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By Order of the Secretary of the Army:

RANDY A. GEORGE
General, United States Army
Chief of Staff

Official:

MARK F. AVERILL
Administrative Assistant
to the Secretary of the Army
2401103

SHANE P. MORGAN
Brigadier General, United States Army
56th Field Artillery School Commandant,
Fort Sill, Oklahoma

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judith.n.oman.civ@army.mil



**Field Artillery
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Editor & FA School PAO: Judith Oman
Art Director: David Johnson

For more information, contact the
U.S. Army Field Artillery School at
(580) 558-0836

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Purpose

Originally founded as the *Field Artillery Journal*, the *Field Artillery Professional Bulletin* serves as a forum for the discussions of all U.S. Army and U.S. Marine Corps Field Artillery professionals, Active, Reserves and National Guard; disseminates professional knowledge about progress, development and best use in campaigns; cultivates a common understanding of the power, limitations and application of Fires, both lethal and nonlethal; fosters Fires interdependency among the armed services, all of which contribute to the good of the Army, joint and combined forces and our nation. The *Field Artillery Professional Bulletin* is pleased to grant permission to reprint; please credit *Field Artillery Professional Bulletin*, the author(s) and photographers.

Cover

SPC Austen Rankin and PVT Tyler Snell, of Bravo Battery, 2nd Battalion, 2nd Field Artillery “Big Deuce”, SEND IT during live fire exercises at Fort Sill Oct. 20, 2023. (Photo by Chris Wilson, Fort Sill Public Affairs)





A Message from the Chief of the Field Artillery



“There has never been a more exciting nor more relevant time to be a Redleg!”

BG Shane P. Morgan
Chief of the Field Artillery

Greetings from Blockhouse Signal Mountain and Fort Sill—

The Field Artillery Branch’s priorities remain aligned with the Chief of Staff of the Army’s four focus areas: Warfighting, Delivering Combat Power, Continuous Transformation, and Strengthening the Profession.

WARFIGHTING: We recognize the Field Artillery’s pivotal role for the Joint Force and the critical role that you, the fire supporter, perform in Large-Scale Combat Operations from within a Multi-Domain Environment. To meet our future challenges, we must continue to embrace change, adapt, and transform in contact. Our solemn duty as Redlegs is to ensure our Soldiers never fight a fair fight. Massed-concentrated Field Artillery Fires matter – Cannons, Rockets, and Missiles is what we deliver.

DELIVERING COMBAT READY FORMATIONS: While the Field Artillery Branch and the Army continue to transform, we must remain laser focused on the fundamentals of Fire Support and fielded force equipment. The fielded force will maintain our M119A3, M777A2, and M109A6/A7 PIM for our current fight, and thus, we must maintain and sustain our cannon fleets to the highest levels of operational readiness. To provide timely and accurate fires for our maneuver formations we will continue to provide trained, proficient, and lethal howitzer sections, fire direction centers, and fire support teams. From the close fight to the deep fight and from mortar teams to missiles, we destroy, neutralize, and suppress by cannon, rocket, and missile fires. The Field Artillery will never walk away from the close fight! New technology will prove disruptive, but it’s you, the Fire Supporter, who fights with lethal fires at echelon, who will always be decisive.

CONTINUOUS TRANSFORMATION: Exciting developments in our Redleg arsenal signal significant progress in precision, lethality, mobility, and increased range capabilities. The Precision Strike Missile (PrSM) is a game changing asset, replacing the Army Tactical Missile System (ATACMS) and doubling the volume of fire with two missiles per pod. The Mid-Range Capability (MRC) offers a dual-missile system expanding engagement ranges past 1,000 kilometers, seamlessly aligning with joint missions. The Long-Range Hypersonic Weapon (LRHW), delivered to the 5th Battalion, 3rd Field Artillery Regiment, introduces a strategic deep strike capability with ranges exceeding 2,500 kilometers and speeds surpassing 6,000 kilometers per hour.

STRENGTHENING THE PROFESSION: Professional writing is the cornerstone of the Army Profession. The Field Artillery Professional Bulletin and Field Artillery Journal facilitate professional dialogue and is where we share conceptual ideas and professional discourse. We encourage all Redlegs from our young Soldiers to seasoned leaders, Commanders, CSMs, and our Veterans to write. Be a part of the solution – drive relevant change!

We are hosting our inaugural GEN Raymond T. Odierno Best Redleg Competition from 10-14 May, testing 13B Cannon Crewmembers, 13F Joint Fire Support Specialists, and 13J Fire Control Specialists. Named after the 38th Chief of Staff of the Army and an incredibly proud Redleg, no one loved team competitions more than “GEN O.” This May, the best Field Artillery units from our numbered divisions will travel to the ancestral home of the Field Artillery to compete in a five-day competition to identify the best ... of the best... by test...in our Army!

“There has never been a more exciting nor more relevant time to be a Redleg!”

Shane P. Morgan

BEST REDLEG

10-14 May 2024 | Fort Sill, Oklahoma



**There has never been a more exciting,
nor more relevant time to be a Redleg!**

» GEN Raymond T. Odierno Best Redleg Competition.

The Field Artillery School will host the inaugural GEN Raymond T. Odierno Best Redleg Competition at Fort Sill 10-14 May 2024.

Named after the 38th Chief of Staff of the Army, GEN Raymond T. Odierno. He was a career-long Redleg, who loved team competitions.

» Five Day Competition.

Field Artillery units from around the Army have been invited to participate in this inaugural event, from our active duty units, National Guard, DIVARTYs and separate BCTs.

Focused on Field Artillery Fundamentals, the Best Redleg Competition will identify the U.S. Army’s very best Field Artillery crews, sections and teams.



BRL Website

The Battle of Fort Ridgely: Artillery Saves the Fort, and Minnesota, for the Union in August 1862

Part 4: Final Dakota Assault on Ft. Ridgely, 22 AUG 1862

By Dr. John Grenier, Field Artillery Branch Historian

This is the final part of the FAPB four-part series on the Battle of Fort Ridgely. We used the preceding edition (see Part 3 in issue 6-23-3) to explain the Dakotas' first attacks on Ft. Ridgely on 20 AUG 1862, and we focused on the heroics of the fort's defenders, led by field artillerymen, in repulsing the Dakota's attack. This part tells the story of the Dakota's final, desperate, and in the end, failed assault on Ft. Ridgely on 22 AUG 1862. It explains points to ways that Redlegs might want to consider the events that transpired at Ft. Ridgely, ways that have deep significance for both American history and the history of the Branch.

After the failed, initial assault on Ft. Ridgely on 20 AUG 1862, Little Crow spent the next day lobbying and cajoling at the Lower Agency while other Dakotas spread the net of rape, pillage, and murder over the farmsteads that escaped their attention the previous three days. Little Crow abandoned trying to explain grand strategy, and he instead promised that Ft. Ridgely's commissary and contractor huts remained full of booty and cash. Upwards of 800 warriors—many of them from the Wahpeton and Sisseton bands who to this point had sat out the fighting—agreed to join him on what he promised would be the last and decisive attack on the fort.

Little Crow's plan was simple. He intended to encircle the fort, and upon his signal, Dakotas could rush its defenses on all sides. Medicine Bottle would again attack from the northeast. Mankato volunteered to lead the warriors to overwhelm the Soldiers who crewed the gun at southwest corner. The Thief and his followers, convinced the hardest fighting and therefore best opportunity to win glory might take place at the southwest corner, joined Mankato. Big Eagle intended to attack from the south and southeast. Little Crow told the Dakotas that many of them might die at Ft. Ridgely, but the Blue Coats could not keep up fires to repel all of them if they attacked in unison as he directed. Little Crow instructed that the Dakotas must at all costs focus single-mindedly on the artillerists. He promised to personally and publicly give each warrior who killed a soldier at the cannons an eagle's tail feather that he could wear in his headband for the rest of his life, and he assured the warriors that he intended to be with them in the thick of the fighting. Once the

Dakotas captured the big guns, they could make short work of the Soldiers and then, as far as Little Crow cared, plunder the fort's stores and refugees to their hearts' content.

SGT John Jones suspected that the Dakotas learned their lesson on 20 AUG, and the next time they appeared outside the fort, they intended to rush it en masse and focus a thrust somewhere along the south side. He therefore remained at the southwest corner. SGT James McGrew took up station with his 12-pound cannon at the northwest corner of the parade field, and Mr. John Whipple with his similarly sized howitzer, returned to the northeast corner. Luckily for the defenders, it rained most of the night and drenched the fires that had obscured their views beyond the barricades. Instead of fighting building fires, the Soldiers piled cordwood into four-foot high barricades at southwest and southeast corners. While the defensive positions and scheme of fires were better developed than they had been during the attack on 20 AUG, and more Soldiers were prepared to operate the guns, no one inside the fort had seen signs of more relief headed their way.

The assault of 22 AUG took time to develop. Several Dakotas, camouflaged with prairie grass and flowers that made them difficult to see until they presented themselves, crawled forward and sniped at defenders late in the morning. Others moved into the stables and sutler's house on the south side of the fort. Well-placed artillery shells set those buildings on fire, and they drove the Dakotas from them. Medicine Bottle appeared as if he intended to charge from the northeast corner, but several rounds from Whipple's howitzer quickly put an end to that. Medicine Bottle left a handful of men in the wood line, and he shifted

most of his warriors the long way around to the west of the fort, to join the warriors on its south side. The defenders saw this movement unfold, though they were not unsure what the Dakotas intended. SGT McGrew wheeled the reserve 24-pound field piece from the center of the parade field to just south of the commissary, while his 12-pound mountain howitzer’s crew also repositioned the piece to face the south. SGT John Bishop moved another reserve mountain howitzer from the southeast and faced it to the southwest. The artillerists loaded all the cannons with double charges of cannister.

Around 4 p.m., the Renville Rangers heard a loud voice shouting in Dakota. They assumed it was Little Crow, though it most likely was Mankato, because the former had been carried off the battlefield after shrapnel from Whipple’s gun hit him in the head and knocked him senseless earlier in the day. One of the *métis*¹ ran to SGT Jones and reported that the rangers believed the Dakotas were marshaling at the southwest, just as hundreds of warriors swarmed out the ravine. Mr. Dennis O’Shea adjusted the elevation and the direction on the 6-pound field gun that he commanded, and the Renville Rangers laid down fire from their rifles. Dozens of Dakotas gained the barricade and the rangers fell back before O’Shea fired the field gun into the mass of Indians. A split second later, McCrew, with the 24-pounder, and Bishop followed suit. Joseph Coursollo, a *métis* from the Redwood Agency who fought as a volunteer citizen, recalled, “At the instant the Indians joined forces, all three cannon roared. The shells tore great holes in the ranks of the warriors ... The Indians skedaddled and the fighting was over.”

Both sides agreed that the artillery saved the day for the Blue Coats on 22 AUG, just as it had two days earlier. LT Timothy Sheehan, in his official after-action report, explained, “The Indians prepared to storm, but the gallant conduct of the men at the guns paralyzed them, and compelled them to withdraw, after one of the most determined attacks ever made by Indians on a military post.” Big Eagle, in his 1894 memoirs “A Sioux Story of the War,” wrote, “But for the cannon I think we

would have taken the fort ... the cannons disturbed us greatly.”

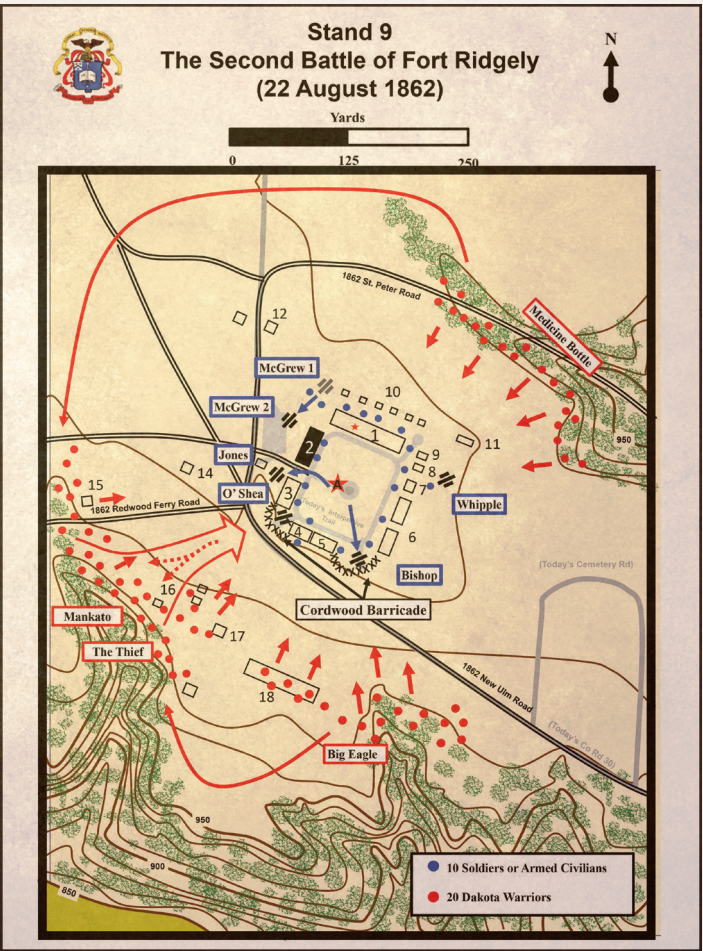
After tasting defeat at second time at Ft. Ridgely, the Dakotas abandoned all hope of taking it, and they again focused on New Ulm. Although the settlers fled from the town after repulsing the second (and more ferocious) attack on 23 AUG, few doubted that at Ft. Ridgely the Dakotas already had lost the war. Union forces from Ft. Snelling flowed into Southwest Minnesota over the next several days. While COL Henry Sibley proved frustratingly slow (at least from the settlers’ perspective) in moving beyond Ft. Ridgely, ground truth was that Dakotas could not stop the Army from operating at will across all of Southwest Minnesota. The Army’s mountain howitzers, in particular, gave Union Soldiers, state militia, and Renville’s Rangers a tremendous advantage over the Dakotas, and allowed them to quash uprising in its remaining battles, at Birch Coulee and Wood Lake, in large measure by killing the Dakotas’ leaders. Mankato, for example, was killed by a cannon ball at the Battle of Wood Lake. On 23 SEP, the soldiers’ lodge gave up over 250 prisoners to COL Sibley at Camp Release. Nearly 2,000 Dakotas surrendered to Federal and state authorities, though Little Crow fled on to the Northern Plains, and Medicine Bottle and Little Six sought refuge from the British government in Canada. The Army arrested 392 warriors, and it confined hundreds of Dakota men, women, and children in an internment camp on an island in the middle of the Minnesota River outside Ft. Snelling. A commission composed of officers of the Minnesota Volunteer Infantry sought to hold accountable the perpetrators of the uprising, and in less than six weeks’ time, it tried and sentenced 303 Dakota men to death for rape and/or murder. President Abraham Lincoln, America’s greatest president, and a lawyer by training and someone almost obsessively focused on finding justice and reconciliation, even in the midst of a civil war that was tearing apart the nation, personally reviewed each conviction. He approved death sentences for 39 Dakotas. Several warriors who could prove that they fought only at Ft. Ridgely saw their sentences commuted since they were, in today’s terms, legal combatants. Big Eagle was

among them. On December 26, 1862, 38 Dakota men—including some who protected white and *métis* captives—were hanged in Mankato in the largest mass execution in American history. Congress abolished the Dakota agencies and declared the 1853 treaty null and void. In May 1863, Minnesota banished the survivors (hundreds died over the course of the winter) of the internment camp to present-day South Dakota. Two settlers killed Little Crow in July 1863 outside Hutchinson, Minnesota; the legislature paid \$500 for his scalp and displayed it in the state’s history museum for decades. The British turned Medicine Bottle and Little Six over to US authorities in 1864. The Army hanged them at Ft. Snelling, in November 1865; medical students used the corpses as cadavers.

Determining the legacy of the Dakota Uprising is a task fraught with pitfalls. The Battle of Ft. Ridgely might seem an insensitive choice for study, one that glorifies victory against a foe that likely never had a chance of winning and minimizes the Army’s substantial role in the hardships inflicted on indigenous peoples during the conquest of the American West. But nuance is often elusive in history. In 2012, Minnesota’s governor Mark Dayton called for 17 AUG to be a “Day of Remembrance and Reconciliation” in his state. Emotions over the Dakota Uprising continue to run raw a decade later, and they burst to the surface each 26 DEC when the Dakotas publicly remember and mourn the executions at Mankato.

The history of the Battle of Ft. Ridgely therefore should not, and cannot, be plucked from the larger currents of American history and studied in isolation, no matter how self-contained, or unpleasant on a macro level, it seems. Nor should FA professionals ignore the first instance in Army history in which artillerists defended their outpost until the relief arrived and saved it. In the final analysis, we should remember Big Eagle’s words: “We went down determined to take the fort, for we knew it was of the greatest importance to us to have it. If we could take it we would soon have the whole Minnesota valley.” One can only imagine how much more settler, *métis*, and Indian blood might have flowed if the Dakotas had indeed taken Ft. Ridgely and the entire Minnesota River Valley in August 1862 and forced the US Army to fight to regain it.

Dr. John Grenier is the FA Branch/USAFAS historian at Fort Sill, Oklahoma.



Dakota attacks on Ft. Ridgely on 22 AUG 1862.



Beginning in 2005, members of the Sioux Nation rode to Mankato during the Christmas season to publicly remember and honor the Dakotas executed there on the day after Christmas, 1862. The year 2022 marked the last of the Remembrance Rides.

¹ The Métis (meti(s)/ may-TEE(S)) are an Indigenous people whose historical homelands include Canada’s three Prairie Provinces, as well as parts of British Columbia, the Northwest Territories, Northwest Ontario and the northern United States. They have a shared history and culture, deriving from specific mixed European (primarily French, Scottish, and English) and Indigenous ancestry, which became distinct through ethnogenesis by the mid-18th century, during the early years of the North American fur trade.



ENHANCING TACTICAL LEVEL TARGETING WITH ARTIFICIAL INTELLIGENCE

By WO1 Clifford A. Baxter, WOBC Class 004-23,
John A. Robinson Eagle Writing Award Winner

In the ever-evolving landscape of modern warfare, artificial intelligence (AI) has emerged as a game-changing theory in military operations, particularly in enhancing tactical-level targeting. The problem with human-driven tactical-level targeting lies in its inherent limitations in achieving rapid acquisitions, precise targeting and optimal decision-making due to cognitive processing constraints and the complexities of rapidly evolving enemy combatants and their ability to displace promptly. AI-driven targeting systems can revolutionize precision, accuracy and sensor-to-shooter capabilities, elevating the effectiveness and efficiency of military engagements to unprecedented heights. By harnessing the power of AI algorithms and advanced data processing, commanders could rely on a comprehensive and intelligent decision-making framework that ensures superior target identification and minimizes collateral damage for a decisive advantage on the battlefield. This article delves into the impressive impact of AI in bolstering tactical-level targeting, emphasizing the remarkable improvements in precision, accuracy and sensor-to-shooter enhancement that would redefine the face of modern warfare.

AI-driven systems can significantly enhance precision and accuracy in tactical targeting. Traditional targeting methods often rely on human operators, who can be prone to fatigue, stress and human error. AI algorithms, on the other hand, can analyze vast amounts of data quickly and accurately, leading to improved target identification and tracking. Researchers at Collins Aerospace have demonstrated the benefits of AI in precision targeting. They developed an AI-based system that will identify and track potential threats on the battlefield. The system improved target recognition accuracy, rapidly aiding human operators and enhancing precision during engagements (Tactical et al. (TITAN), n.d.) AI-driven systems that provide real-time analysis and decision support are crucial in rapidly changing battlefield scenarios. AI-driven systems can process data from multiple sources, such as sensors, Unmanned Aerial Vehicles (UAV) and satellites, to provide commanders with up-to-date information and insights, enabling more informed and timely decisions. A study by the RAND Corporation on AI integration in military operations highlighted that AI-driven systems could analyze vast amounts of data and detect,

analyze and respond to attacks faster and more effectively than human operators can (RAND Corporation, 2020). This capability enhances situational awareness and helps military personnel respond quickly to emerging threats.

AI algorithms, accounting for environmental factors in calculating optimal trajectories in tactical targeting, play a significant role in determining the trajectory of munitions. Wind speed, humidity, terrain and other variables can affect the accuracy of targeting solutions (Sentient et al., 2023). Artificial intelligence algorithms can consider these factors when calculating trajectories, leading to more precise impact points. The system could provide superior accuracy to traditional trajectory calculation methods, especially in challenging weather conditions.

Minimizing collateral damage and unintended harm are critical assessments during large-scale combat operations. Artificial intelligence can assist in mitigating these risks by analyzing the environment, identifying potential risks to civilians and proposing alternative engagement strategies. The International Committee of the Red Cross (ICRC) has emphasized incorporating ethical considerations into AI-driven targeting systems (ICRC, 2022). By using AI to predict potential collateral damage, military forces can make more informed decisions that prioritize the safety of civilians.

Artificial intelligence can significantly improve target prioritization and weaponeering, ensuring that the most critical threats are engaged with appropriate munitions. Machine learning algorithms can learn from historical engagement data and adapt strategies to optimize targeting effectiveness. The Department of Defense has found that AI-based target prioritization systems outperformed traditional methods. The AI-driven systems demonstrated a higher success rate in neutralizing high-value targets while minimizing resource expenditure (Vergun, 2022).

Sensor-to-shooter enhancement is one of the significant challenges in fire support. Sensor-to-shooter is the efficient and timely utilization of sensor data to identify and engage potential threats. Artificial intelligence algorithms can revolutionize this process by analyzing data from various sensors, such as radar systems, UAVs and



surveillance cameras. By employing machine learning techniques, AI can distinguish patterns, detect anomalies and recognize potential targets more accurately than human operators. A study by Albon (2022) demonstrated that AI-enhanced sensor-to-shooter systems achieved increased target identification accuracy compared to conventional methods. This enhancement resulted from AI's ability to process multiple data sources simultaneously, enabling faster target recognition and reducing false favorable rates. Reduction in processing times contributes to quicker target engagement and reduces the risk of losing an opportunity to engage a target. One of the challenges in tactical targeting is the time it takes from identifying a potential target to executing an engagement. Traditional workflows involve manual data analysis and coordination, leading to delays that can be critical in time-sensitive situations. Artificial intelligence offers the potential to streamline this process by automating data processing, target selection and weapon assignment (Grand-Clément, 2023). Considering these technological progressions, AI-driven tactical targeting systems hold the capability to reduce processing times by up to 70%. The AI algorithms can analyze incoming sensor data, prioritize targets based on predefined criteria and suggest the most suitable weapons for engagement. Human intervention is crucial in approving AI's suggested attack criteria and ensuring responsible and ethical deployments of weapons systems. This reduction in processing times allows for quicker responses to emerging threats and enhances the overall effectiveness of tactical operations.

To ensure the successful integration of AI systems, training programs must be designed to educate military personnel about the capabilities and limitations of AI. Artificial intelligence has the potential to significantly augment decision-making processes, data analysis and situational awareness on the battlefield (Sentient et al., 2023). However, Soldiers and commanders must understand the boundaries of AI's capabilities and avoid over-reliance on automated systems. Military personnel can make informed decisions and effectively leverage AI technologies to achieve mission objectives by providing comprehensive education about AI's potential strengths and weaknesses.

Effective collaboration between humans and AI

systems is vital for achieving optimal outcomes in military operations. Developing best practices for human-machine collaboration requires an in-depth understanding of AI functionalities and human expertise. Training programs should teach Soldiers and commanders how to communicate effectively with AI systems, interpret AI-generated insights and make contextually appropriate decisions. Collaboration should not be viewed as a mere integration of technologies but rather as a synergistic partnership where human judgment and AI insights complement each other to enhance overall operational effectiveness.

“In the loop” and “on the loop” are two essential concepts in the realm of artificial intelligence that highlight distinct modes of human involvement and control within AI systems. “In the loop” refers to a scenario where humans remain actively engaged and directly influence AI decision-making. This involvement ensures that AI operates under human supervision and adheres to predefined ethical and regulatory guidelines (Mazzolin, 2020). On the other hand, “on the loop” pertains to a higher-level oversight approach, where humans monitor and manage the AI system's performance and intervene only when necessary, allowing the AI to function with greater independence (Model Artificial Intelligence Governance Framework, 2020). Striking the right balance between these two modes is crucial for optimizing AI systems' capabilities while ensuring responsible and accountable deployment.

In conclusion, the challenges of human-driven tactical-level targeting stem from its inherent constraints on rapid acquisitions, precise targeting and optimal decision-making, primarily driven by cognitive processing limitations and the intricate nature of changing scenarios. The integration of AI would highlight the remarkable improvements in precision, accuracy and sensor-to-shooter capabilities achieved through AI-driven targeting systems. This development ushers in an era of unmatched effectiveness and efficiency in military engagements. Furthermore, the continuous evolution of technology and the advancing sophistication of AI algorithms promise even more innovations in tactical targeting. This integrated approach offers a safer, more strategic pathway for navigating modern conflicts.

WO1 Clifford A. Baxter hails from Medford, Oregon. He enlisted in the U.S. Army on January 18, 2011, and was appointed an Army Warrant Officer in December 2022. He graduated from the Warrant Officer Basic Course in September 2023. WO1 Baxter is currently the Battalion Targeting Officer at 3-13th FAR, 75th Fires Brigade. WO1 Baxter's experience in calling for fire and targeting has led him to explore the realm of Artificial Intelligence (AI). Over the last few years, He has developed a genuine interest in AI. He firmly believes that thoughtful human and AI collaboration could be a game changer, enhancing our lethality in Large-scale Combat Operations. He is excited to be a part of this convergence between military expertise and AI and looks forward to contributing to the ongoing evolution of our capabilities. He strongly believes that AI has the potential to bring positive impacts to our operations.

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The Crucible of Fires: State of the Art Fires Center Named After Legendary Ranger

By SFC Jorden M. Weir, Chief Public Affairs NCO for the 75th Ranger Regiment

After four years of planning, collaboration, design and renovation, the U.S. Army's 75th Ranger Regiment cut the ribbon on the Domeij Fires Center on Nov. 2, 2023, marking its grand opening.

"Today, we stand on hallowed ground," said MSG Ian Pletch, the 75th Ranger Regimental Fires Noncommissioned Officer. "Not just because of the bricks and mortar that shape the structure behind me, but because of the legacy it represents. We are here to honor a man whose journey was truly the stuff of legends."

The center is named after SFC Kristoffer Domeij, who served as the Fires Support Noncommissioned Officer for 2nd Battalion, 75th Ranger Regiment, when he was killed during combat operations, Oct. 22, 2011, in Afghanistan.

It was his 14th combat deployment.

Above: Ranger Fire Supporters with the 75th Ranger Regiment unveil the sign for the Domeij Fires Center. After four years of planning, collaboration, design and renovation, the U.S. Army's 75th Ranger Regiment cut the ribbon on the Domeij Fires Center on Nov. 2, 2023, marking its grand opening. (U.S. Army photo by SGT David Soflin)

THE MAN

Domeij was a fire supporter of legendary proportions within the Ranger Regiment, whose incredible career laid the groundwork for what would become Ranger Fires Support as it exists today.

"[Domeij] walked amongst us during one of the toughest periods in Ranger history," said COL J.D. Keirse, Commander of the 75th Ranger Regiment. "Back-to-back deployments in the places that others feared to tread. This was an important time in Ranger history.

"The rest of the joint force was on the ropes," he said, "and needed Rangers to track down the leaders and high-level facilitators of the enemy. Kris did it each and every night."

SFC Robert Reynolds, a forward observer with the 75th Ranger Regiment, who had never met the man in person, told the story of Domeij with reverence and awe.

"[Domeij] came to Ranger Regiment pre-9/11," Reynolds said. "In a world where things were changing, capabilities were being delegated down, he oversaw all of it. He led the way. He was a man who could layer effects and layer fires in a way that was kind of next level."

Domeij earned the distinction of becoming one of the first Joint Terminal Attack Controller (JTAC) qualified members in the U.S. Army at the time.

It is a distinction that has rippled across time and left a permanent mark on the Regiment. Now, Ranger Fire Supporters are required to become JTAC qualified when they become NCO's.

"Not only are we good Rangers," said SGT Jack Masterson, a forward observer with the 75th Ranger Regiment, "but we're also really good fires guys. It's not one or the other. They go hand in hand. And [Domeij] was really the first to show that we can do that."

Reynolds hammering the breadth of Domeij's influence on the Ranger Regiment home by bridging the past with the present.

"We look back at our history," said Reynolds. "We look at WWII and the Rangers who climbed Point du Hoc on D-Day. I personally didn't climb

Point du Hoc. You know what I mean? And so, I ask myself: how do I carry forward and how can I be the guy who climbs Point du Hoc ... when MY Point du Hoc comes around?"

"Kris Domeij showed us how," he said.

THE DOMEIJ FIRES CENTER

The Center's inception began when retired CW3 Gregory Funk, former Fires Officer for the 75th Ranger Regiment, recognized the need to accelerate its lethal effects capabilities in the special operations forces environment.

"When you look at the training path of fire supporters and special operators that are JTACs, there's a lot that goes into it," Funk said. "If you look at the special operations task force (SOF) Truths, these skills can't be easily replicated and mass produced. It's a unique skill that requires detailed training. It's not a hobby. It is a very serious skill set that can either make or break a mission."

Building on a history, dating back to then Secretary of the Army, GEN Creighton Abrams' Charter to the Regiment in 1974, which charged the elite special operations unit to "be better with their hands and weapons than anyone," the 75th Ranger Regiment set out to bridge the significant gaps that exist in the Army's fires capabilities by building a physical representation of groundbreaking technology coupled with the unmatched fighting spirit of the Rangers.

"The problem was that getting the actual training reps in relied too heavily on factors outside of the unit's control," said Funk. "Bad weather rolls in, training can't happen. Aircraft malfunctions, training can't happen. Even when things go perfectly, the amount of time between iterations for the lanes to reset means that individual Fire Supporters and JTACs may only get one or two reps in during the exercise."

There is a cosmic divide that exists between simply having proficiency in a skill set and having mastery of it and it's a divide the Domeij Fires Center aims to close.

Here they will get the reps necessary to gain true mastery of their craft. The center offers a dynamic space where Ranger and partner forward observers

can experience tough battlefield problems and solutions firsthand and envision applications within their own operations.

“It’s designed for the next generation of fires Rangers and Soldiers,” Masterson said. “I think that it’s probably honestly going to revolutionize things, not only for forward observers, but also Army JTACs.”

It is a \$2.2 million fires training facility, unrivaled in all the Army, that exemplifies cutting-edge fires technology in both the special operations realm and beyond.

It is a total immersion simulator, able to not only replicate the most complex combat scenarios that a forward observer could face in the real world, but also to capture real time data that Ranger Forward Observers can use to gain a profound understanding of their equipment, technology, tactics and perhaps most importantly, themselves, in order to meet the ever-evolving challenges facing the Army and the nation.

Spanning more than 1,500 square feet, the Domeij Center combines a joint operations center and individual virtual training simulators to provide the greatest training benefit possible to every fire supporter in Regiment and beyond. The deliberate inclusion of the latest fires technologies and equipment underlines the 75th Ranger Regiment’s commitment to continual, realistic and exhausting training as it strives to build and field the best possible fire supporters in the Army.

THE LEGACY LIVES ON

“The infantry owns the last 100 yards of the battlefield, no question,” Reynolds said. “But they’re not going to get that close without substantial amounts of fire support.”

That, at its core, is what the Domeij Fires Center is all about. Setting the conditions necessary for Rangers to continue to dominate any mission they are called upon to fight. This center embodies a steadfast commitment to actively contribute to advancing solutions in the battle space and setting new Army standards.

“This building is the arena,” Pletch said. “This building is the crucible where Ranger Fires professionals are built. Forged through fire, led by

Ranger NCOs who give you the opportunity to fail forward; to get 1% better every day. This building represents the Ranger spirit of SFC Kristoffer Domeij. His legacy lives on. It is our turn now to do for others ... what he did for us.”

Rangers Lead The Way.

SFC Jorden M. Weir has more than 12 years of Army public affairs experience and has spent the last eight years working within special operations. He is currently the Chief Public Affairs NCO for the U.S. Army’s 75th Ranger Regiment.



Top: SFC Kristoffer Domeij’s mother, Scoti Domeij, cuts the ceremonial ribbon, held by the 75th Ranger Regimental Command team, to officially open the Domeij Fires Center on Nov. 2, 2023. The center is named after SFC Kristoffer Domeij, who served as the Fires Support Noncommissioned Officer for 2nd Battalion, 75th Ranger Regiment, when he was killed during combat operations, Oct. 22, 2011, in Afghanistan. Below: Members of the U.S. Army’s 75th Ranger Regiment look at photos decorating the walls and try out the gym of the newly opened Domeij Fires Center. (U.S. Army photos by SGT David Soflin)



FIRES

KNOWLEDGE NETWORK

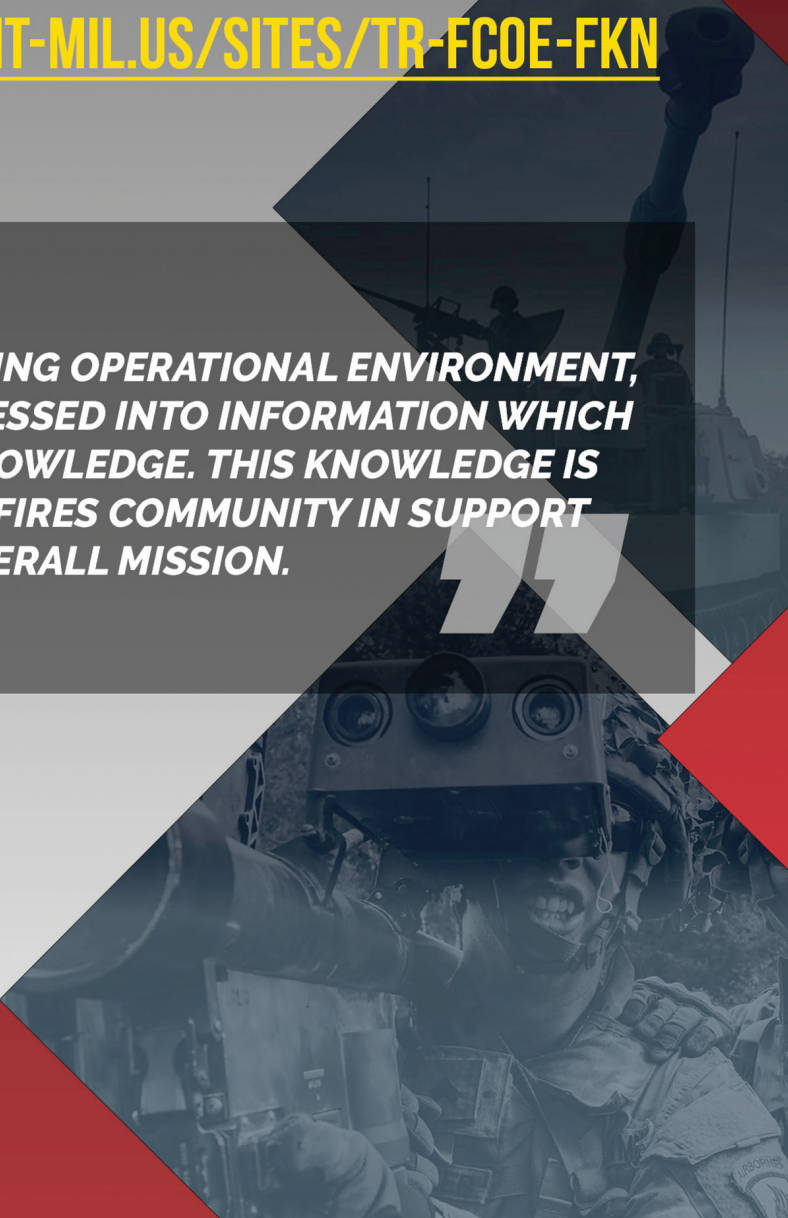
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“TO STAY AHEAD OF A RAPIDLY CHANGING OPERATIONAL ENVIRONMENT, DATA MUST BE ANALYZED AND PROCESSED INTO INFORMATION WHICH IS TRANSFORMED INTO USABLE KNOWLEDGE. THIS KNOWLEDGE IS THEN SHARED THROUGHOUT THE FIRES COMMUNITY IN SUPPORT OF THE ARMY’S OVERALL MISSION.”



U.S. ARMY



The Combat Aviation Brigade and Digital Call for Fire: Increasing Lethality of the Division

By MAJ Andrew Agee, CPT Joseph Conroy,
CW2 Andy McMullen and CW2 Page Frazier

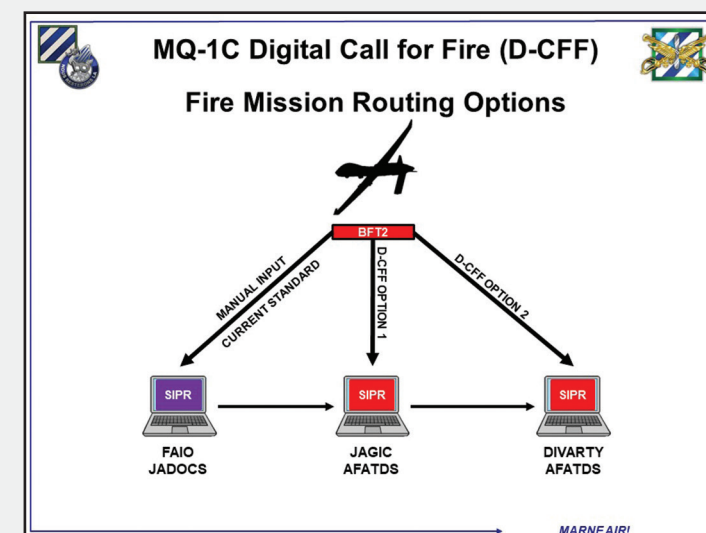
The rapidly changing battlefield in large-scale combat operations (LSCO) requires the division to dynamically deliver effects to meet the commander's intent and targeting objectives. The joint air ground integration center (JAGIC) enables this process by executing and clearing joint fires and controlling division airspace. The JAGIC is the focal point of the division's current operations integration cell (COIC) floor and the division fires enterprise must make every effort to add efficiency to this fire support system. The digital call for fire (D-CFF) capability inherent to the combat aviation brigade (CAB) affords the division options for fire mission routing, enables reduced mission processing times and allows the conservation of critical munitions for both aviation and division artillery (DIVARTY) assets. Examining the technical process and analyzing these outcomes associated with D-CFF will highlight opportunities for the division to increase overall effectiveness and lethality.

The D-CFF capability from the MQ-1C Universal Ground Control Station (UGCS) and AH-64E is enabled by the onboard blue force tracker 2 (BFT2) system. The BFT2 allows the operator or pilot to generate preformatted calls for fire and route them to the appropriate Advanced Field Artillery Tactical Data System (AFATDS) utilizing the Secret Internet Protocol Router (SIPR) network. The technical requirements to execute D-CFF include an AFATDS connected to upper tactical internet (TI), an AFATDS database with the aircraft built into the unit and communications workspace at echelon and network permissions both locally and through the Mission Command Support Center (MCSC). Multiple publications provide the technical step-by-step configuration process to enable D-CFF. This article focuses on the practical application of D-CFF for the modern Army division. D-CFF provides the division additional beyond line-of-sight (BLOS) means to transmit fire mission data and widen the division's kill web. The D-CFF requires no "swivel chair" actions and inserts the fire mission into the appropriate position in the kill chain.

The execution of D-CFF from the MQ-1C and AH-64E provides the division with numerous options for routing fire missions based on target description, time sensitivity, or mission requirements. The division targeting working group (TWG) should drive the identification

of the ideal fire mission routing path and the targeting decision board (TDB) agenda should include subsequent routing approval. The division should consider the D-CFF mission routing as crucial as the high pay-off target list (HPTL), target synchronization matrix (TSM) and division kill contract during the TWG/TDB process. With mission requirements and the HPTL changing daily it is necessary to continually revisit the mission routing during the TWG/TDB. Applying

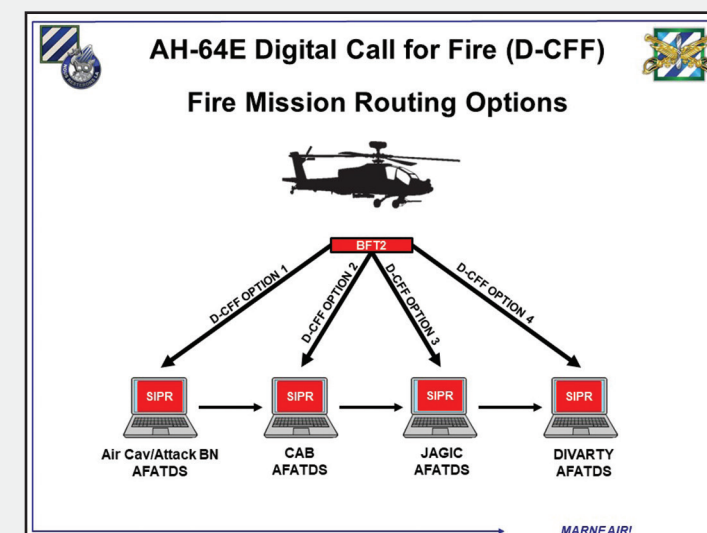
known enemy dispositions. It is an over-the-horizon capability that is not hindered by line-of-sight requirements. The software is intuitive and acts as a bridge between the aircrew, aircraft and adjacent warfighters. In execution, the aircrew can detect a possible target and trigger the processing, exploitation and dissemination (PED) procedure with a few clicks of a button. The D-CFF can be utilized without taking away any other capability of the UAS, making it an independent



this analysis to the targeting process will increase the efficiency and lethality of the division's fire support system.

The MQ-1C Gray Eagle is a strategic intelligence, surveillance and reconnaissance (ISR) unmanned asset employed at the division echelon. Its place on the battlefield is often beyond the forward line of troops (FLOT). Operating within the deep fight, it's a prime enabler in maintaining enemy contact, orienting the supported force, providing early and accurate warning and providing reaction time and maneuver space. Its sensors, electro-optics, radar capability and laser marking allow effortless detection, identification and prosecution of targets for DIVARTY delivery assets. The unmanned aerial system (UAS) is designed to fly higher and longer than most aviation assets on the battlefield while remaining significantly undetectable to our adversaries.

The MQ-1C UAS is equipped with the BFT2 system that provides access to D-CFF and enhances the comprehensive initiative of fires. The system is a digital means to gain situational understanding of not only friendly forces but also



kinetic multiplier. Once identified as hostile, the UAS operator can transfer targeting information directly to the end user of the AFATDS. This communication does not require proximity; it is secure, encrypted and proven in real-world applications. This process enables the fire mission to bypass extra protocols, reducing the time it takes to achieve effects on target.

The Field Artillery Intelligence Officer (FAIO) located in the G-2 Analysis and Control Element (ACE) receives intelligence from every collection asset available, including the live feed of the MQ-1C. This enables the FAIO in close coordination with the JAGIC Chief to execute target validation and send targets to the JAGIC. The FAIO commonly sends targets to the JAGIC through the Joint Automated Deep Operations Coordination System (JADOCS). Sending targets through JADOCS requires the FAIO to manually input the target data obtained from the MQ-1C's sensor into the JADOCS to populate on the target board of any subscribing JADOCS client. Once the JAGIC has received the target via JADOCS, the JAGIC Chief transmits it digitally to the JAGIC AFATDS and then to the DIVARTY AFATDS for prosecution.

This process takes time and can result in fire mission congestion at the JAGIC JADOCS.

Applying the capability of MQ-1C D-CFF to this process enables the fire mission to skip steps by the operator directly routing the fire mission to the JAGIC or DIVARTY AFATDS. The FAIO monitoring the MQ-1C feed, still in close coordination with the JAGIC Chief, will execute target validation and direct the Gray Eagle operator to initiate a D-CFF on an identified HPT. It is important to note that under this construct the FAIO controls which fire missions require

adding efficiency to the delivery of surface-to-surface fires to enhance the lethality of the division.

The AH-64E is another tool at the division's disposal to deliver effects in the division deep area. For the CAB's attack out of contact in the division's deep area to be successful, the division must adequately plan and resource the operation. During the division targeting process, the division must source the requirements for suppression of enemy air defense (SEAD) to enable CAB operations. The types of SEAD include immediate fire mission

The most significant hurdles to the execution of D-CFF for the CAB are training proficiency in forward observer tasks and fire support manning below the brigade level.

a MQ-1C D-CFF and instructs the operator on all actions to take in terms of mission routing based on the options approved in the TDB. The Gray Eagle operator would not be authorized to generate D-CFF missions without the FAIO first executing target validation and providing approval. For example, MQ-1C D-CFF could be used to send targets deemed time-sensitive or targets at the top of the HPTL from the Gray Eagle UGCS directly to the DIVARTY AFATDS to shorten execution time. Meanwhile, depending on the approved attack guidance matrix (AGM), the MQ-1C operator at the direction of the FAIO could route targets that are number 2 or 3 on the HPTL directly to the JAGIC AFATDS. The FAIO would route the remaining HPTs via the current standard process of manual input into JADOCS. This staggered process for fire mission paths further prioritizes fire missions destined for DIVARTY and alleviates potential backlog in the JAGIC during high-intensity operations. The shortened mission chain makes DIVARTY rockets more effective and enables DIVARTY to conserve critical munitions for future division operations. Similarly, for the MQ-1C, decreased fire mission processing times because of D-CFF allows the Gray Eagle to maintain AGM-114 Hellfire missiles for aircraft defense or for when specific enemy critical capabilities are identified. This process, as described, can decrease overall mission processing time by removing links from the kill chain and

requests, pre-planned targets, division-level shaping tied to a kill contract and non-lethal effects. It is a combination of these forms of SEAD that sets the CAB up for success. The division should authorize a quick-fire net between the CAB and DIVARTY for immediate fire mission requests to facilitate more responsive fires and prevent delays in DIVARTY's response. Without D-CFF, this process requires receiving the fire mission through voice or tactical messaging for manual input into the air cavalry squadron or attack battalion AFATDS to start the digital kill chain. The combination of a swivel chair action and a longer mission processing path severely increases the response time of DIVARTY rockets.

AH-64E D-CFF can help the division achieve the purpose of an attack out of contact by decreasing fire mission processing times and enabling the AH-64Es and the DIVARTY to maintain critical munitions for future operations. Applying the D-CFF capability to the CAB to DIVARTY quick-fire net, an AH-64E executing an attack out of contact can route missions directly to the DIVARTY for prosecution. The JAGIC remains in the loop when the DIVARTY pushes the fire mission data to the JAGIC for air clearance. The AH-64E D-CFF quick-fire net to DIVARTY allows the JAGIC to continue to focus on the holistic division deep fight and alleviate a fire mission backlog at the JAGIC. The quick-fire net enables the AH-64E

to execute D-CFF against HPTs with responsive fires while simultaneously engaging enemy formations with AGM-114 Hellfire missiles to achieve the purpose of the attack mission. The AH-64E can utilize terrain to mask the aircraft and time engagements with DIVARTY fire missions to mass effects. The achievement of mass and simultaneity will increase the effectiveness of AH-64E Hellfire missiles and DIVARTY rockets, ultimately conserving critical munitions. The D-CFF quick-fire net shortens the path fire missions must travel and decreases fire mission processing times. Applying AH-64E D-CFF in division operations again adds efficiency to the broader fire support system and further bolsters the lethality of the division.

The most significant hurdles to the execution of D-CFF for the CAB are training proficiency in forward observer tasks and fire support manning below the brigade level. MQ-1C operators and AH-64E pilots execute recognition of combat vehicles (ROC-V) training as part of their gunnery training progression. However, this is a perishable skill that the CAB must include in training at every opportunity. Additional training iterations of ROC-V will ensure operators and pilots correctly identify HPTs during operations allowing an efficient D-CFF process without wasting critical DIVARTY rocket munitions. Another crucial aspect of implementing D-CFF is training operators and aviators on the elements of a call for fire and the proper format of a D-CFF. A checklist for D-CFF procedures and including dry D-CFF training in routine training flights will help build confidence and proficiency across the MQ-1C and AH-64E communities. The last obstacle to the execution of D-CFF is fire support manning at the air cavalry squadron and attack battalion levels. Currently, the Army authorizes each of these battalion-sized elements: one fire support officer (FA CPT), one fire support NCO (13F SFC) and one AFATDS. This number of personnel and equipment must be increased to execute and maintain 24-hour operations during LSCO. The fire support officer is involved heavily in planning and should never be relied on to operate the AFATDS. The fire support NCO is the primary AFATDS operator and would require supplemental manning from the CAB fire support element for prolonged operations. These units require an increase in authorized 13F Soldiers to serve as AFATDS experts and operators to configure and troubleshoot the system during 24-hour operations. Adding one fire support NCO

(13F SGT) and two fire support specialists (13F SPC) to the fire support elements of the air cavalry squadron and attack battalion would ensure these units could maintain a high intensity fires fight. The CAB can overcome potential training proficiency impediments to D-CFF through realistic training that validates the described mission routing paths and incorporates D-CFF into routine training flights.

The D-CFF capability organic to the combat aviation brigade brings many options for fire mission routing, which will decrease fire mission processing times. This purely digital process provides a means to build efficiency into the division's fire support system by streamlining missions around or through the JAGIC as necessary. The results of the D-CFF process creates more effective surface-to-surface fires and conserves critical DIVARTY and AH-64E munitions. The practical application of MQ-1C and AH-64E D-CFF offers an innovative way to increase the lethality of the division by dynamically and rapidly delivering effects in the division's deep fight.

MAJ Andrew Agee is a field artillery officer currently serving as the 3rd Combat Aviation Brigade Fire Support Officer. He has previously served as the 3rd Infantry Division JAGIC Chief, a Joint Readiness Training Center fire support OC/T and the 31D DIVARTY Fire Control Officer. He holds a B.S. in Integrated Strategic Communication from the University of Kentucky and a Master of Military Operational Art and Science from Air University.

CPT Joseph Conroy is a field artillery officer currently serving as the 3-17 Air Cavalry Squadron Fire Support Officer. He has previously served as the 2-502nd Infantry Battalion Assistant Fire Support Officer and 1-320th Field Artillery Battalion Assistant Fire Direction Officer. He holds a B.S. in Mechanical Engineering from the United States Military Academy.

CW2 Andy McMullen is a field artillery targeting technician currently serving as the 3rd Combat Aviation Brigade Targeting Officer. He has previously served as the 2nd Armor Brigade Combat Team, 3rd Infantry Division Field Artillery Intelligence Officer and Target Acquisition Platoon Leader. He is pursuing a B.S in Criminal Justice from Purdue University.

CW2 Page C. Frazier is a Tactical Unmanned Aerial Systems (TUAS) Operations Technician. Assigned to E/3CAB AVN REGT as the UAS Standardization Officer and Aviation Mission Survivability Officer. Mr. Frazier advises commanders on the strategic employment of UAS within the battlespace as well as the survivability measures needed to conserve UAS combat power. He holds an AAS as a UAV Flight Operator and studies at Embry-Riddle toward his B.S. in Unmanned Systems Applications.

Looking to the Past for LSCO Inspiration
“Desert Redleg: Artillery Warfare
in the First Gulf War”

By MAJ Destry S. Balch

The role of division artillery units (DIVARTYs) has been a topic of heated discussion for the operational force since their reimplementation in 2014. Aside from their bi-annual roles in simulated Warfighter Exercises (WFX), many leaders are unable to draw much inspiration for the true scale of what a DIVARTY provides the division and how to effectively integrate that capability. Desert Redleg: Artillery Warfare in the First Gulf War by L. Scott Lingamfelter (US Army Colonel, retired) explores how the 1st Infantry Division Artillery (1ID DIVARTY) planned, organized and executed the largest organization of FA units since World War II. It provides present-day FA leaders much needed insight into the function of a DIVARTY in large-scale combat operations (LSCO) and provides inspiration for how a DIVARTY commands, controls and sustains large-scale artillery operations.

Blending personal memoir with historical analysis, Lingamfelter recounts his firsthand experience as the 1ID DIVARTY Executive Officer (XO) during the “Big Red One (BRO)” operational train up, deployment, execution and redeployment in the First Gulf War from 1990 to 1991. Along the way, Lingamfelter analyzes the logistical and operational friction the 1ID DIVARTY faced and highlights challenges that modern DIVARTYs will encounter in future large-scale conflicts. Lingamfelter divides the 1ID DIVARTY combat operations into three phases: 1) Artillery raids against Iraqi forces from 16-24 February 1991, 2) Preparatory fires against Iraqi positions prior to the 1ID breach on 24 February 1991 and 3) Field artillery tasks supporting the 1ID from the breach up to the suspension of hostilities on 28 February 1991.

Lingamfelter describes the preparatory fires before the combined arms breach of the Iraqi defenses, in which nearly every delivery system under the DIVARTY’s control continuously fired for an hour in support of the combined arms breach. The Commanding General of the 1st Infantry Division, Major General Thomas G. Rhame stated that, “the performance of the FA in combat has caused all of us to remember what we had perhaps

forgotten, namely its incredible destructive power and shock effect. The preparation fires I witnessed prior to our assault on the breach line were the most incredible sight I have seen in 27 years of service.”

The Army has primarily trained and fought counter-insurgency operations since 2003. Since then, institutional LSCO fires skills have atrophied, making it crucial to draw inspiration and guidance from the past. Throughout Desert Redleg, Lingamfelter repeatedly emphasizes two primary responsibilities a DIVARTY has in LSCO: 1) Command and control (C2) of all FA units supporting the division and 2) Sustainment of those FA units, especially concerning ammunition.

C2 of FA Units
Supporting the Division

The first responsibility of a DIVARTY in LSCO is the C2 of all FA units supporting the division. This requires accurate positioning of delivery systems at the correct time with the appropriate ammunition to effectively engage targets and execute the detailed synchronization of the supported division’s fire support plan. 1ID DIVARTY masterfully executed the ability to rapidly adapt the FA C2 structure to support and sustain the fires demands of the division. At execution on D-Day (24 February 1991), the 1ID DIVARTY controlled a total of seventeen artillery battalions, including nine 155mm battalions, four 203mm battalions, three M270 battalions and an additional three M270 / Army Tactical Missile System (ATACMS) batteries.

C2 of FA units is a complex process that is standardized in FM 3-09. The two most important elements of FA C2 in FM 3-09 are 1) Army Support Relationships (formerly known as FA Tactical Missions) and 2) the tenets of “AWIFMN.”

The 1ID DIVARTY tasked organized their supporting FA units into the four doctrinal FA support relationships: direct support (DS) for the FA cannon battalions to support their maneuver brigades and decrease the response time for brigade level targets; general support (GS) for FA units to exclusively service deep division targets for the 1ID Force Field Artillery Headquarters (FFAHQ); seneral support reinforcing (GSR) to enhance the supported unit’s ability to mass when the supporting unit was not servicing targets

1st Infantry Division Artillery (DIVARTY)
Task Organization 24 February 1991

1ID DIVARTY: Force Field Artillery Headquarters (FFAHQ)

1-5 FA (155mm SP)	DS 1/1ID
4-5 FA (155mm SP)	DS 2/1ID
4-3 FA (155mm SP)	GS
B-6 FA (MLRS)	GS
D-25 TAB	GS

75th Field Artillery Brigade: R 1ID DIVARTY

1-17 FA (155mm SP)	R 4-5 FA
5-18 FA (203mm SP)	GSR 1-5 FA
A-1-158 FA (MLRS)	GS
A-6-27 FA (ATACMS)	GS VII Corps Artillery
C-26 TAB	GS

1st UK Armored Division Artillery: R 1ID DIVARTY

2 FD (155mm SP)	GSR 4-5 FA
26 FD (155mm SP)	GSR 4-5 FA
40 FD (155mm SP)	GSR 4-5 FA
32 HV (203mm SP)	GSR 4-5 FA
39 HV (MLRS)	GS

42nd Field Artillery Brigade: R 1ID DIVARTY

3-20 FA (155mm SP)	R 1-5 GA
2-29 FA (155mm SP)	GSR 1-5 FA
1-27 FA (MLRS)	GS

142nd Field Artillery Brigade: GSR 1ID DIVARTY

1-142 FA (203mm SP)	GS
2-142 FA (203mm SP)	GS
1-158 FA (MLRS)	GS

GS - General Support
GSR - General Support Reinforcing
R - Reinforcing
DS - Direct Support
TAB - Target Acquisition Battery (Counterbattery Radar)
MLRS - Multiple Rocket Launch System
ATACMS - Army Tactical Missile System
UK - United Kingdom

for the FFAHQ; and reinforcing (R) to enable the supporting FA unit’s exclusive massing of fires for the supported FA unit. Detailed definitions of these support roles and their accompanying Seven Field Artillery Inherent Responsibilities are found in FM 3-09, Chapter 4.

1ID DIVARTY also embraced
the tenets of AWIFMN:

Adequate fire support for the committed units: 1ID DIVARTY placed 1-5 FA and 4-5 FA in DS of each of their maneuver brigades (1/1ID and 2/1ID, respectively) and subsequently assigned them their own GSR and R cannon battalions to provide adequate fires. This allowed the brigades to service targets in their own deep areas and provided them

the ability to mass multiple FA BNs on maneuver objectives before their seizure or clearance.

Weight to the main effort: 2/1ID was the main effort for the division. 1ID DIVARTY not only placed 4-5 FA in DS of 2/1ID, but gave them four cannon battalions in GSR, one cannon battalion in R and priority of GS fires during the attack phase of the operation.

Immediate responsive fires: 1ID DIVARTY accomplished responsive fires by decentralizing a large portion of the supporting FA units. Placing units in DS to maneuver brigades or R to other FA units is the most common facilitation of responsive fires. However, establishing quick fire nets for planned targets and rehearsing mission processing procedures prior to combat operations were vital to ensuring that firing units processed fire missions as quickly as possible after target identification.

Facilitation of future operations: The 1ID DIVARTY staff conducted extensive analysis into the positioning of FA units on the battlefield as well as time-distance analysis of friendly maneuver units. This was vital to ensure that the supported maneuver brigades of 1-5 FA and 4-5 FA (along with their own R and GSR FA units) did not outpace them as they switched their support relationship from GS to DS.

Maximum feasible centralized control: Generally, the maximum C2 limit of any unit is around three to five subordinate units. It would be impractical for the 1ID DIVARTY to exercise direct C2 over all seventeen supporting battalions. If the 1ID DIVARTY was unable to effectively C2 a particular unit, that unit would be put into a supporting role to another, to ensure that every delivery system stayed shooting for the duration of the operation. 1ID DIVARTY delegated specific control authorities to subordinate FA brigade HQs but maintained centralized command of all supporting units by exercising the duties and responsibilities of an FFAHQ outlined in FM 3-09. This ensured that no echelon controlled more than five subordinate units but still maintained the maximum feasible centralized C2 through the 1ID DIVARTY commander.

Never keep artillery in the reserve: Lingamfelter emphasizes the critical concept that any non-firing tube, launcher, or cannon is an opportunity

wasted by the division commander. Every FA unit was continuously tasked with planning, rehearsing, or executing fire missions for 1ID.

Without the deliberate C2 structure provided by the 1ID DIVARTY, the joint force could not have coordinated and executed the massive rocket and cannon artillery raids, massed preparatory fires and rapid reorganization of delivery units to their supported maneuver brigades that were vital to the rapid defeat of the Iraqi army. Every division requires a well-trained and well-educated DIVARTY to provide that C2 to effectively manage internal FA units and integrate any external FA units into their task organization. Due to the increasingly complicated nature of warfare and the high-demand/low-availability of cannon, rocket and missiles in LSCO, the mantra of every DIVARTY should be “right command/support relationship, right time, right place, right ammo.” These relationships are the first crucial element that facilitates accurate and timely fires.

Modern DIVARTY commanders can exercise and increase their proficiency in C2 of division FA units during WFX and during command-post exercises (CPXs). When DIVARTY commanders plan training objectives for their CPXs or WFX, they should aim for their DIVARTYs to successfully C2 up to twelve (12) individual FA Battalions, with one to three reinforcing FA BDE HQs to enable the delegation of control. Twelve (12) should be the aimpoint because it is more than the span of typical “garrison” C2 but not so many that it detracts from the DIVARTY’s ability to effectively plan. This forces commanders to place units in the support roles outlined in FM 3-09 to effectively fight. Commanders should request FA Battalions and brigades that include as many diverse weapon systems as possible (M777A2, M119A3, M109A6/7, M270A1, M142) and even emerging system battalions like Extended Range

Cannon Artillery (ERCA) to exercise the rapid transition of support relationships and nuances in fire mission processing that were so vital to the 1ID DIVARTY’s success. Learning how to rapidly integrate external units and consistently tasking, changing and exploring the intricacies of support relationships is the only way that DIVARTYs will be able to learn how to provide adequate C2 to supporting FA units in future conflict.

Sustainment of FA Units Supporting the Division

Providing the ammunition for the 1ID DIVARTY’s task-organization was a significant logistical feat for its staff. Transporting and storing artillery Class V ammunition is burdensome for even the best trained and fully manned logistical units. It requires intricate knowledge of fuze/shell combinations, propellant types, munition ranges and projectile functions that may not be well understood by those outside the FA branch. Lingamfelter provides an extensive analysis of the ammunition required to keep the King of Battle shooting during the Gulf War. The expenditures totaled almost 25,000 cannon shells and over 2,500 rockets in the campaign’s twelve days of ground combat operations. The result of the artillery ammunition expenditure was the destruction of 50 enemy tanks, 139 armoured personnel carriers (APCs), 30 air defense systems, 152 artillery pieces, 27 missile launchers, 108 mortars, 548 wheeled vehicles, 61 trench lines and bunker positions, 92 dug-in and open infantry targets and 34 logistical sites.

Modern DIVARTY and FA battalion staffs struggle to forecast or properly plan for the appropriate type and quantity of ammunition to support their commander’s objectives. One could reference ATP 3-09.23, Chapter 7 for historic trends of the type and quantity of cannon ammunition based on the operation type, but

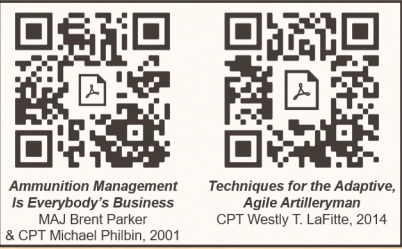
1 ID DIVARTY and Supporting Units Ammo Expenditures 16-28 FEB 1991				
	HE	DPICM	RAP	Rockets
Artillery Raids (16-23 FEB 91)	5792	1436	1980	1606
Preparatory Fires Prior to Breach (24 FEB 91)	4621	1515	0	414
Breach to Change of Mission (24-28 FEB 91)	5614	4057	290	540
Total	16027	7008	2270	2560

these tables are generic “cookie cutter” planning tools and no such tables exist for rockets. The targeting cycle and the subsequent identification of Field Artillery Tasks (FATs) are what truly drives FA ammunition forecasts and unit basic loads (UBLs). The quantity and type of ammunition required to support those FATs are a function of “Battlefield Calculus,” or the total amount of ammunition required based on range to the target, target type and the commander’s desired effect.

Just like C2, modern DIVARTY commanders should train ammunition management during CPX and WFX and most importantly during battle rhythm academics and leadership professional development (LPDs). An effective method to establish Class V discipline in any formation is to modify leader certification exams to add nomenclatures, fuze shell combinations, munition ranges, munition functions, Department of Defense Identification Codes (DODICs) and vehicle haul capacities and develop a unit development plan to educate the formation on Class V. Leaders will only make learning their ammunition a priority if their commanders make it a priority.

Education aside, a good litmus for commanders to gauge their unit’s ability to manage ammunition is how well they forecast expenditures. If a staff is unable to effectively forecast ammunition 72 hours out, it indicates that 1) the staff does not understand the capabilities, limitations and functionality of the ammunition they are managing, or 2) the division’s targeting cycle is broken and cannot provide the necessary inputs for the DIVARTY staff to forecast the ammunition required to support their assigned FATs.

Battlefield calculus, outputs of targeting, haul capacities, controlled supply rates, required supply rates and UBLs are all topics that are far too complex to outline in this article. Previous FA officers have already written about these topics and copies of their findings can be found below. The



first is an article from 2001 written by MAJ Brent Parker and CPT Michael Philbin and the second from 2014 written by CPT Westly T. LaFitte. Both are prime examples to the level of detailed

planning and analysis required to execute effective fires in LSCO.

To be successful, the 1ID DIVARTY staff had to ensure every staff section integrated into the 1ID targeting cycle. Treating the DIVARTY staff as an extension of the Division staff, not just a subordinate HQ involved in parallel planning, was an essential element 1ID DIVARTY used to ensure delivery systems were in the right time, in the right place, with the right ammunition and right command support relationship to execute their FATs. Parallel lines never touch.

Conclusion

As the joint force looks ahead towards LSCO, the Field Artillery Branch should draw insights and inspiration from the Gulf War to understand the complexity and challenges associated with planning, executing and sustaining fires. Although current DIVARTYs are learning how to adapt to fighting in LSCO, they have not demonstrated their true potential and lethality in more than three decades. Lingamfelter’s detailed historical account highlights the command, control and sustainment that DIVARTYs must apply in the LSCO of tomorrow, even thirty years after the Big Red One was “rounds complete.” For the FA branch to effectively provide this vital support in future conflicts, “Desert Redleg: Artillery Warfare in the First Gulf War” by L. Scott Lingamfelter should be mandatory reading material for FA Captains Career Course, students at the U.S. Army Command and General Staff College and all FA battalion and DIVARTY staffs across the Army. In the words of COL Lingamfelter, “You go forward best, by going back first.”

References:

Lingamfelter, L. S. (2020). *Desert Redleg: Artillery warfare in the First Gulf War*. University Press of Kentucky.

MAJ Destry “Sam” Balch is a FA BOLC Gunnery Instructor at the US Army Field Artillery School. MAJ Balch has served tours in support of OPERATION SPARTAN SHIELD, OPERATION ATLANTIC RESOLVE and OPERATION INHERENT RESOLVE. His previous positions include Battery Fire Direction Officer (3/4ID), Platoon Leader (3/4ID), Battalion Fire Direction Officer (3/4ID), 4ID DIVARTY Fire Control Officer, Brigade Fire Support Officer (2/82 ABN), Battalion Fire Support Officer (2/82 ABN) and Howitzer Battery Commander (2/82 ABN).

Rotational Training Units (RTUs) at the National Training Center (NTC) often do a respectable job adhering to and conducting their battle rhythm targeting events. They tend to not do as well publishing the orders products resulting from this meeting, however. Targeting product development and distribution, especially target selection standards (TSS) and attack guidance matrices (AGMs), continues to challenge units. Additionally, inconsistent adherence to the priorities listed therein when confronted by target simultaneity or troops in contact (TICs) is a recurrent trend for some units. The best targeting

tools are simple, specific and specified, allowing for rapid execution or decision making when leaders confront variance or circumstances requiring adjustments.

Firstly, Target Selection Standards apply the criteria of target location error (TLE), size, activity (stationary or moving) and timeliness to reports about enemy activity to help analysts determine what enemy objects are actionable targets versus just suspected targets which need further development or confirmation.



By CW3 David Brown

Example Standalone Target Selection Standards

- High-payoff Target (HPT): Refers to specific, prioritized commander approved targets that collection assets must acquire for a given phase, critical event, battle period, or Air Tasking Order (ATO) day. Generated from high value targets (HVTs).
- Target Location Error (TLE): Measurement of the difference between actual and perceived target locations. Here, it means the maximum allowed sensor detection error, expressed as a circular radius in meters, to engage targets. Varies by weapon system.
- Timeliness: Latest time information is of value (LTIOV) to weapon systems based on the

Target Selection Standards				
HPT	TLE	Size	Activity	Timeliness
2S6	100 meters	1 SEC (1x)	Stationary or Moving	5 minutes
2S19	50 meters	1 SEC (1x)	Stationary or Moving	5 minutes
1L-220	150 meters	1 SEC (1x)	Stationary or Moving	5 minutes
T-90	50 meters	1 PLT (3+)	Stationary or Moving	5 minutes

HPTL/AGM/TSS/

Phase: II												High Payoff Targets						DTG															
Priority												1		2		3		4		5		0600-1500											
Target Category												ADA		FS		MNVR/ENG		C3		REC (EW/CEMA)													
Targets												SA6/SA8/SA22		2S19		T90		BN CPs and above		CICADA													
												2S6		BM 21		UMZ/IMR/MTK																	
												SA24/SA18		9A51		BRDM/BMP																	
Weapon System / Attack												FA BN		1. 100m		2		1. 100m		1		1. 100m		4		1. 100m		3		1. 100m		2	
														2. Section				2. Section				2. BN TOC				2. Section							
														3. S				3. S				3. S				3. S							
														4. 6 min				4. 6 min				4. 10 min				4. 45 min				4. 6 min			
												MLRS BN		1. 150m		1		1. 150M		2		1. 150M		3		1. 150M		2		1. 150M		1	
														2. Section				2. PLT				2. PLT				2. BN TOC				2. Section			
														3. S				3. S				3. S				3. S				3. S			
														4. 6 min				4. 6 min				4. 10 min				4. 45 min				4. 6 min			
												EW/CEMA		1. 500m		4		1. 500m		5		1. 500m		5		1. 500m		5		1. 500m		4	
														2. Section				2. PLT				2. PLT				2. BN TOC				2. Section			
														3. S/M				3. S/M				3. S/M				3. S/M				3. S/M			
														4. 6 min				4. 6 min				1. 10 min				1. 10 min				1. 10 min			
												CAS		1. 500m		3		1. 1KM		3		1. 1KM		1		1. 1KM		1		1. 1KM		3	
														2. Section				2. PLT				2. Section				2. BN TOC				2. Section			
														3. S/M				3. S/M				3. S/M				3. S/M				3. S/M			
														4. 6 min				1. 6 min				1. 10 min				1. 45 min				1. 10 min			
												AAA		1. 500m		5		1. 1KM		4		1. 1KM		2		1. 1KM		4		1. 1KM		5	
														2. Section				2. PLT				2. Section				2. BN TOC				2. Section			
														3. S/M				3. S/M				3. S/M				3. S/M				3. S/M			
														4. 6 min				4. 6 min				4. 10 min				4. 45 min				4. 10 min			
When												I/A		I/A		A		A		A		A											
Damage												N/S		N		D		N		N		N											
BDA Required												Y		Y		N		N		N		N											
REFERENCES: Priority of Attack 1. TLE=Max. 2. Size=Min.																																	
3. Target Activity=Stationary (S) / Moving (M) 4. Timeliness																																	
WHEN: I=Immediate A=As Acquired P=Planned DAMAGE: D=Destroy N=Neutralize S=Supress BDA REQUIRED: Y/N																																	

target's expected dwell time or on station time. To use a sports analogy, this is your shot clock or how long you have to take the shot and engage the target before needing to reconfirm that the target is still present or actionable.

- Activity: Describes the status of the enemy activity required for engagement. Varies by weapon system.
- Size: Minimum number of target elements required for targeting or worth engaging. May also vary by weapon system.

Because several TSS elements vary by weapon system (TLE, activity, size), many targeting officers

choose to combine the TSS and high-payoff target list (HPTL) with the AGM.

Example combined HPTL, AGM and TSS

Regardless of format, the field artillery intelligence officer (FAIO) uses target selection standards to keep the brigade intelligence-support element (BISE) focused on acquiring and developing the HPTs in the areas the unit needs to attack to ensure success of the friendly course of action. As such, they should drive its development and enforce its use. Typically at NTC, new or junior S2 analysts send a lot of raw data, not information, that isn't actionable. The FAIO filters, prioritizes and converts that data to information, sending actionable targets to the appropriate shooters or

Notional Sensor Processor to Analyst PACE P: USMTF. A: SALT/A (XMPP Chat). C: SALT/A (JBC-P Free-text). E: Radio/SVOIP.	Notional Analyst to FAIO PACE P: USMTF (S305 TIDAT). A: SALT/A (XMPP Chat). C: Swivel-chair. E: Runner	Notional FAIO to FSE PACE P: AFATDS/JADOCs/EMT. A: SALT/A (XMPP Chat). C: Swivel-chair. E: Radio/SVOIP.
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Attack Guidance Matrix						
PRI	CAT	HPT	When	How	Effect	Remarks
1	ADA	2S6	Immediate	FA BN; MLRS	Destroy	BDA Required
2	FS	2S19	Immediate	FA BN; CAS	Neutralize	CFFZ 1 IVO PL GENE F-Kill 6 2 S19s
3	RSTA	1L-220	As Acquired	FA BN; MLRS	Neutralize	MSN-Kill
4	MNVR	T-90	Planned/As Acquired	CAS; AAA	Destroy	K-Kill 6 Tanks
Immediate (I): These targets take precedence over all others and are conducted even if weapon systems must be diverted from engagements already underway. As acquired (A): Means the target should be engaged when acquired. Planned (P): Indicates that the target should be planned for future firing or put on file for action at a specified time.						

fire support elements (FSEs) in accordance with commander targeting priorities and the unit’s operational framework.

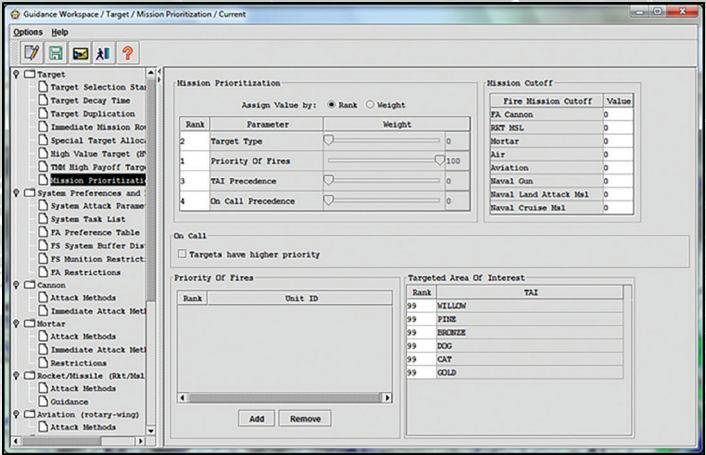
Notional FAIO steps in Killing a Target

- Sensor acquires a target. Analysts passes target information to FAIO.
- FAIO checks acquisition/report time to determine validity.
- FAIO evaluates target: HPT, size, & activity check. TLE check. Request collection cross cueing for target location refinement if necessary.
- FAIO generates fire mission and sends to appropriate echelon shooter based on target location and operational framework (Inside/ Outside AO, long/short of BDE/DIV CFL, etc.)
- FAIO prompts collection for BDA if target requires it.
- FAIO prompts BISE to update common intelligence picture.

An attack guidance matrix (AGM) is a commander approved targeting tool that addresses when and how to attack targets and the desired effects against those targets. As such, deviations from this product should be rare and informed by knowledgeable decision makers. Effective AGMs are intelligible, specific, consistent and distributed to the current operations (CUOPs) at large.

Example Attack Guidance Matrix

- **High-payoff Target (HPT):** Refers to specific, prioritized commander approved targets that collection assets must acquire for a given phase, critical event, battle period, or Air Tasking Order (ATO) day. Generated from HVTs.
- **When:** Probably the most misunderstood part of the AGM. This column comparatively indicates when the target should be attacked and is tantamount to mission precedence. As such, this column should mirror your HPT priority; this is to say, immediate (I) targets correspond to higher priority targets. We've seen some units list their third or fourth priority HPT as an “immediate” strike, causing confusion during execution regarding what to strike first, the immediate or the supposedly “higher” priority target on the HPTL.
- **How:** Weapon systems (in order of employment priority) that will engage the target.
- **Effect:** Desired effects, physical and functional, against the target and or target system.
- **Remarks:** Battle damage assessment (BDA) requirements, coordination requirements, attrition goals, criteria for HPTL change, measures of performance (MOPs) and measure of effectiveness (MOEs), etc.



Lastly, your tools are only as good as the thought and flexibility you’ve put into them because they have limits. The AGM, for example, doesn’t account for all the planning factors or machine variables that can actually determine fire mission value in operations or in Advanced Field Artillery Tactical Data System (AFATDS). While accounting for high-payoff targets, the standard AGM leaves out other factors that could influence fire mission value. Four variables determine fire mission value in AFATDS:

- Target Type (High-payoff Target)
- Priority of Fire
- TAI Precedence
- On Call Target Precedence

As a thought experiment, consider the case of units simultaneously calling for fire. Whose targets would you service first: a unit with priority of fire calling for fire on targets that don’t meet the TSS/AGM or a unit calling for fire on HPTs that presumably do? The “correct” answer, in truth, varies according to the circumstances ruling at the time and your commander’s intent. The case for HPT importance is self-evident but prioritizing priority of fire may be appropriate when a main effort battalion/squadron is leading a brigade attack or movement to contact and risks culminating.

Deliberate targeting becomes deliberate dynamic targeting when we recognize, adapt to and confront variance in our plans. As fire supporters, we are often the first to recognize the operational importance of indicators and spot reports in the command post as it relates to resource requests and synchronization in support of the maneuver plan. This analysis should occur in real time during operations when any reports come in. It could also occur during synchronization drills such as a two or seven minute drill.

Notional Deliberate to Dynamic Targeting Sequence Informed by Information

In any case, the targeting working group (TWG) is the primary deliberate synchronization meeting where you plan, establish and rank proposed priorities for commander approval before the target decision board (TDB). Your targeting priorities and the criteria for their change, produce requirements and really matter in the case of target simultaneity, when you may be only able to prosecute a few targets when many present themselves. Targeting products are the commander’s priorities, information aids and execution tools. Without priorities or execution tools, units run the risk of prosecuting targets in a first in first out undisciplined fashion while potentially more impactful targets languish in a Joint Battle Command-Platform (JBC-P) chat or AFATDS target workspace queue. The most effective units keep their priorities simple, specific, specified and socialized with the entire CUOPs down to the JBCP operator who may be the only one calling out reports in the command post.

CW3 David Brown currently serves as the Targeting Trainer for Operations Group Bronco Team at Fort Irwin, California. He is a Warrant Officer Basic and Advance course graduate. His previous assignments include Brigade Targeting Officer, Division Artillery Counterfire Officer, Field Artillery Brigade Lethal Effects Element Targeting Officer, Target Acquisition Platoon Leader and Battalion Targeting Officer.

Data	Information	Knowledge
"9 T-90s moving west from Barasu IVO Racetrack."	801st BTGs tank companies are moving along Axis of Advance 2 in Central Corridor, not the Northern Corridor as expected	Enemy counterattack force will bypass EA GOLD. TF XXX in the central corridor does not have priority of support according to the plan Recommend changing Priority of Fire, diverting CAS, changing the HPTL, etc.
What (Salute)	So What (Variance)	Therefore/Recommendation

For the past three years and as directed in the FY 23 National Defense Authorization Act, XVIII Airborne Corps has been working closely with the joint force, industry partners and intelligence agencies to enhance doctrinal targeting processes and leverage artificial intelligence within multinational and multiservice systems and workflows. These technologies have come to aid targeting officers and intelligence analysts with the identification, development and prosecution of targets, reducing that target lifecycle from days to minutes. The advancements are also increasing staff efficiency and decreasing bandwidth consumption. This has led the Corps to adopt innovative technologies such as the Broad Area Surveillance-Targeting (BAS-T), part of the National Geospatial Agency's (NGA) Maven program. Broad Area Surveillance-Targeting has given XVIII Airborne Corps' Fusion Cell the ability to leverage artificial intelligence within deliberate and dynamic targeting processes by detecting objects within an image at scale, operating in one easy to use single user interface on a low bandwidth tactical network. When compared to the time it would take trained analysts to search an entire image, the difference is significant. Broad Area Surveillance-Targeting is not a replacement for geospatial intelligence analysts, but rather an augmenting tool saving time, allowing the commander to make timely and informed decisions and staff concurrently stays focused on targets by priority. BAS-T algorithms fuse data from multiple sensors and platforms to bring analysts and operators a priority based, in-

depth assessment of the enemy systems present within the commander's area of responsibility (AOR).

Fighting with algorithms, however, is not simply a consumer's game where you receive output of targets. XVIII Airborne Corps routinely employs commercial and national space based electro-optical (EO) and synthetic-aperture radar (SAR) imagery to help identify gaps between the identification of object classes within the BAS-T models (algorithms). This refinement is done by rejecting or accepting the detections that the model has identified within any specific image. The feedback provided by the analysts helps the model understand where it is falling short, as well as where it got the detection right. During Joint All-Domain Command and Control (JADC2) exercises such as the Corps quarterly Scarlet Dragon series and "1000 Decisions an hour," XVIII Airborne Corps tests new models and their performance against object classes of common military equipment such as transporter rector launchers (TEs), towed artillery pieces, radars and surface vessels. These classes are just a few among the many that BAS-T algorithms can detect within EO or SAR

imagery. These exercises also allow XVIII Airborne Corps to refine battle rhythms and processes. The detections within the image can also help in the development of named areas of interest (NAIs), as well as confirm or deny any perceived or suspected enemy activity within the AOR. Once a pass is made by space-based assets and any one of many computer vision algorithms processed the image, the live layer associated with BAS-T



XVIII AIRBORNE CORPS BAS-T EMPLOYMENT

By CW2 Christopher A. Chabrier-Montijo

A helpful experimental joint tool based on currently available technology that augments our work flows to allow us to move faster and at a greater scale than ever before.

within Maven Smart System (MSS) publishes to everyone within the staff in real time. Both the Field Artillery Intelligence Officer (FAIO) on the floor and the GEOINT analysts all see these detections on MSS, thereby enabling all to work collectively at scale and speed. From there, they conduct target vetting and validation based on the high payoff target list (HPTL), target selection standards (TSS) and attack guidance matrix (AGM), previously approved by the commander.

Detects are sent to target workbench (TWB) within MSS, where they are prioritized and sent to any of the following for prosecution: Advanced Field Artillery Tactical Data System (AFATDS), or published as a J series 3.X track via Joint Range Extension Applications Protocol or JREAP-C or JREAP-A. Maven Smart System can talk to Joint Automated Deep Operations Coordination System (JADOCS), but is not a system utilized by the XVIII Airborne Corps due to JADOCS inability to process increased data streams. The artificial intelligence within BAS-T digests hundreds of kilometers at once, allowing us to hold enemy forces at risk and enabling staff efficiency and timely engagement of targets; both kinetically and non-kinetically.


Scarlet Dragon – Oasis, an exercise held January 2023, allowed XVIII Airborne Corps and U.S. Central Command (CENTCOM) to jointly employ BAS-T successfully while being geographically separated. XVIII Airborne Corps successfully used BAS-T and MSS to prosecute deliberate and dynamic targets and nominate targets using TWB and for both organizations to see information in real time. Additionally, we highlighted the ability to conduct the Sensitive Target Approval and Review (STAR) Process within two hours by using TWB and BAS-T. XVIII Airborne Corps used BAS-T to detect enemy equipment (training) in Fort Liberty, North Carolina and Nellis AFB, Nevada. From the fusion cell, we sent targets to 18th Field Artillery Brigade AFATDS in Nellis, AFB, where they successfully did a live fire, as well as publishing a track on JREAP-A thru an Air Operations Center, where a B-52 Bomber dropped live ordnance on Fort Liberty. Scarlet Dragon VII will be a joint effort with U.S. Indo-Pacific

Command (INDOPACOM) from July through August 2023.

At our last 1,000 Decisions an hour exercise in June 2023 – an exercise to assure data readiness of the Corps – BAS-T algorithms were processed in various areas within different combatant commands AORs. They included CENTCOM, INDOPACOM and U.S. European Command (EUCOM). The exercise is designed to stress the analysts by injecting thousands of detections within a given area. The result is then captured by Army Research Lab and the NGA, to improve future models and aid in national collection strategy development and modifications.

BAS-T is not a new way to conduct targeting. It is a tool that allows targeteers, the fusion cell and the commander's staff to leverage artificial intelligence and help identify gaps, while saving time and resources. It has been successfully employed on operational deployments and XVIII Airborne Corps has found it useful in streamlining processes and systems. We will continue to refine it by working alongside industry partners and government agencies. It is not a "XVIII Airborne Corps thing", but rather a helpful experimental joint tool based on currently available technology that augments our works flows to allow us to move faster and at a greater scale than ever before. It is a tool being made to work for any joint or Army Headquarters, regardless of echelon, based on assigned mission set and operational variables.

CW2 Christopher A. Chabrier-Montijo has been a Targeting Officer at XVIII Airborne Corps for two years. For these past two years, he has worked closely with NGA and industry partners like Palantir, MAXAR, Royce GEO, among others, to enhance the tactical employment of national and commercial assets. This includes the development and refinement of artificial intelligence models throughout the fiscal years and testing them during exercises such as Scarlet Dragon and 1K Decisions series every quarter. He deployed last year as part of Operation Assure and Deter and used these capabilities for real world operations. What is now known as the SAG-U began as the Fusion Cell for XVIII Airborne Corps, which he was a member of and this capability was utilized. He has demonstrated this capability to Multinational Partners like Canada, UK, Australia, Joint HQs like CENTCOM, INDOPACOM, as well as Army units that include USARPAC, USAREUR-AF, Army Futures Command, III Corps, the 10th Mountain Division and the 82nd Airborne Division.



Culture, Training and the Marine Corps Combat Evaluation

By CPT Quenten C. Hare

AS an artillery captain looking forward to battery command there is one big question that comes up for me daily, “Will I be able to prioritize training and individual Marine development over administrative tasks?” There is a way to accomplish this though and I see it occurring in three parts: 1) Building a culture of wanting to train for combat operations, 2) Changing the way the Marine Corps Artillery Battalion employs its batteries in support of division operations, and 3) Using the Regimental Artillery Training School through the Marine Corps Combat Readiness Evaluation (MCCRE) as a proof source for training standard attainment.

A Winning Culture

Building winning culture begins with remembering that every day is a tryout and only the top performers will play on game day. Marines and artillerymen alike joined to be challenged. As leaders we have every obligation to show them what success looks like then bring them to their human limits in an attempt to obtain that success. Marine Artillery is great at giving you all the tools you need to build a strong culture. Marines want three things, field time with their gun sections, a high number of rounds fired safely and a no fail mission that they continually take pride in accomplishing. Ground fighting on the gun line, drinking a beer at Fiddler’s Green, sharing in the rum punch during St. Babs and taking a shot from the swab bucket all come from the three things Marines want. They want the field time to ground fight and take a shot from the swab

bucket. They want the feeling of continuously accomplishing a no fail mission ensuring that St. Babs has cause for celebrations. Ultimately, they want to put rounds on target because we earn our way to Fiddler’s Green, first through the mud on Fort Sill and finally anywhere Field Artillery is fired. It’s not hard to build a culture, we just need to prioritize the training we need with the things Redlegs want.

The Battery and The Division

What if Field Artillery wasn’t an infantry training aid? What if artillerymen went to the field to train for artillery training and readiness (T&Rs) and the division had a way to support an infantry T&R without reducing the effectiveness of a battery’s training evolution? One of the hardest things to deal with is losing momentum in training by taking a training week off the training, exercise and employment plan (TEEP) to conduct a tactical air control party (TACP) or a unit deployment program (UDP) battalion’s MCCRE. When I was last there 10th Marines’ two battalions had set deployment cycles. If you were in the UDP battalion your battery would likely get a six month rotation to Japan. If you were in the Marine Expeditionary Unit (MEU) battalion you had a 1/4 chance of getting a MEU. Not great odds. Although the MEU is the historic Marine Corps deployment, going to a UDP battalion would ensure you experienced the full cycle of the Combat Arms Marine or Tuckman’s team building cycle. Experiencing the full gamut of checking into a unit, conducting a work up, passing a MCCRE, deploying, redeploying home, executing a mess night and departing for a new battery or rising in



Battery E in the Kingdom of Saudi Arabia.



The SNCOs and Officers of Battery E in the Kingdom of Saudi Arabia.

billet in rank are paramount to a young Marines' development. So important that it's the heart of Gen. Neller's last birthday ball message (watch it again, in 12 years of Marine Corps birthday balls that one hit home the hardest for me). Not only does the UDP battalion ensure that you go through that cycle it potentially guarantees you go through it twice during your lieutenant time.

How does a TACP shoot or a UDP MCCRE affect each battalion? Unit deployment program batteries deploy to Japan to attach to 12th Marines, an artillery regiment. We owe it to United States Indo-Pacific Command (INDOPACOM) to send them the best trained artillerymen that we can. Losing a week of training to shoot 40 rounds at a TACP shoot or 25 rounds during an infantry battalion's UDP MCCRE is not time well spent. Likewise these events take from the MEU battery's ability to detach from their parent unit early and attach to the Battalion Landing Team (BLT) as soon as possible. During both of those events you can view artillery as a training aid to someone else. Doing the math, rounds fired divided by time allotted likely equals a low return on a training investment.

So what? There are likely two batteries in the MEU battalion with little on their TEEP besides Rolling Thunder, the biannual regimental firing exercise. Take one battery and for 12 calendar months assign it as the division training aid. That battery wasn't deploying anyway and they still need to fire rounds to stay proficient. Allot them a significant amount of the ammo for the year for battery level training and encourage that battery commander get after it but their primary mission is accurate, effective and reliable fires in support of TACP, independent battalion MCCREs and any artillery mission taking from the pre-deployment training (PTP) Those Marines may not be able to take pride in the fact that they're going to be the pointed edge of the spear for a year but they can take ownership of what artillerymen take pride in. Field time with their gun sections, a high number of rounds fired safely and a no fail mission that they continually take pride in accomplishing.



Marine Corps Combat Readiness Evaluation

The Marine Corps Combat Readiness Evaluation is one of the Marine Corps' best tools for training standard attainment evaluation. It absolutely is and I believe that. 2ndLt Hare reported to Battery E, 2nd Battalion 10th Marines right after it was slated to attach to Battalion Landing Team 1/8. We experienced one MCCRE before we attached to 1/8 and that was the 10th Marines Artillery Training School MCCRE and the revitalized professionalism of the evaluation had just begun. Under the direction of the Regiment Field Artillery Chief, MGySgt a former Battery Gunnery Sergeant of E/2/10, he took the MCCRE from its previous check in the box to a high stress evaluation that took Marines to the edge of their artillery knowledge and challenged their ability to overcome human factors. If you've ever been a part of 10th Marines in Camp Lejeune you know what it's like to throw rounds in the breach, security patrols and dig the crew serves in while covered in the newest worst heat rash you've ever had. The MCCRE did two things for the battery, 1) it tested our ability to fight like artillery and meet T&R standards and 2) it solidified an important piece of Marine Corps and Field Artillery culture.

The MCCRE is, and should be, the regiment's last opportunity to ensure Marines are training to the required standard. 10th Marines did this at gunpoint. The influential comment our battery commander made to the officers of the battery before we pulled out of the motor pool was "We've trained the Marines hard and they're ready for this. They will knock it out of the park or 2/10 will find new officers that will train them to." I'm sure there are many ways to take that comment. In the warrior culture we all find ourselves in, I believe the appropriate way is as a reminder that everyday is a tryout and only the top performers will play on game day. Looking back I am confident the battalion commander would not have relieved all his officers if we failed. I don't think. Either way we burned the ships and walked into the MCCRE as if we were going to combat. After we completed the MCCRE MGySgt told the battery how we fared. The cheers from the

dirt mired faces of the Marines were deafening. Hearing from a Battery E alumni that he'd go to combat with us was all we needed to hear before detaching from 2/10 and attaching to 1/8.

Unfortunately the infantry and artillery can have a strained relationship from time to time. Checking into 1/8 after its MCCRE put us in the same position we would have put any Marine that joined our battery after our MCCRE. "You missed the hard part," or something to that effect would likely echo through the barracks. I don't have the perfect answer to mending that relationship. I do see the value in shared experiences and that experience comes in joining 1/8 earlier in the pre-deployment training pipeline. If the MCCRE is going to evaluate the overall combat effectiveness of the battalion they have all of the assets that will be available to you on the MEU actively employed on the infantry MCCRE may begin to bridge that gap. I'd venture to say that the bedrock of combat operations is trust and confidence. That needs to develop significantly earlier than at the gates. If the first BLT event occurs five weeks before your first at sea time the new battalion commander likely hasn't developed much trust in the ability and fidelity of the newly attached battery.

Rounds Complete

The firing battery and every level of leadership above it all agree that training for Large-Scale Combat Operations (LSCO) is the goal. Training for combat operations during peacetime is a combination of resource allocation and culture. Marines need to be bought into the training and battery level leaders own that mission. Resource allocation is a cooperative mission owned by higher level leaders and the battery, with time being one of our greatest assets.

CPT Quenten C. Hare served as the Fire Direction Officer and Assistant Executive Officer with Battery E, 2nd Battalion 10th Marines and while attached to Battalion Landing Team 1/8 in support of the 24th Marine Expeditionary Unit. During his tenure in Battery E they supported BLT 1/8 in the Afghanistan Evacuation in August 2021. He currently serves as the Officer Selection Officer for Central Pennsylvania.

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Available for download on the Fires Knowledge Network (FKN) and Unit Training Assistance Program (UTAP/account required) at the QR codes below or copy and paste the link in your browser.



FKN

<https://armyetaas.sharepoint-mil.us/f:/t/sites/TR-FCoE-Reach-back/Repository/Field%20Artillery/Commandant%20Approved%20Training%20Videos?csf=1&web=1&e=edpT9Z>



UTAP

<https://www.milsuite.mil/video/watch/video/67440>

CAC required for both websites.

Training Multinational Corps – on – Joint Air Land Integration

By COL Kevin Jackson, LTC Tony Dunkin and MAJ Wes Martin

Foreword

“Integration and interoperability are key to executing successful large-scale combat operations and vital for survival. U.S. Army Europe and Africa (USAREUR-AF) is delivering a gated, command-post centric training model that prepares NATO Corps and Divisions to plan, coordinate and fight through the breadth and depth of today’s battlefields. Ukraine illustrates how truly decisive this can be. The side that successfully integrates air and land operations gains the advantage. The side that doesn’t suffers the consequences.” LTG John S. Kolasheski, CG, V Corps

Joint Air-Land Integration Initiative

The training and readiness of the U.S. Army and U.S. Joint Force may not be enough to win the next war alone. We will need to fight alongside our partners and Allies to bring the strength and capabilities of a coalition to the fight. Future U.S. Army efforts must center on the training and readiness of the entire coalition to achieve battlefield success. The current conflict in Ukraine highlights the complexity of large-scale combat operations (LSCO) and the need to continue to ready U.S. and coalition forces to ensure integrated deterrence or to fight and win if called upon. Interoperability remains a constant challenge but shouldn’t prevent efforts to train land and air forces on integrating capabilities and training staffs to fight in LSCO.

Recent changes in command structures across NATO have simplified command and control for the land and air components. This unity of command and intuitive leadership allows subordinate commanders to lead efforts to train and integrate more than has ever been done before in Europe. Joint air land integration is one area that we see renewed interest and focus as we continue to learn lessons from the current conflict in Ukraine. Many nations across the globe question how their forces could conduct air land integration in LSCO at echelon. In short, staffs at the division and corps levels must continue to train the basic principles and find ways to exercise and learn how to fight their formations. How then do you train both a U.S. and multinational staff outside of a major warfighter exercise/combat readiness evaluation, or prepare them to participate and excel?

One approach to the training we are adopting

in USAREUR-AF, is to develop a scalable and repeatable training program of instruction (POI) to train these staffs. A shortfall of relevant experienced coupled with an immediate demand for capability across NATO force structure drives the need for both short and long-term approaches to building expertise. The basic premise is to utilize existing organizations and enhance the combat readiness evaluation (CREVAL).

Naturally, it will take time and resources to institutionalize air land integration (ALI) training creating a sustainable model within NATO Force Structure (NFS). While that system comes online, the immediate solution focuses on a small mobile training team (MTT) that attempts to visit each of the ten multinational corps and train them on air land integration. If this MTT can increase the organic capability of a corps or division to accomplish their wartime mission, we consider this success. We also recognize this is the “commercial off the shelf solution” and the need exists to institutionalize this process across NATO and develop doctrine and standard operating procedures (SOPs) to promulgate lessons learned and drive change for future operations and training.

The current four-day POI model we are implementing is based on feedback and application from one of the multinational corps, 56th Artillery Command and the expertise from the Army Joint Support Team (AJST). AJST is key as the foundational proponent with vetted doctrine like how U.S. divisions and corps are trained for warfighter preparation, that can be applied across theater. Both U.S. and NATO air components, U.S. Air Force in Europe (USAFE-AFACRICA) and Allied Air Command (AIRCOM), are also major players in providing subject matter expertise in their portions of the POI. The expertise of NATO’s Deployable Air Command and Control Centre (DACCC) is also key for utilizing this 4-day POI model and ensuring NATO doctrine and processes are permeated throughout this training. The 19th Battlefield Coordination Detachment, who interfaces with all the various elements and maintains a Battlefield Coordination Detachment/ Ground Liaison Element (BCD/GLE) inside of AIRCOM and USAFE, is coordinating across all the players to strengthen this effort. The 19th BCD’s relationship with organic USAREUR-AF corps and divisions allows for synchronization of those units’ air land integration efforts with both Allied Land Command (LANDCOM), AIRCOM, USAFE-

AFAF and USAREUR–AF. The goal is to create a POI and establish Joint Air Ground Integration Center (JAGIC) SOPs that could be utilized by any partner nation in Europe or multinational corps to increase their war fighting ability.

The four-day model explained:

JALI ACADEMICS				
	Day 1	Day 2	Day 3	Day 4
0900-0915	LSCO Overview Brief	US Targeting Seminar	Indirect Fires, Airspace Requirements, and Coordination Measures	Systems Interoperability
0915-1000 (45 min)	TACS/AAGS			
1000-1010	Break	Break	Break	Break
1010-1100 (50 min)	Joint Air Tasking Cycle	Fire Support and Targeting in support of LSCO	Army Aviation: Employment & Airspace Requirements	Review and AAR
1100-1110	Break	Break	Break	
1110-1200 (50 min)	Joint & Army Airspace Control	JAGIC Overview & Duty Positions Part I	Airspace Demo	
1200-1300	Lunch	Lunch	Lunch	
1300-1350 (50 min)	Joint Airpower & Air Org for Combat	JAGIC Overview & Duty Positions Part II	JAGIC SOP Review	
1350-1400	Break	Break	Break	
1400-1450 (50 min)	The BCD and GLD	ASOC	Battle Drill Review	

Day 1: Key concepts of the operational level and organizational structure that enable air–land integration. Creating a baseline understanding of the players and concepts necessary to enable execution of air–land operations across all echelons. This day creates common understanding of influences above the corps level and what entities and systems drive joint force synchronization.

Day 2: The key theme for the day is the transition down to the tactical level where JAGIC or similar tactics, techniques and procedures (TTPs) are utilized to enable air–land operations. The lead-in topic of targeting at echelon and its importance in influencing the LSCO fight. This day introduces organizations to concepts necessary to the ergonomics of synchronizing all airspace usage with procedural control to best enable the commander to shape with air–land operations.

Day 3: This day focuses on the measures and controls necessary for synchronization. To enhance understanding and build the team, a

practical exercise portion will reinforce concepts introduced earlier in the POI. This practical exercise demonstrates the building of a unit airspace plan (UAP) to underscore the importance of accounting for all planned airspace usage. Further experience is generated through a battle drill focused practicum. This demonstration of how a JAGIC operates in

specific scenarios emphasizes the importance of the skills need and arrangement of the cell.

Day 4: This day will focus on the topic of systems interoperability. Various NATO organizations based on country specific systems and training expertise require robust federated mission networking solutions to effectively communicate. The training concludes with a review and AAR to refine the POI for other organizations and discussion on developing a sustained training plan.

Beyond Academic Foundations

The logical progression of training for NATO Corps is development of individual skill proficiency for the staff team. This can be gained through a variety of training sources including National Institutional Training, NATO Schools and unit on the job training. Beyond the individual level the progression to collective training requires more deliberate planning and resourcing. Opportunities available during the near term, short of tier one

JALI Proficiency Roadmap		
2023	2024	2025
<ul style="list-style-type: none">Individual Training (ex NJTS)Initial Academics 4x Corps<ul style="list-style-type: none">MNC-NEEuro CorpsRRC-FRMNC-SEJAGIC SOP DevelopmentFinland JALI ConferenceNATO F2T	<ul style="list-style-type: none">Transition to Collective TrainingAdditional Corps AcademicsSOP ImplementationCREVALsExpanded Discreet Training EventsSustained TrainingOver the Shoulder CoachingIncreased Systems Interoperability	<ul style="list-style-type: none">Improved AcademicsInstitutional Base for NATOCREVALsDiscreet Training for SustainmentExercise OC/T SupportSystems Interoperability

exercises, include AIRCOM Find, Fix, Track (F2T) events, USAFE Air Warfare Center (UAWC) training network and simulation, unit level digital skills training (DST). Find, fix, track events provide a short duration training experience with NATO air assets participating in live fly events that could scale to include land forces participating in sequence with dynamic targeting events. USAFE Air Warfare Center operates on up to 13 different networks and has the capability of connecting remote systems to facilitate scenario–based training. Units partnered with USAREUR rotational forces bring both experience and access to battle labs enabling DST like training for partnered forces.

Building capability over time requires organizational experience and the ability to adapt to lessons learned. The standard NATO model of CREVAL creates a gap between experience–based training evolutions with 10 Corps competing for resources. To address this timing gap at unit level a more frequent stream of training experiences is necessary to generate and maintain readiness. Future training must be frequent and specialized enough to stimulate a JAGIC responsible for synchronizing fires and airspace during LSCO. Ideally units build and resource training at home station to develop, refine and validate SOPs. A progression to multiple echelon DST is also an important step in ensuring systems interoperability. Coupling of scenarios and simulations with training objectives would provide a robust collective training program. Beyond these steps options exist leveraging the federated mission network (FMN) connected systems to create and drive distributed discreet training events on a reoccurring basis. This

bridges the gap between individual training and CREVAL level events by inserting gated command post centric training evolutions.

Conclusion

The NATO fight is inherently joint and multinational and to win this fight, prepared forces with the ability to integrate land and air operations will remain key to battlefield success. We believe that foundational POI focused on air land integration across war fighting functions with practical exercises can improve both U.S. and multinational formations at echelon. The digital architecture and interoperability especially in NATO create challenges, but we are confident that through low–cost repeatable training and practical monthly exercises success can be achieved. NATO will benefit from a deliberate institutionalization of air land integration principles and training that creates an asymmetric advantage.

COL Kevin Jackson is currently the Brigade Commander for the 19th Battlefield Coordination Detachment in Ramstein, Germany. He previously served as the Battalion Commander for 2–15 FAR and has held various joints jobs in the Joint Staff J35 and Office of the Secretary of Defense (Policy).

LTC Anthony Dunkin is currently serving as the Joint Targeting Coordinator for 1 German Netherlands Corps in Munster Germany. LTC Dunkin is headed to Battalion Command in Grafenwoehr, Germany in summer of 2024.

MAJ Wesley Martin is currently the Deputy Plans Chief for the 19th Battlefield Coordination Detachment in Ramstein, Germany. He previously served as the Battalion Executive Officer for 1–94 Field Artillery Regiment at Joint Base Lewis–McChord.

Convergence Theory

By MAJ Brandt Murphy and MG (Ret.) Richard Longo

I. Introduction.

Convergence is one of four tenets of operations aside from agility, endurance and depth. Field Manual 3-0, *Operations*, defines it as “an outcome created by the concerted employment of capabilities from multiple domains and echelons against combinations of decisive points in any domain to create effects against a system, formation, decision maker, or in a specific geographic area.”¹ What is concerning, however, is that units at echelon continue to struggle with not only achieving convergence but also and more importantly, *understanding* convergence (i.e., the what and why). Organizations unfortunately succumb to the notion of describing convergence as “fancy massing” or as an outcome of creating

1 FM 3-0, *Operations*, 01 October 22, p. 3-3

effects on a singular point on the battlefield through multiple delivery methods (e.g., surface-to-surface in conjunction with air-to-surface). Toward enhancing such understanding, this article expands the conversation and describes both the “what” and “why” of convergence. It also highlights critical core concepts required for convergence operations. It does not, however, prescribe “how” convergence is achieved – such an endeavor remains for a later date.

II. What & Why of Convergence.

The general principles of convergence form its “what” and “why.” First, the “what” of convergence is a determinant of those outcomes that are produced as *effects* (primarily cognitive),

as well as *affects* (physical, or substantially tangible) – henceforward denoted as “*xxffects*,” when coupled. Convergence as a result of the outcome of *xxffects* within each of the five *domains* (cyberspace, space, air, land and maritime) creates conditions by which the enemy is forced to account for both physical and cognitive dilemmas at multiple decisive points. Simultaneously striking physical and cognitive objectives by impacting them produces a paralyzing effect on the opposing force.² The enemy psyche (command & control function), therefore, is hamstrung to the point where effective decision-making is diminished, reducing responsiveness to friendly forces’ action within each of the domains. Moreover, such an outcome is achieved in conjunction with *xxffects* within each of the three *dimensions* (physical, information and human) which impact both friendly and enemy forces for the duration of operations.

Convergence produces concerted employment of capabilities resulting in surprising, effective tactics that accrue advantages over time.³ When executed properly, the overall *xxffect* is greater than the sum of each individual effect. However, this is only achieved when the executing echelon is able to sufficiently balance the principles of war specific to mass, objective and economy of force.⁴ Convergence, then, creates the opportunity for

enduring, simultaneous, or sequential individual effects through the synchronization of specific targets and broad effects.⁵ Put simply, impacting several decisive points simultaneously, or in sequence, via concerted *xxffects* results in both physical and cognitive dilemmas that the enemy is forced to address in the current space and time. Ultimately, convergence “creates exploitable opportunities that enable freedom of action and mission accomplishment.”⁶

As such, we draw **assessments** of convergence as an output of the results of “what” *xxffect* has been produced (i.e., what have we done and how has that *xxaffected* the enemy?).

Second, the “why” of convergence provides its purpose. To that end, *xxfecting* systems, formations, decision-makers, or specific geographic areas enables the executing echelon to accrue advantages over time via the creation of multiple dilemmas, as previously addressed.⁷ By broadening the scope of mass, synchronization and combined arms convergence exists to *xxfect* the enemy across time, space and all domains.⁸ Therefore, the purpose of convergence is to achieve unity of purpose and unity of effort through simultaneity, or sequential action, in order to achieve a paralyzing *xxffect* on enemy efforts and decision-making and capability.

Convergence is **evaluated** through the ways in which the friendly executing echelon and its subordinates are able to maintain the initiative, control tempo and force the enemy to react accordingly.

What (is produced)

- Concerted employment of capabilities
- Surprising, effective, tactics that accrue advantage over time
- Overall effect that is greater than the sum of each individual effect
- Balance of the principles of mass, objective & economy of force
- Syncs specific targets and broad objectives
- Enduring, simultaneous, or sequential individual effects
- Balance with agility and initiative

Why (purpose/to)

- Create effects against systems, formations, decision-makers, specific geographic areas
- Accrue advantages over time
- Create multiple dilemmas
- Broaden the scope of mass, synchronization & combined arms
- Create effects across time, space & domains
- Achieve unity of purpose & unity of effort
- Achieve simultaneity
- Have a paralyzing effect on enemy decision-making

2 FM 3-0, *Operations*, 01 October 22, p. 3-5

3 FM 3-0, *Operations*, 01 October 22, p. 3-3

4 Ibid.

5 Ibid.

6 Ibid.

7 Ibid.

8 Ibid.

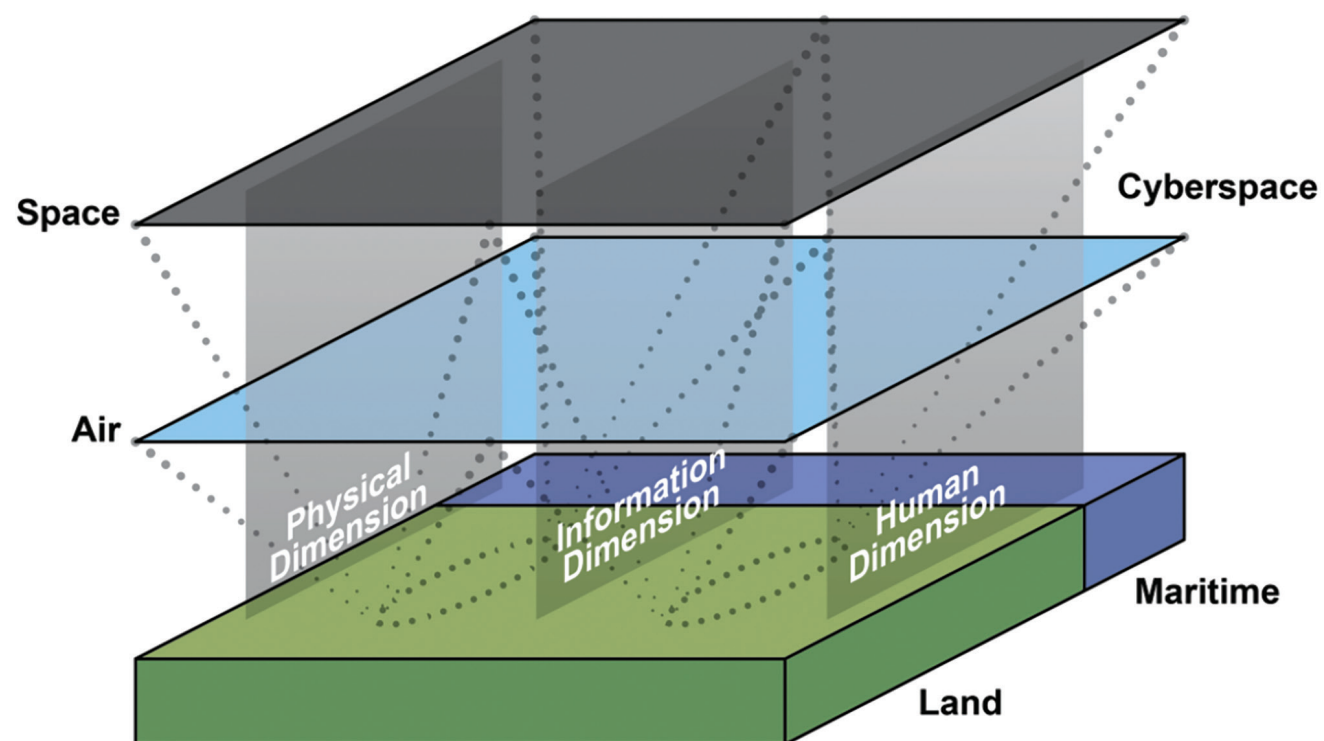


Fig. 1: Domains and dimensions of an operational environment. (FM 3-0, OCT 22).

III. Convergence Core Concepts: Integration, Coordination, & Synchronization.

Convergence requires three critical aspects to form its foundation: integration, coordination and synchronization. First, **integration**, is the *arrangement of military forces* and their actions required to create a force that operates by engaging as a whole.⁹ Integration is achieved in operations through battle rhythm boards, bureaus, centers, cells and working groups (B2C2WG).

The second critical aspect, **coordination**, is defined as the act of *making parts* of something, group of people, etc. work together in an efficient organized way.¹⁰ With the myriad requirements necessary to coordinate military action taken into account, coordination is achieved via battle/ commander updates as well as frequent sessions of commanders’ dialogue. Most importantly, it is the coordination aspect that ties forces to plans (or reactions to the enemy in execution), highlighting where risk can be mitigated or where significant gains can be capitalized upon throughout the operation.

Finally, **synchronization** is the *arrangement of military actions*, in time, space and purpose to produce maximum relative combat power at a decisive place and time.¹¹ This critical aspect includes two sub-elements necessary to achieve

synchronicity, which are *simultaneous effects* and *sequencing effects*. Simultaneous effects achieve the result of attacking enemy forces in multiple domains at the same time and across the depth of the enemy’s echelons. Important to note is that simultaneous effects aim to further paralyze the enemy’s decision-making process which, in turn, stymies its most critical lethal and non-lethal capabilities for a limited period of time.

Sequencing effects create dilemmas and opportunities for deception when enemy forces begin to expect a pattern. In other words, by modifying the timings of complimentary effects the executing echelon creates unmitigable uncertainty within the enemy command and control element. It is not to say that adjustments to timings should de-synchronize *effects*, only that careful consideration must be taken into account in order to ensure sequencing effects do not *de-integrate*, *de-coordinate*, or *de-synchronize* preapproved operations in time and space with respect to both commander’s intent and subordinates’ disciplined initiative. Plainly stated, organizations must not “surrender the initiative for the sake of synchronization.”¹² For a non-doctrinal quantitative perspective of analysis which may be useful to planners, see **Figure 3**; wherein *Convergence* is the outcome of *Integration*, *Coordination* and *Synchronization* modified by *x* (friendly forces) over *y* (enemy forces) distributed over *Time* in conjunction with

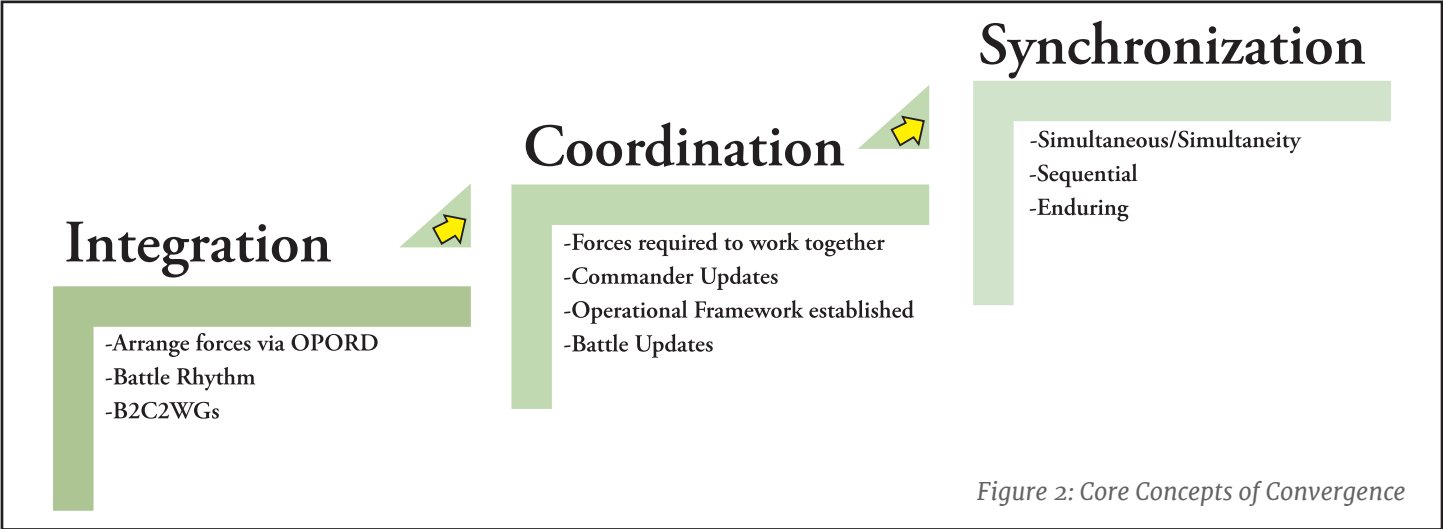


Figure 2: Core Concepts of Convergence

$$C = \frac{(I + C + S)(\frac{x}{y})}{T(Cond)}$$

Figure 3: Convergence Equation

operational *Conditions* (risks to mission and risks to force).

IV. Convergence Complexity Analogies.

To demystify convergence complexity, consider the analogy of an old-fashioned, analog alarm clock. The clock is comprised of four elements: twelve numbers, an hour hand, a minute hand and a hand for the seconds. As such, the clock’s *integration* is depicted by the hour hand, *coordination* by the minute hand and *synchronization* by the second hand. Organizations that are integrated, solely, are able to successfully achieve operations twelve times per complete evolution (the hour hand is true once per hour). Conversely, organizations that are **integrated** and **coordinated** are better yet able to achieve multiple effects, or sixty times per each of the twelve evolutions (given sixty minutes per hour).

It is only when an organization is **synchronized**, as well as **integrated** and **coordinated**, that true convergence is possible as an outcome. In other words, the second hand drives the minute hand which, in turn, actuates the hour hand (e.g., sixty by sixty opportunities throughout twelve evolutions). At this point, operations are occurring in time and space simultaneously in multiple, predetermined domains and dimensions. It is inherent upon the executing echelon to plan when the “alarm” (true convergence) is to be set by the hour, minute and second which will therefore paralyze the enemy’s psyche (command and control facilities) and severely limit its most lethal and non-lethal systems. When the “alarm” is integrated, coordinated and synchronized then convergence is realized from a conceptual perspective.

V. Conclusion.

This article examines the “what” and “why” of convergence toward enhancing understanding at echelon. It is not meant to prescribe “how” to achieve convergence; rather, to expand the conversation on it as one of four tenets of operations. The core concepts denote theoretical aspects, or principles, required for decision-making which account for convergence as an outcome when confronting a near-peer adversary. Therefore, *integration*, *coordination* and *synchronization* are critical given the requirement for organizations to remain acutely cognizant of capabilities available in each domain and dimension.

Convergence is not the result of successfully massing surface-to-surface and air-to-surface effects in conjunction with non-lethal or cyber effects. It is the outcome of impacting several decisive points simultaneously, or in sequence, resulting in both physical and cognitive dilemmas that the enemy must address. The reason we seek convergence is to diminish the enemy’s ability to effectively command and control forces, paralyze decision-making and hinder their ability to employ capabilities aimed at denying the friendly commander’s end state.

MAJ Brandt Murphy serves as a Fires Observer, Coach/Trainer in Operations Group Alpha at the Mission Command Training Program (MCTP) on Fort Leavenworth, KS. He is currently pursuing a Ph.D. in Leadership Studies from Gonzaga University.

MG (Ret.) Richard Longo serves as a Fires Senior Mentor for the Mission Command Training Program (MCTP).

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9 Ibid.
10 Oxford English Dictionary. ‘Coordination’. *Oxford Learner’s Dictionary*. Accessed May 22, 2023. https://www.oxford-learnersdictionaries.com/us/definition/american_english/coordination.
11 FM 3-0, *Operations*, 01 October 22,p. 3-5
12 Ibid.

Setting the Conditions

Teaching Companies and Battalions how to “Lead with HE”

By CW3 Tanner Port and CPT Jared Rooney

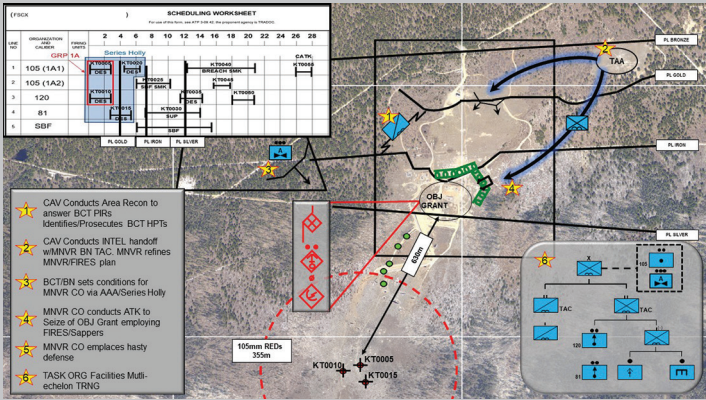
Leading up to its Joint Readiness Center (JRTC) rotation, Falcon Brigade deliberately focused its training cycle on setting the conditions at echelon by leading with fires. The design behind this training methodology focused on coaching and mentoring company commanders and battalion staffs on how to incorporate fires to maximize their effectiveness. The brigade (BDE) accomplished this by nesting its training events with how the BDE commander (CDR) envisioned using the Joint Fires Enterprise at the JRTC. The key training event that allowed the brigade to facilitate the BC’s training guidance were the fires support coordination exercise (FSCX). Focusing primarily on offensive operations, maneuver (MNVR), intelligence (INTEL) and fires planners used a schedule of fires in support of the MNVR plan that leveraged all organic sensors (e.g. BDE reconnaissance troop, scouts and radars) to prioritize destruction missions that by extension also achieved a suppression effect. This article aims to outline the training methodology; tactics, techniques and procedures (TTPs) used; and lessons learned.

FSCX Design

Fire support coordination exercises (FSCXs) have historically focused on the company (CO) CDRs and their fire support enablers, requiring them to execute an echelonment of fires that ensured constant suppression on the objective area. The intent of these FSCXs is to have the CO team focus on trigger math, risk estimate distances and familiarize MNVR CDRs with what “fires brings to the fight”. In contrast, the methodology behind Falcon Brigade’s FSCX design consisted of three lines of effort (LOE) that aimed to create a robust training scenario that would foster the synchronization of the warfighting functions’ (WFF) conditions:

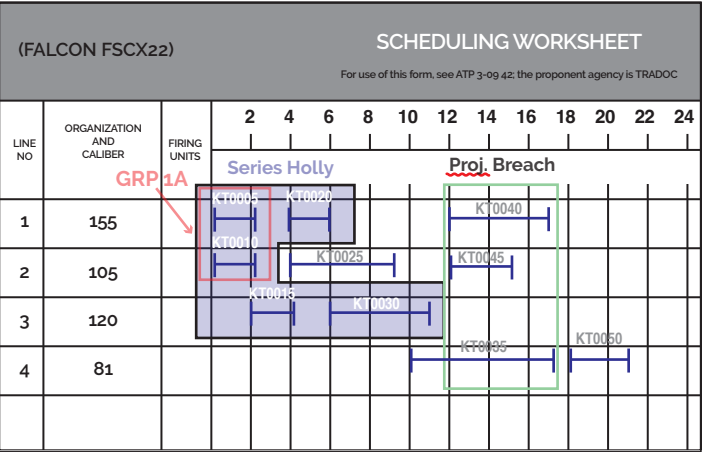
- **LOE 1** consisted of the BDE CDR evaluating the individual CO CDR’s troop leading procedures (TLPs).

- **LOE 2** was creating an opportunity for the maneuver battalion’s (BN) staffs to conduct military decision making process (MDMP) and exercise the future operations/current operations (FUOPs/ CUOPs) handoff to their respective tactical command posts (TACs) for execution of a BN (-) attack.
- **LOE 3** was designing a scenario that would foster a shared understanding between CO CDRs and their fire support enablers on what conditions needed to be set in order to successfully conduct a combined arms breach.



What was different?

The BDE CDR’s intent was to design a FSCX scenario that focused on how the BDE and subordinate BNs would set the conditions for COs at echelon via the fires enterprise and a BN support by fire (SBF). Critical to success was the requirement for the MNVR BN’s TACs to command and control the fight. This departure from the typical BDE “White Cell” provided the BN CDRs the opportunity to visualize and train their TACs. For example, although army attack aviation (AAA) was in direct support (DS) of each FSCX iteration, operational control was retained at the BDE to set conditions via a deep attack for the MNVR BNs. Upon successful completion of the AAA deep attack, the MNVR BN’s TAC would initiate



their respective BN MNVR and fires plans. To facilitate this, each BN received tactical control of an M119A3 and M777A2 Howitzer PLT in support of their “attack to seize” mission. In addition, the BNs were each allocated two priority targets to plan and execute. The BNs were coached and mentored on using their DS Howitzers to **destroy** enemy positions rather than **suppress** them.

Falcon Brigade executed an extensive leader professional development (LPD) series over three months to ensure BN-level leaders understood how to effectively employ and synchronize the brigade combat team’s (BCT) organic fire support assets

to conduct destruction missions via a schedule of fires. Through intelligence preparation of the battlefield, the BDE used time/distance analysis to define each echelon’s fight (BDE/BN/CO) and subsequently identified the conditions that needed to be set to ensure success. This process in turn drove the refinement of the schedule of fires throughout the MDMP/TLP process by highlighting triggers and decision points.

Whereas a typical echelonment would focus on constant suppression by transitioning assets, a Falcon Brigade echelonment used each fire mission to provide a destruction/neutralization effect. This enemy-focused process stressed the rapid sequencing of high payoff targets via a schedule of fires that would provide the overall effect of a traditional echelonment of fires. Ultimately, the goal was to build a shared understanding on what fighting at echelon (CO/BN/BDE) truly means in large scale combat operations (LSCO).

Execution

Upon receipt of battle damage assessment (BDA) from the BDE deep attack, the MNVR BNs executed their respective series targets that focused on enemy machine guns nests. In addition, they

MNVR Metrics						
LD	Bronze	Copper	Silver	Breach	BCO WHITE FALCON	
1100L (all time are + from LD)	11:03	11:05	12:29	21:24		
Fire Mission Metrics						
		Mission Rec at CO	Mission Rec at BN	Mission Rec at Black	Shot	RDS Complete
GRP1A	KT0005 (155mm)	1100L	:03 sec	:06 sec	:54 sec	5:11
GRP1A	KT0010 (105mm)	1100L	:03 sec	:06 sec	1:26	6:00
Destruction	KT0015 (120mm)	1100L	:03 sec	:06 sec	2:05	4:10
Destruction	KT0020 (155mm)				7:48	Cease Loading 9:24
SBF SMK	KT0025 (105mm)	5:25	6:41	6:48	7:32	11:14
Suppression	KT0030 (120mm)				6:07	10:45
Suppression	KT0035 (81mm)	10:20	10:50	10:55	11:45	12:47
Breach SMK	KT0040 (155mm)		Do Not Load 14:00	1410	15:27	17:00
Suppression	KT0045 (105mm)		11:37		12:55	EOM 19:05
Suppression	KT0050 (81mm)	Not Fired				

SYSTEM	MISSIONS	TOTAL ROUNDS	AVERAGE ROUNDS PER MISSION
MORTAR			
81MM	11	114	10.36
120MM	12	153	13.17
Mortars Total	23	272	11.77
FA			
105mm A BTRY	15	202	13.47
105mm B BTRY	10	135	13.50
105mm C BTRY	14	219	15.64
FA Total	39	556	14.20
21 ID “BLACKJACK” GS T-10			
SYSTEM	MISSIONS	TOTAL ROUNDS	AVERAGE ROUNDS PER MISSION
Constructive HIMARS	26	136	5.23
GS HIMARS	7	24	3.43
TOTAL	33	160	4.33
TOTAL RTU	62	828	12.98
TOTAL BLUFOR	95	988	10.10
TOTAL G-MAN	28	530	23.24
Ratio GMAN vs RTU	0.5:1	0.6:1	1.8:1

executed an obscuration smoke mission that set the conditions for the emplacement of their BN SBF. Once the BN TAC determined the conditions had been set, the MNVR CO began its attack, culminating with the combined arms breach of a wired obstacle.

In support of the CO attack, fire supporters were forced to balance the art and science of:

- Refining BN fires plan's attack guidance to support their MNVR element's decision points/triggers, resulting in a comprehensive trigger, location, observer, delivery system, attack guidance, commication or TTLODAC (e.g. methods of control for 81mm/120mm/105mm missions)
- Integration of their organic 60mm mortar systems in either handheld or conventional mode to provide the ground commander the ability to execute preplanned suppression targets and targets of opportunity.
- Observation plans, adjacent unit

coordination and target/BDA hand-off between the MNVR CO and SBF CO.

White Cell

To support this design, the White Cell monitored all FM traffic from the CO to BN TAC to capture MNVR and fires metrics to facilitate after action reviews (AARs).

Historically, the BDE’s fires/brigade aviation element (BAE) sections would simulate the BN TAC in a white cell capacity, performing such functions as receiving situational updates and fire missions. But the “monitor and metric” focus of Falcon Brigade’s TAC provided valuable feedback to the BNs on triggers/lulls in fire/and fire mission processing time.

JRTC

Building off the foundation laid at the FSCX, Falcon Brigade aimed to set the conditions for the MNVR BNs along their respective axes of advance. Objectives were identified along the route and the “Series Holly” schedule of fires methodology was

(JRTC 22-06)			SCHEDULING WORKSHEET														
			For use of this form, see ATP 3-09.42; the proponent agency is TRADOC.														
LINE NO	ORGANIZATION AND CALIBER	FIRING UNITS	2	4	6	8	10	12	14	16	18	20	22	24	26	28	
1	155 (PLT)		AD0265	AD0275													
2	155 (PLT)		AD0270	AD0280													
3	105 (BTRY)									AD0285							
4	120mm									AD0290							

applied to ensure a battlefield handoff between the BCT and the MNVR BNs. Key to the BCT’s success in this was the battlefield reporting from 1–73 CAV and the MNVR BNs’ scouts. Using the deliberate and dynamic targeting process, the BCT was able to rapidly identify high-payoff targets (HPTs) using organic assets and thus leverage division (DIV)-level assets to prosecute them. This concept was validated in the offensive phase of the operation and reflected in the fact the DIV fire missions were almost at parity with the BCTs organic assets (39 BCT fires vs 33 DIV fires).

The key takeaway of this operational concept is that Falcon Brigade was able to successfully identify targets that met DIV’s target selection standards (TSS) and leverage their assets against them. Removing enemy air defense artillery (ADA), fire support (FS) and MNVR (Armor) assets freed up the BCTs organic assets to target enemy assets they could actually achieve a destructive effect on.

Falcon Fires in the Offense

Assessing that conditions had been set via joint fires, the BCT was able to direct its own organic assets via its schedule of fires to set the conditions that would allow for the MNVR BNs to close with and destroy the enemy. The BCT accomplished this by using 4x destruction missions on confirmed enemy locations on OBJ Subaru (Shugart/Gordon). The BCT acquired these targets primarily via the BDE reconnaissance troop and cyber and electromagnetic activities (CEMA) assets. The ability to validate enemy locations on the objective facilitated a rapid target refinement

process that was then incorporated into the BCT’s schedule of fires.

Conclusion

Falcon Brigade’s deliberate focus on setting the conditions at echelon fostered a culture of violence through leading with fires. The most significant lesson learned was the importance of determining what conditions need to be set to continue movement and whether the fire missions achieved its desired effect. This is necessary at both the combined arms rehearsal and the fires technical rehearsal. At echelon, the BCT leveraged organic and DIV fires to set the conditions for the MNVR BNs and established graphic control measures to communicate battlefield handovers. Upon confirmation that the BCT had set the conditions, the MNVR BNs would exercise the same “destruction then suppression” methodology with their allocated targets from BDE and their organic mortars to set the conditions for their companies.

CW3 Tanner Port, 2/82 ABN DIV BCT Targeting Officer, served 13 years as a Field Artilleryman

CPT Jared Rooney is currently the Brigade Assistant Fire Support Officer at the 82nd Airborne Division, 2nd Brigade Combat team’s Fire Support Element. During his time in the Army, he has served as a Fire Direction Officer at 1–78 FA, a Fire Support Officer in 2–325 AIR, a Platoon Leader in Bravo Battery 2–319 AFAR, and a Assistant Fire Support Officer at 2nd Brigade Combat team.



Applying
DIVERGENT THINKING
to improve
LETHALITY
and
RETAIN FLEXIBILITY

By SSG Brandon Sutan

Life in the military, especially in the Field Artillery, is about being adaptable to the circumstances that define our mission, such as spending those late nights to ensure our howitzers are fully mission capable, coordinating with other battalions to provide support if needed, or getting that emergency deployment readiness exercise (EDRE) to ensure that we are always ready at a moment's notice. Now imagine trying to accomplish this. You lose a section chief or squad leader to an unpredictable circumstance now that section loses its firing capabilities until another leader has conducted the proper certification tables. Imagine if you had an additional certified section chief or squad leader within that section. You would no longer have to struggle to fill the

Applying a divergent method of thinking to consider the certifications of two crews per artillery section will allow leaders at all levels to benefit and be accountable.

position and can maintain firing capabilities and be prepared for those unexpected or expected events in the unpredictability of life.

Certifying two crews per section might seem mundane and not worth the effort at first, but using divergent thinking or horizontal thinking, you can create multiple solutions, such as what happens when that section chief has to attend military training or is Department of the Army (DA) selected for drill sergeant or recruiting duty, or gets injured and a medical evaluation board process gets initiated or decides that the Army is longer for them and begins the transition process and now as a leader you are being reactive rather than proactive trying to find the solution and potentially requiring that a recently promoted sergeant takes the reigns knowing that they might not be ready increasing the potential risk of a firing incident. This is a risk many command teams must take as our organizations are ever-changing. The movement of personnel is continuous due to service members due to a permanent change of station (PCS) or being moved to another position due to an unpredictable event.

Many positives correlate with this method of approach as it allows organizational leaders to maintain firing capabilities due to personnel and ultimately allows leaders to instill the efforts of taking care of their service members and allowing them to take advantage of more opportunities to improve their professional development such as attending military training such as schools or professional developmental courses without hindering the organization. It will also give commanders a sense of ease, creating an additional safety check regarding an additional certified leader operating that equipment. At the section level, it will instill a sense of camaraderie and healthy competition to succeed. It will also develop the mindset of being prepared for the

unexpected. Each team member will have at least two positions improving training results as they could move to a different job immediately and be adequately equipped with the increased emphasis on the following level-up drills. Both internal crews will want to be better than the other regarding their artillery skills and proficiency while allowing them to collaborate to achieve the best possible results.

With this method over time, I believe it would have a positive impact as we move forward as the **King of Battle** and will increase the proficiency of our leaders and future leaders when the time comes for the newly promoted leaders to take control of their sections or as the section leaders progress through their careers they will gain a deeper level of understanding and an increased level of knowledge and experience regarding their artillery skills. It will create a systematic approach of leaders training future leaders and identifying better ways of conducting tactical operations, as the best ideas come from trial and error or a different perspective.

In conclusion, applying a divergent method of thinking to consider the certifications of two crews per artillery section will allow leaders at all levels to benefit and be accountable. From the section level, it will increase that progressive competition and will increase training value as they will be required to learn multiple positions to perform what is expected from them and will provide the experience to newly promoted leaders to ensure they are competent and understand the scope of what is required of a section leader. From the aspect of a commander, it allows them to maintain firing capabilities during unexpected events, such as losing a key leader due to an unforeseen circumstance. It encourages them to be more proactive versus reactive. While still being able to have the ability to take care of their

service members and allow more opportunities for their leaders to take advantage of professional developmental programs or PMEs without creating an increased impact on the organization.

SSG Brandon Sutan currently serves as an M777A2 Howitzer Section chief in Bravo Battery, 2-12th Field Artillery Regiment, 1st Stryker Brigade Combat Team at Fort Carson, Colorado. He has consistently trained other howitzer section chiefs and played a vital role in assisting the 2-12th Field Artillery Regiments S3 function. SSG Sutan has operation experience in Operation Spartan Shield, Operation Eager Lion, and Operation Atlantic Resolve. He is also a full-time student at the University of Maryland Global Campus pursuing an undergraduate in Web & Digital Design with an expected graduation in December 2023.



Soldiers from the 75th Field Artillery Brigade; the 2nd Battalion, 18th Field Artillery Regiment; and the 4th Battalion, 60th Air Defense Artillery Regiment load various military vehicles onto rails in preparation for an Emergency Deployment Readiness Exercise (EDRE) at the National Training Center (NTC). (Photo by Edward Muñiz, Fort Sill Public Affairs Office)



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