiments, and their participation should be embraced as an opportunity to inform development rather than as a hindrance to training.

More importantly, today's leaders are in the best position to train the generation of leaders ahead of them since tech-enabled decision making will already be part of the Army they join. With a new reliance on digital warfare, tactical leaders' greatest challenge will be keeping their troops focused on individual warfighting skills to fight, and survive, until they reach a window of opportunity to strike.

Notes

[1] Office of the Under Secretary of Defense for Research and Engineering, Experimentation Guidebook, Version 2.0, October 2021.

[2] Christian Brose, *The Kill Chain* (NY: Hachette Books, 2020).

[3] Army Techniques Publication 3-60, *Targeting*, May 2015.

[4] Joint Publication 3-09, *Joint Fire Support*, April 2019, J7.

[5] No citation, but it is known to circulate many of the combat arms communities within the Joint Special Operations Command.

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Making the Most of ReARMM

LTC ANDREW R. LEWIS

The Army has a long history of change. As adversaries adapt and technology improves, doctrine and equipment adjust. Every current member of the Army is living through such an adjustment as the Army faces the challenge of balancing modernization and maintaining a capable force ready to fill global demand in a time of fiscal uncertainty. Given this challenging problem set, every Soldier and leader should understand their role in helping the Army through this transition period so that we can win the next fight. This article provides a brief history of readiness within the Army, explains the Army's new readiness model, and makes a few recommendations to help the Infantry community adjust and succeed.

The Army's first real readiness model change was in 1953 when the Soviet Union threatened democracy. Then, the Army shifted from maintaining a small force and mobilizing for war when necessary to maintaining a large deterrent force mainly positioned in Europe. Those units forward deployed to Europe received the preponderance of training resources, creating a tiered readiness system. After the fall of the Berlin Wall, the need for such a large force became too costly, subsequently leading to a drastic reduction to the Army force structure following Desert Storm.[1] This smaller, well-trained Army primarily supported deployments in eastern Europe. Shortly after the invasion of Iraq in 2003, the Army realized it could not sustain fighting in both Iraq and Afghanistan. As a result, the Army grew and developed the Army Force Generation (ARFORGEN) model. This new model focused on the brigade combat team and put a premium on family time for units returning from a combat rotation. Over time, an unintended consequence of ARFORGEN was the Army's inability to dominate in large-scale combat operations (LSCO). As a result, many essential skills learned from the professional force of the 1990s atrophied. To fix this quickly, the Army shifted to the sustainable readiness model (SRM), resourcing premier training opportunities focused on decisive action. This model increased readiness and educated the next generation of leaders on how to fight a near-peer threat.

As the National Security Strategy shifted its focus from violent extremist organizations to near-peer threats during the Trump administration, the Army realized the need to modernize. The focus on decisive-action training created a force more knowledgeable of LSCO, but the Army's support of the war on terrorism created significant capability gaps. To address capability gaps, the Army implemented a comprehensive modernization strategy at a scale not seen since the 1980s.[2] Modernizing a large force while maintaining readiness and balancing global demand is complicated. In 2020, the Army announced its implementation of the Regionally Aligned Readiness and Modernization Model (ReARMM) to tackle this challenge. This model will enable the Army to fulfill its joint functions in support of the National Security Strategy. It balances operational tempo while ensuring the nation's premier land force is equipped to defeat a future threat.[3] Additionally, this model creates habitual relationships between units and regional forces throughout the globe to better tailor missions to combatant commander requirements.[4]

ReARMM is conducted in three distinct phases, each with a planned eight-month timeline: modernization, training, and

Figure 1 — ReARMM Unit Life-Cycle Model[5]

Modernization (8 Months)	Training (8 Months)	Mission (8 Months)
• Unit reorganization • Integrating modern capabilities • Displace equipment process • New equipment fielding/training	• Mission-tailored • Regionally focused • Individual/small unit/collective training • Home-station training/live-fire exercises/combat training center rotations/warfighter exercises	• Designated units assigned against specific missions/regions • On mission or ready for assignment • Initial response force/contingency response force/decision action

➢ **Enables Army transformational change to a multidomain land power**

➢ **Focuses units regionally with predictable, habitual relationships** to specific missions and theaters, enhancing Army support **competition**

➢ **Synchronizes all Army components, providing predictability to formations**

mission. During the modernization phase, units will receive and train on their new capabilities. This phase is also an opportunity to build a healthy, ready force. Units can take advantage of this time to create cohesive teams and give Soldiers opportunities for time to recharge. Once complete with modernization, units will conduct a mission-essential task list-focused training cycle, integrating and mastering their new capabilities to prepare for a combat training center rotation. Once proficient, teams will deploy to their region or continue training as part of the more significant contingency force.[6]

The Army faces multiple challenges in 2023 that could easily distract good leaders from getting ReARMM right. Like any other operation, preparing and executing this 24-month readiness model takes detailed planning and shared understanding within a unit. Success requires leaders who understand how ReARMM creates a better force and communicate this to their formations. Additionally, leaders must invest equal time in planning for the modernization phase as they would for the training and mission phases. It is easy to focus planning resources primarily on field training or deployments. With ReARMM, if a unit fails in the modernization phase, the modernized equipment may not be integrated effectively, resulting in an exhausted force going into a high-demand training cycle. This scenario could further complicate the Army's retention challenges. Lastly, leaders must not view ReARMM as a tiered model and accept that the Army is modernizing as quickly as possible and prioritizing units based on known demands.

ReARMM is the right approach for the Army to balance readiness and modernization. It includes many benefits: allows commanders to prepare their organizations; balances mission, equipment, and personnel requirements; and ensures prioritization of limited resources based on regional alignment. ReARMM will only serve to increase the strength and flexibility of organizations as the Army modernizes; however, it requires leaders who understand the process and share their understanding with subordinates to maximize opportunities.

Paratroopers in 2nd Battalion, 503rd Airborne Infantry Regiment, 173rd Airborne Brigade, engage targets during a live-fire exercise in Cyprus on 14 February 2023. (Photo by SSG John Yountz)

A row of Joint Light Tactical Vehicles assigned to the 2nd Armored Brigade Combat Team, 3rd Infantry Division arrives at Fort Stewart, GA, in September 2022 as part of Army modernization efforts. (Photo by SSG Justin McClarran)

Notes

[1] James Kitfield and Don Ward, "The Drawdown Deepens," *Government Executive* (1 May 1993): 9.

[2] Latashia Bates, "Army Readiness and Modernization in 2022," Association of the United States Army (15 June 2022), accessed 25 January 2023, from https://www.ausa.org/publications/army-readiness-and-modernization-2022#.

[3] Devon Suits, "Army Implementing ReARMM Unit Life Cycle Model," Army News Service (2 March 2021), accessed 25 January 2023 from https://www.army.mil/article/243828/army_implementing_rearmm_unit_life_cycle_model.

[4] GEN James C. McConville, "Army Multi-Domain Transformation," (16 March 2021), accessed 25 January 2023 from https://api.army.mil/e2/c/downloads/2021/03/23/eeac3d01/20210319-csa-paper-1-signed-print-version.pdf.

[5] Graphic was adapted from MG Kurt J. Ryan and COL Jin H. Pak, "Operationalizing ReARMM: A Sustainment Perspective," *Army Sustainment* (11 August 2021), accessed from https://www.army.mil/article/249275/operationalizing_rearmm_a_sustainment_perspective.

[5] MG Ryan and COL Pak, "Operationalizing ReARMM."

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Assessing the Climate and Culture in Your Organization: A CSM's Perspective

CSM JESSE J. CLARK

Climate and culture are key elements to any organization's success, and one way you can assess an organization is by looking at these two elements. Organizations that are motivated, dedicated, and have a high esprit de corps tend to have the best climate and culture. Those that do not usually have continuous issues, especially with standards and discipline. Some areas that I feel are important for leaders to look at to have a positive climate and culture are communication, discipline across the formation, leadership, and the level of trust.

Communication

As leaders, we must understand that clear and concise communication is vital to keeping our subordinates informed, and it is just as important for subordinates to communicate with their leadership. Maintaining a positive line of communication across the formation facilitates shared understanding and decreases misinformation. This is true in both garrison and tactical environments. If organizations lack the ability to do this, it causes confusion and continuous misinformation, potentially leading to mission failure or worse. One system that is helpful for communication is the operations process, which includes troop leading procedures (TLPs) and the military decision-making process (MDMP). These processes are helpful to keep organizations synchronized and "in the know" of what is coming up.

Additionally, at the battalion and below level, the use of formations to put out information is a great way to ensure that information is disseminated to the lowest level. Although cell phones are useful for sending out information, this format can sometimes be overused, which causes some members in the organization to miss the required information they need to be successful. It also limits the personal interactions that help build a positive climate and culture. As a battalion command sergeant major, I found myself often relying on my cell phone as well when I put information out to the first sergeants; however, I also used emails to company and platoon leadership. Motorpool and closeout formations are a great way to provide key information to the entire organization and have those personal interactions that are needed. Having clear and flat communication in an organization makes all members feel like they have the tools they need to be successful, which helps build a positive climate and culture.

Discipline

Discipline is a word that leaders often use to determine the climate and culture within their organization; however, it can refer to many different areas within the organization. Some areas that the word discipline could be referring to include the conduct of a unit's members and if they are in good keeping with the Army Values. It can also refer to how the organization conducts business. Discipline is also tied to how we accomplish tactical tasks, such as training for combat at echelon, and garrison tasks, such as administrative and medical processing to reach required readiness levels. Soldiers like to know that their personal administrative actions are being handled such as their basic allowance for housing (BAH) packets or bonuses that they are entitled to. A well-rounded and disciplined organization can do all that is required but must set priorities. Units that are unable to complete these tasks or do not prioritize tasks tend to try and do too much at one time, which overwhelms the organization. While some fail to set priorities, others may only prioritize tactical tasks as opposed to the garrison tasks. This can be detrimental to an organization's overall readiness and can have a negative impact on its climate and culture. If leaders ignore administrative tasks, it ultimately impacts those they lead, which can create hostility in the organization. We must be disciplined in combat, training, and in garrison. We lead Soldiers no matter

Closeout formations are a way to provide key information and have personal interaction with your Soldiers. (Photo courtesy of 2nd Battalion, 4th Infantry Regiment)

where we are at. We must teach our young leaders the right way to conduct business, or it will cause issues for our Army in the future. Set the example on what right looks like and affect the discipline in your organization.

Good Leadership

Leadership in an organization is vital to ensuring a positive climate and culture. If leaders have clear and concise communication on a daily basis and build an organization that is disciplined, they will create an environment that members want to be a part of. Leaders who are unable to do this will cause a climate and culture that is undisciplined with low morale, and members will not want to be there. All this will cause failure in any task or mission that the organization is required to complete. This can easily be fixed, regardless of a leader's time in service or time in an organization. All they must do is care! Leaders should care about the members of their organization, care about the success of the organization, and care about what happens to both once they leave. If leaders are able to do this during their time in a unit, the organization will be better than it was when they arrived and will build an environment that members want to serve in. Leaders can be the solution to a good climate and culture in their organization.

Trust

An organization without trust is an organization that is heading for disaster. Trust is the most important attribute of our profession, and it cannot be absent or it will create a climate and culture that is negative and filled with indiscipline and challenges. If an organization has generally good communication, is disciplined, and has leaders who care about those they lead, then this will ultimately build trust across the organization. It sounds easier than it can be at times. Trust is something that must be earned over time and is not automatic when new members show up to an organization; however, if a positive climate and culture already exist, it is easier to build trust. Build trust early in your organization.

Real-World Scenario

I have been a member of several different types of organizations over my time in the Army. These units had different mission sets and different climates and cultures, depending on the leaders. The climate and culture could change each time a new leader arrived; however, if the organization had good communication, was generally disciplined, and had leaders who cared, the organization would continue to be positive and a place a member truly wanted to serve in. One of the things that I have learned is that when given the opportunity to lead, give everything you have every day to make that organization as great as you can for those who are a part of it.

Trust is something that must be earned over time and is not automatic when new members show up to an organization; however, if a positive climate and culture already exist, it is easier to build trust.

Conclusion

Climate and culture can be seen as two of the most important aspects of an organization. These have impacts on everything that organization does or fails to do. That is why as leaders it is so important to ensure that your organization has good communication from top to bottom, is disciplined, has leaders who care, and has trust built with its members. By doing these things in your organization, you will see more success, more commitment, and a higher level of retention than you may have seen previously in that organization or in others you have served in. We owe it to the sons and daughters of this great nation to give them an environment that they will thrive in and want to continue to be a part of in the future.

At the time this article was written, **CSM Jesse J. Clark** was serving as the senior enlisted leader of 2nd Battalion, 4th Infantry Regiment, 10th Mountain Division (Light Infantry) at Fort Polk, LA. He is currently the senior enlisted observer-coach-trainer in Task Force Panther, Joint Multinational Readiness Center at Hohenfels, Germany. He began his military career in February 2000 when he enlisted in the Army Reserves as a hospital food specialist with the 256th Combat Support Hospital in Cleveland. After 9/11, he joined active duty as an Infantryman. He attended Infantry One Station Unit Training and Airborne School at Fort Benning, GA, and was then assigned to the 82nd Airborne Division at Fort Bragg, NC. He has served as an infantry team leader, squad leader, platoon sergeant, first sergeant, observer-coach-trainer, and operations sergeant major. He has deployed twice to Afghanistan in support of Operation Enduring Freedom, once to Iraq in support of Operation Iraqi Freedom, to Poland in support of Operation Atlantic Resolve, to Kuwait in support of Operation Spartan Shield and Operation Inherent Resolve, and to Qatar in support of Operation Allies Refugee. CSM Clark earned an associate's degree in general studies from Troy University as well as bachelor's and master's degrees in organizational leadership from Columbia Southern University.

Newly Released Doctrine

Field Manual (FM) 3-90, Tactics, May 2023

FM 3-90 describes combat-tested tactics and techniques for offensive, defensive, and enabling operations. For each type of operation, FM 3-90 discusses the organization of forces; minimum essential control measures; and general planning, preparation, and execution considerations. You can access FM 3-90 using the QR code on the right or the following link: https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN38160-FM_3-90-000-WEB-1.pdf.

Agile Command and Control Wins at JRTC

LTC JEFF FARMER

Above, a battalion commander receives an update brief from his attached armor-mechanized team during a rotation at the Joint Readiness Training Center. (JRTC rotational photos)

I was guilty. During my first six months in battalion command, I found myself forward with two rifle companies and the tactical command post conducting an air assault during the hours of limited visibility with more than 400 of my best friends.[1] Our mission: attack to seize key terrain in vicinity of Objective Galaxy in order to establish a lodgment for the brigade. This lodgment would then facilitate the brigade's effort to begin its combat power generation in the defense of Arnland.[2] I fancied myself a commander's commander and was determined to prove this theory in the flesh during our brigade's premier training event focused on large-scale combat operations (LSCO) in the infamous Fullerton Training Area, aka "the Box," at the Joint Readiness Training Center (JRTC) at Fort Johnson, LA.

Commanders belong forward, ensuring that the unit's subordinate formations have a shared understanding of their intent and providing the leadership and direction required to gain and maintain the operational tempo necessary to complete the mission. However, being forward with my Soldiers created a void in my visualization of future operations with the battalion staff, which in return created slow and untimely mission orders, minimal operational graphics to the companies, and poor transition management of the organization. I quickly learned that placing oneself at the point of friction does not relieve commanders of their responsibility to ensure their staff also fully understands their visualization of the fight, which will enable the appropriate and timely planning, orders processes, and current operations systems that sustain a battalion and propel it to success. Ultimately, commanders should be able to leave their staff and conduct battlefield circulation with well-defined decision points and triggers that enable the command to conduct timely command and control (C2) of its subordinate elements.

Battalion commanders cannot and should not abandon the battalion staff at the main command post (MCP) or the tactical command post (TAC) without communicating a shared visualization and intent. Programming the required training objectives into the staff's individual and collective train up is tantamount to squad-, platoon-, and company-level proficiency training to find, fix, and destroy the enemy. Reciprocally, the battalion staff owes the battalion commander constant refinement of its analyses across all appropriate warfighting functions to facilitate timely and accurate decision-making. Often, these analyses can result in an appropriate reallocation of resources/assets or even a task reorganization based

on risk or potential opportunities to exploit the enemy or gain momentum.

A former brigade commander of mine defined two types of decision points:

1) Allocation/reallocation of combat power to exploit an enemy vulnerability, and

2) Allocation/reallocation of combat power to mitigate a friendly weakness.

Both require brigade or battalion commander-level approval. These should not be confused with triggers. Triggers are generally an action that the staff has planned and gained prior approval from a commander for deliberate action once the established conditions are present. These triggers can be the difference in a delegated authority executing timely indirect fires into an engagement area or committing a reserve force to exploit a seam in the enemy's flank. All these planning processes, to include the shared understanding of a common operational picture (COP), are critical to the science of C2 in a LSCO environment.

Much like my time as an infantry battalion commander, as an infantry task force senior in JRTC's Operations Group, I have observed many of my contemporaries focused on the same mantra as I did when entering "the Box" — "ride or die" with the company commanders while paying little attention to their staff. Unfortunately, this often results in the battalion staff and C2 nodes struggling to accurately battle track friendly forward positions and contact with enemy elements or clear ground and air to employ indirect fires assets in an accurate and timely manner. Additionally, the planning of transitions and future operations often falls short.

Battalion commanders can influence and shape the appropriate application of violence of action and enable maneuver of subordinate units. This is largely accomplished by training battalion staffs to establish and maintain an effective COP, enforcing a transition from conceptual to detailed planning (operational graphics), and updating running staff estimates while adhering to a battle rhythm (doing routine things routinely). An often overlooked and underrated approach is through good old-fashioned adjacent unit coordination (battalion commander to battalion commander and staff primary to staff primary). All these components are relatively simple but require repetition, discipline, and redundancy through systems and trained members of the team.

Common Operational Picture

Army Training Publication (ATP) 6-0.5, *Command Post Organization and Operations*, defines a COP as "the end product of knowledge and information activities, running estimates, and battle tracking. It is the operational picture tailored to the commander's requirements, based on common data and shared information, and facilitates collaborative planning and the achievement of situational understanding."[3] Additionally, this end product should be a single display of relevant data that is shared with more than one other command.[4] In producing and maintaining a battalion COP, the battle captain — or COP manager — must not merely illustrate operational graphics from the battalion operations officer's concept sketch that was constructed during the military decision-making process (MDMP) but constantly update the operational graphics with bottom-up refinement from company commanders, the scout platoon, battalion intelligence officer, and all applicable warfighting functions. This can be done over lower tactical internet (T/I) mediums such as via the Joint Battle Command-Platform (JBC-P)/Joint Capabilities Release (JCR).[5]

When digital means are degraded, another way is the physical transmission of analog graphics on transparent overlays from companies to battalion and vice-versa. As a battalion commander, our battalion coined this process the "pigeon scroll." The pigeon scroll proved highly successful and was a simple polyvinyl chloride (PVC) pipe that carried 1:50 overlays consisting of an enemy situation template (SITEMP), operational graphics, fires overlays, and a matrix operations order shell. This carrier system was utilized by any and every element circulating the battlefield. For example, if the distribution platoon was conducting a logistical resupply point (LRP) mission, it would carry updated graphics and/or mission orders in the PVC pipe to be handed off to the company trains. Conversely, a company commander could update the battalion commander and battalion COP with their operational graphics and fires plan via backhauling the company's PVC pipe to the LRP, which was then handed to the distribution platoon for dissemination to the battalion TAC or MCP. All battlefield circulation was treated the same way, regardless of rank or position.

Regardless of the unit's technique, the refinement process should be codified in the battalion's command post standard operating procedures (CPSOP), sometimes referred to as

A staff section updates the battalion common operating picture during a Decision Action Training Environment-Europe (DATE-E) rotation at JRTC.

the tactical operations center standard operating procedures (TOCSOP) or planning standard operating procedures (PSOP) manual.[6] This process should be trained down to company command posts to continuously refine friendly positions, company boundaries, engagement areas, obstacle composition/disposition as well as known and suspected enemy positions. A common observed mistake is a lack of designated company boundaries, whether on a movement to contact or merely in an area defense. This reassessment will assist the battalion intelligence officer in assessing the enemy order of battle, as well as assist the battalion operations officer and commander in determining the appropriate array of forces based on the enemy threat.

Conceptual to detailed graphics are critical to expedient and precise control. ATP 6.0-5 identifies that a COP should consist of an area of operations, significant activities including unit boundaries and current locations within the AO, maneuver graphics, active and planned fire support coordination measures, active and on-order airspace control measures, sustainment nodes and main supply routes, civil considerations, known and templated threats, hazards and enemy locations and activities, protection priorities, and risk assessment.[7]

Running Estimates

ATP 6-0.5 states, "Running estimates and the common operational picture are key products used for building and maintaining situational understanding. A running estimate is the continuous assessment of the current situation used to determine if the current operation is proceeding according to the commander's intent and if planned future operations are supportable."[8] The criticality of this statement can easily go unnoticed until put into action under a time-constrained, austere environment, where a free-thinking opposing force, weather, and terrain get a vote. The situation is further compounded by both the time and location of where a commander deploys with their TAC. Without continuous running estimates across all warfighting functions and an up-to-date COP, a staff cannot efficiently provide accurate and timely information to the commander. Further, this complexity will muddy the waters on a staff's ability to provide timely and feasible recommendations for the commander's decision points regarding future operations.

During LSCO training at JRTC, well-trained companies and battalions can generally plan 12-24 hours out to sustain combat operations. Highly trained companies and battalions can forecast 24-48 hours out and see through the transition of one battle period into the next.

Commanders can remedy the problem of outdated information by using all training events conducted across the battalion as multi-echelon training opportunities for leaders and staff. This allows leaders and staff members at echelon to get the multiple repetitions needed to build competency during battalion and company collective-training events such as programmed situational training exercises (STXs), fire coordination exercises (FCXs), and command post exercises (CPXs). These exercises should include training objectives that focus on continuous running staff estimates, driven by the battalion executive officer, through routine employment of battalion command nodes, at echelon, as applicable to the unit's modified table of organization and equipment (MTOE).[9]

Bottom line, by training as we fight, battalion commanders should train their staff routinely by issuing written guidance (commander's intent) and then displacing themselves over time (could be while observing training or jumping with the TAC) to simulate friction within the MCP.[10] This practice will first create an environment that empowers the battalion executive officer or operations officer to execute two-minute drills (or whatever is within the battalion's SOP).[11] Second, this dispersion will force the battalion commander to receive updates through redundant measures (e.g., battle rhythm, commander's update brief via alternative means, such as frequency modulation [FM] radio or lower T/I mediums [JBC-P/JCR]). Third, this exercise will emphasize the criticality of a disciplined battle rhythm — the elusive battle rhythm.

The sooner a battalion can implement a battle rhythm via either a warm or cold start, the better. If the commander cannot be at the MCP in person, no problem. The Army gave commanders an executive officer, operations officer, and operations sergeant major. It also created platforms to enhance and increase redundant communications measures, analog COPs with running staff estimates, lower T/I, tactical satellite (TACSAT), and even FM radio.

Adjacent Unit Coordination

This is a softball. Help solve your brigade commander's problems by talking to your brothers and sisters on your left, right, and — yes — to your front and rear. Seems simple, right? Often, just like you, the brigade commander is torn on where they should be during the point of friction. Ideally, depending on the situation, the brigade commander's focus, besides the synchronization and integration of their reconnaissance and intelligence-enabled fires plan, is looking at the next fight — specifically, posturing battalions to transition and sustain their operational reach. Additionally, the added complexity of the tyranny of distance to accomplish commander-to-commander dialogue and communicating their visualization can potentially put some commanders on the periphery of frequent dialogue. Frequent and constant shared visualization from battalion commander to squadron and fellow battalion commanders can mitigate the tactical risk of losing tempo and ideally enable disciplined initiative, based on the brigade commander's guidance. This will also enable battalion commanders to provide timely and feasible recommendations. These recommendations can come in the form of suitable battalion boundaries or engagement areas and often lead to identifying gaps and seams that could potentially call for a change in task organization.

If physical circulation is not possible or feasible due to time, terrain, or enemy, the utilization of alternative means, such as FM and lower T/I, is sufficient. However, in my experience and observations, the employment of point-to-

A company commander updates the battalion commander for the adjacent unit, which will be assisting in securing the brigade's main objective, and the commander from the attached multinational partner.

point over-the-horizon communication systems, such as via the Global Rapid Response Information Package (GRRIP), can save hours of time and facilitate quick, concise communication between battalions/squadron and from battalion commanders to the brigade commander.[12] Moreover, this equipment does not require network infrastructure during a time of increased emphasis on lower T/I due to expeditionary requirements of tactical C2 nodes.

Conclusion

In summary, battalion commanders can wear out their organization by trying to focus on too many facets while training for a unit's mission-essential tasks supporting LSCO. Focusing on implementing systems, expeditionary battalion and company command posts, and personnel proficiency within the approved command post systems can make all the difference with respect to timely decision-making and execution in a LSCO environment. The personnel training investment requires the battalion staff to be disciplined, constantly updating the battalion COP and battalion staff estimates and conducting subordinate and battalion-level adjacent unit coordination. This staff discipline will significantly put any maneuver, combat support, or combat service support battalion on a competitive playing field in "the Box" at JRTC.

More importantly, these systems and trained personnel, at all echelons, will better prepare any battalion for combat in LSCO. A well-organized and maintained COP not only enhances situational awareness across the staff and subordinate units, but when appropriately constructed, a COP can be the difference in the employment of timely and accurate fires, direct-fire employment, and gaining/maintaining momentum. All these components enhance C2 and reduce the risk of fratricide. C2 in a LSCO environment is not just an art but a necessary science to warfighting against a near-peer threat.

Editor's Note: *This article was first published by the Center for Army Lessons Learned at https://www.army.mil/article/267840/agile_command_and_control_wins_at_jrtc.*

Notes

[1] While it is customary to write using the third person when drafting lessons learned papers, I felt that by injecting my fallacies early on that it would disarm the reader and hopefully impart some of the lessons learned through my pain instead of theirs.

[2] Arnland is the allied nation under the Decisive Action Training Environment – Europe (DATE-E) operational environment (OE). In DATE-Caucasus OE, the friendly nation is Atropia and in DATE-Pacific, the friendly nation is South Torbia. For more information on the DATE OE, please see "DATE Knowledge Base," OE Data Integration Network, version 2.11.1, Training and Doctrine Command, Department of the Army, https://odin.tradoc.army.mil/DATE.

[3] Army Training Publication (ATP) 6-0.5, *Command Post Organization and Operations*, March 2017, para 3-51.

[4] Ibid, para 1-10.

[5] The multitude of command and control (C2) platforms that the modern leader must deal with is substantial. To name but a few (oldest to newest): Force XXI Battle Command Brigade and Below (FBCB2), Blue Force Tracker (BFT), Joint Capabilities Release (JCR), and Joint Battle Command-Platform (JBC-P). All these platforms provide ease of communication throughout all echelons over lower tactical internet mediums.

[6] While the tactical operations center standard operating procedures (TOCSOP) is technically being phased out of doctrine for the newer doctrinal term, command post standard operating procedures (CPSOP), it is still in use due to the duration of the global war on terrorism where the use of TOCSOP became common with the utilization of the TOC.

[7] For more information on common operational picture best practices, reference ATP 6-0.5, Appendix C "Command Post Communications," para C-34 to C-36 and Table C-1, "Common Operational Picture Checklist."

[8] Ibid, para 1-9.

[9] A modified table of organization and equipment is an official change to the basic table of organization and equipment in order to adapt it to the needs of a specific unit or mission set. For more information, reference the Army Force Management School (AFMS) website at https://fmsweb.fms.army.mil/protected/secure/tools.asp.

[10] "Training as we fight" is one of the four principles of training in accordance with Army Doctrine Publication 7-0, *Training*, July 2019. ADP 7-0 is currently in the process of being updated.

[11] The two-minute drill is basically a mini commander's update brief that allows the elements of the command post to quickly inform the requesting key leader any pertinent information as of a specific date and time. In order to be able to conduct these types of drills, each element must keep up-to-date and accurate information.

[12] The Global Rapid Response Information Package (GRRIP) was designed specifically for light and airborne formations as it provides a rugged, secure, beyond-line-of-sight voice and data communications without the need for local network infrastructure, so Soldiers can communicate anytime and anywhere on the planet. For more information, reference PEO C3T (Satellite Communications: GRRIP, Program Executive Office Command Control Communications-Tactical, Department of the Army, Aberdeen Proving Ground, MD, https://peoc3t.army.mil/tn/grrip.php.

LTC Jeff Farmer currently serves as the Infantry Task Force 1 Senior in the Operations Group at the Joint Readiness Training Center at Fort Johnson, LA. He is a 20-year Army Infantry officer with four deployments to Afghanistan and Iraq. LTC Farmer commanded the 1st Battalion, 506th Infantry Regiment, 101st Airborne Division (Air Assault) from March 2020 to June 2022. His previous assignments include serving with the 2nd Battalion, 9th Infantry Regiment (mechanized); 1st Battalion, 502nd Infantry Regiment (air assault); and 2nd Battalion, 12th Infantry Regiment (light). LTC Farmer also served more than three years as a strategic and operational planner on the Joint Staff and U.S. Africa Command.

John W. Mabes III, the observation detachments chief at JRTC for the Center for Army Lessons Learned, also contributed to this article.

2023 Doughboy Awards

The Doughboy Award is presented annually to recognize an individual for outstanding contributions to the U.S. Army Infantry. It is the highest honor the Chief of Infantry can bestow on any Infantryman. This year's recipients, GEN (Retired) Daniel B. Allyn and CSM (Retired) Michael A. Kelso, will be recognized during the Doughboy Dinner on 12 September. The award, presented on behalf of all Infantrymen past and present, is a chrome replica of a helmet worn by American Expeditionary Soldiers during World War I and the early days of World War II. The term "Doughboy" originated in Texas where Soldiers trained along the Rio Grande in preparation for the Great War. The Soldiers became covered in the dusty, white adobe soil and were called "adobes" by mounted troops. Over time, this term transitioned to become doughboys.

GEN Daniel B. Allyn

GEN (Retired) Daniel B. Allyn was born in New Hampshire and raised in Berwick, ME. He graduated from the United States Military Academy at West Point, NY. He served as the 35th Vice Chief of Staff of the United States Army and retired in 2017.

GEN Allyn's previous assignments include serving as a platoon leader and later executive officer in C Company, 2nd Battalion, 508th Infantry Regiment, 82nd Airborne Division and Operation Urgent Fury, Grenada; B Company commander, 2nd Battalion, 503rd Infantry Regiment, 2nd Infantry Division, Republic of Korea; C Company commander, 1st Battalion, 75th Ranger Regiment and Operation Just Cause, Panama; assistant operations officer, 75th Ranger Regiment; operations officer, Joint Special Operations Task Force, Operation Desert Shield/Desert Storm; operations officer, 1st Brigade, 82nd Airborne Division; commander, 1st Battalion, 325th Airborne Infantry Regiment, 82nd Airborne; commander, 3rd Battalion, 75th Ranger Regiment; commander, 3rd Brigade, 3rd Infantry Division, Fort Benning, GA, Operation Desert Spring, and Operation Iraqi Freedom; Assistant Deputy Director for Joint Operations, Joint Staff; Deputy Director for Operations, Joint Improvised Explosive Device Defeat Organization; Chief of Staff, XVIII Airborne Corps and Fort Bragg and Chief of Staff, Multinational Corps-Iraq, Operation Iraqi Freedom; Deputy Commanding General XVIII Airborne Corps and Fort Bragg; Deputy Commanding General, Joint Task Force-Haiti, Operation Unified Response; Commanding General, 1st Cavalry Division, Fort Hood, TX, and Operation Enduring Freedom; commanding general, XVIII Airborne Corps and Fort Bragg; Commanding General, U.S. Forces Command; and Vice Chief of Staff of the Army.

His awards and decorations include the Distinguished Service Medal with 1 bronze oak leaf cluster (OLC); Silver Star; Defense Superior Service Medal with 2 bronze OLCs; Legion of Merit with 2 bronze OLCs; Bronze Star Medal; Defense Meritorious Service Medal with 1 bronze OLC; Meritorious Service Medal with silver OLC; Joint service Commendation Medal; Army Commendation Medal with 3 bronze OLCs; Army Achievement Medal with 2 bronze OLCs; Combat Infantryman Badge with star; Expert Infantryman Badge; Master Parachutist Badge with bronze star; Ranger Tab; Pathfinder Badge; Joint Chief of Staff ID Badge; and the Army Staff ID Badge.

CSM Michael A. Kelso

CSM (Retired) Michael A. Kelso from Missouri is a 2010 inductee into the Ranger Hall of Fame. His career of 32 years includes service with Airborne, Commando, and Ranger units. CSM Kelso began his Army career in 1973, enlisting for the 82nd Airborne Division. He served with 3rd Battalion (Airborne), 4th Air Defense Artillery.

After reading about the communist-supported insurgency in the Republic of Rhodesia, CSM Kelso volunteered for service in the Rhodesian Army in 1977. Trooper Kelso served with 3 Commando, The Rhodesian Light Infantry. Assigned to 12 Troop, he served as a "stick" rifleman, troop medic, and machine gunner participating in reconnaissance and Fire Force missions, including air assault and six combat parachute assault missions including Operation Dingo-Zulu One. On 23 November 1977, Trooper Kelso was one of 48 3 Commando and 96 SAS troopers to conduct a combat parachute assault, from 400 feet, onto the Vanduzi communist terrorist base camp complex near Chimoio, Mozambique. The camp housing 5,000 terrorists was 70 kilometers inside Mozambique, providing training, logistics, and Marxist indoctrination. Remaining 30 hours on the ground, Rhodesia's largest cross-border raid saw more than 1,200 communist terrorists killed, several hundred wounded, and the base destroyed.

CSM Kelso served more than 19 years in Ranger units including 1st Battalion (Ranger), 75th Infantry; Special Operations Forces-Europe (Bad Tolz); 3rd Battalion, 75th Ranger Regiment; Headquarters and Headquarters Company (HHC), 75th Ranger Regiment; 4th Ranger Training Battalion; and HHC, Ranger Training Brigade. While assigned as 1SG/Commandant of the Ranger Indoctrination Program, he served as security team leader for the Regimental Commander's Jump Tactical Operations Center (Team Black) during the combat parachute assault onto Rio Hato, Panama, during Operation Just Cause. Upon graduation from the Sergeants Major Academy in 1994, he was assigned to the Ranger Training Brigade as the operations sergeant major. In 1995, he was promoted to command sergeant major and assigned to the 4th Ranger Training Battalion. In 1999, after serving as CSM, 1st Battalion, 501st Parachute Infantry Regiment, he was selected as the Ranger Training Brigade CSM. In 2002 he was selected by the Commanding General of the U.S. Army Infantry Center to serve as the Fort Benning Command Sergeant Major. After retirement, in 2005, he worked 17 years in the Maneuver Battle Lab as chief of the McKenna Experimental Site.

CSM Kelso's awards include the Distinguished Service Medal, the Armed Forces Expeditionary Medal with Arrowhead, the Rhodesian Operational Service Medal, the Combat Infantryman Badge, the Expert Infantryman Badge, the Master Parachutist Badge with Bronze Star (Rio Hato) and the Ranger Tab. He was inducted into the Order of St. Maurice (Primacerius). He is honored as a Distinguished Member of the 75th Ranger Regiment and the Ranger Training Brigade. He holds a master's degree (International Relations) from Troy State University. He serves on the board of the National Infantry Association, the National Ranger Memorial Foundation, the Ranger Scholarship Fund and is a mentor with Three Rangers Foundation.


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