



Field Artillery.

Professional Bulletin

2023, Issue 3



Approved for public release; distribution is unlimited.

Headquarters, Department of the Army. PB 6-23-3

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Field Artillery Professional Bulletin

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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

A Battery, 1-147th Field Artillery Regiment, South Dakota Army National Guard, launches reduced-range practice rockets during a live-fire exercise at Camp Ripley, Minnesota, July 19, 2022. The Multiple Launch Rocket System (MLRS) holds two launch pods, with each pod capable of carrying six RRPRs. (U.S. Army photo by SPC Elizabeth Hackbarth, 364th Theater Public Affairs Support Element)

The Field Artillery School at Fort Sill, Oklahoma



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Mission Statement

The Field Artillery School trains Soldiers, Officers and Marines in tactics, techniques and procedures for the use of fire support systems in combat. The school provides individual training from the basic level to mid-level leadership skills. The school supports collective training of lessons learned on today's battlefield by maintaining a professional conversation with Soldiers and Marines in the field.

At all times, the school supports the field artillery mission, which is to destroy, neutralize, or suppress the enemy by cannon, rocket and missile fire and to help integrate all lethal and nonlethal fire support assets into combined arms operations.

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

Part 3: Dakota Assault on Ft. Ridgely, 20 AUG 1862

By Dr. John Grenier, Field Artillery Branch Historian



Ordinance Sergeant John Jones. This image shows Jones in his officer's uniform. After the Battle of Ft. Ridgely, he accepted a commission as the captain of the Third Battery, Minnesota Volunteer Artillery, and he served in the 1863-1864 Northwestern Indian Expedition, designed to punish the Dakotas for the 1862 uprising. This image is courtesy of the Minnesota History Center.

Fortuitously for the defenders of Ft. Ridgely, the Dakotas gave them more than forty-eight hours to complete their defensive preparations and become more comfortable working their guns. The soldiers' lodge shouted down Little Crow at a council of war on the afternoon of 18 AUG, and they and their followers bypassed the fort on their way to New Ulm, a town of about 900 souls about twenty miles down the river valley, early on 19 AUG. The Dakotas expected to find easy plunder in New Ulm. Instead, they discovered about 50 farmers and shopkeepers behind a barricade and ready to sell their lives dearly so their families and neighbors could flee to Mankato, a settlement further down the valley built on the site of M-ak'-to's village. The Dakotas rushed the barricade in the late morning, but several volleys—New Ulm's defenders shared among themselves only twelve rifles and shotguns, but a handful of them

arrived at St. Peter and searched out Thomas Galbraith. Galbraith, a former BIA representative at the Lower Agency who resigned in protest over the bureau's inefficiency and corruption, had raised a company of *métis* recruits—Renville's Rangers, named after their *métis* leader, Gabriel Renville (also known as Ti'wakan, or Sacred Lodge, among the Dakotas)—to serve as a home guard for Minnesota's frontier settlements. Galbraith immediately called out the rangers and a company of new enlistees for the Union Army and they rushed to Ft. Ridgely. They arrived in the afternoon of 19 AUG. By sundown, therefore, 180 men stood ready to defend the post and the nearly 300 refugees in it. Almost none of the Soldiers other than SGT John Jones and Mr. John Whipple possessed combat experience; Mr. Dennis O'Shea had served in the peacetime Army. Many of the *métis*, on the other hand, had fought in intra-tribal wars, but the defense of



This is part three of the four-part FAPB series on the Battle of Fort Ridgely, in which field artillerymen, for the first time in US military history, successfully defended an isolated outpost against a dedicated and determined enemy attack. We used the preceding edition of the FAPB to explain the Dakotas' strategy for capturing Ft. Ridgely and the emergence of US field artillerymen as the main defenders of the outpost. This part tells the story of the Dakota assault on Ft. Ridgely on 20 AUG 1862 and points to the professionalism and courage of SGT John Jones and his team of artillerymen in defending the fort against almost insurmountable odds.



were veterans and remembered enough of their military training to make maximum advantage of their few firearms—stopped them short of it. A torrential afternoon downpour then dampened the Dakotas' ardor, and they withdrew up the valley.

As the first Battle of New Ulm unfolded, reinforcements marched as quickly as they could manage for Ft. Ridgely. LT Timothy Sheehan, upon receiving (late on 18 AUG at Glencoe) CPT John Marsh's message that "The Indians are raising hell," turned his company around and force-marched it and a party of Bureau of Indian Affairs (BIA) teamsters twenty-three miles through the night to the fort. They arrived near sunrise on 19 AUG, and LT Thomas Gere transferred command to LT Sheehan, whose six months of commissioned service made him the most experienced officer in fort. A few hours earlier, at 3 a.m., one of Gere's messengers

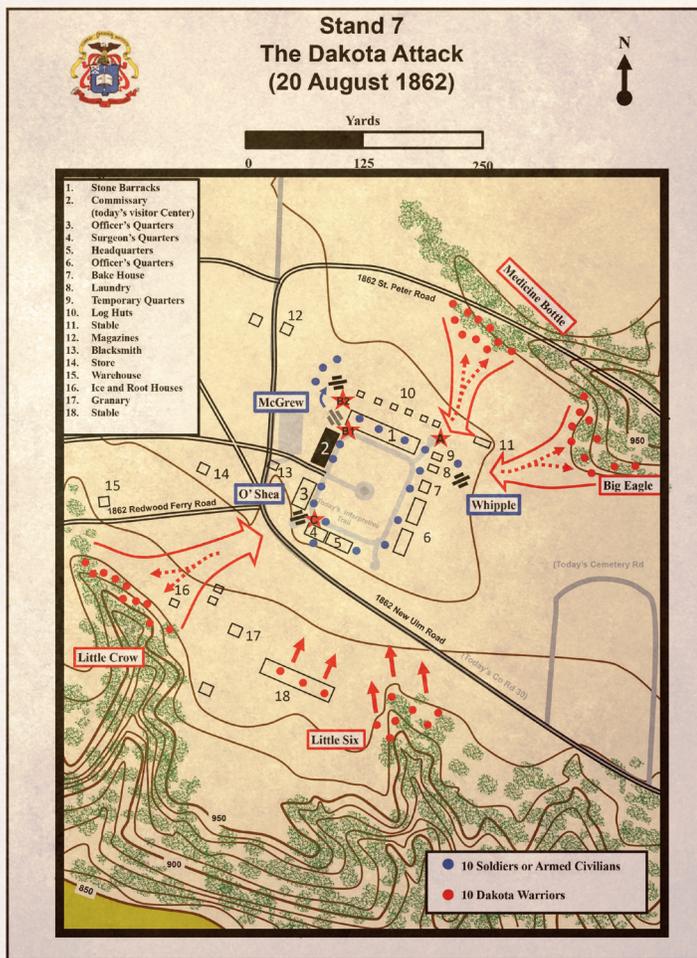
Ft. Ridgely promised to be something outside of their experiences.

Dakota scouts noted the arrival of Sheehan's company, the Renville Rangers, and the Minnesota Volunteer Infantry. Little Crow again urged the Dakotas to attack the fort, before more reinforcements reached it. He conceived a two-phased plan for 20 AUG, starting with diversionary charge from the northeast ravine and then an assault at the parade field's southwest corner, just as SGT Jones predicted. At 1 p.m., LT Sheehan and twenty Soldiers were outside the fort, on its west side, trying to complete their horse-mounted, clockwise reconnaissance of the perimeter that they began at the northeast corner. Though they passed near them, they completely missed the nearly 200 Dakotas under Medicine Bottle (Wa-kañ-o-zhan-zhan) and Big Eagle (Wanbdí Tánka) in the brush-filled ravine and


“Running his piece quickly behind the building ... McGrew cut his next fuse to its shortest limit, reloaded, ran the howitzer out amidst a shower of bullets, and exploded his second shell in the very midst of the extremely troublesome party, wholly dislodging [them] from their position.”


woods opposite the northeast corner, and the 200 warriors gathering in the ravine to the southwest of the fort. Upon the signal of three back-to-back rifle shots, Medicine Bottle's and Big Eagle's warriors charged the parade field. Whipple, with the assistance of refugee Werner Boesch, an ex-Swiss artilleryman, swung the howitzer to point at Medicine Bottle's warriors and pulled the lanyard. Lightning Blanket recalled, "As we were running in we saw the man [Whipple] with the

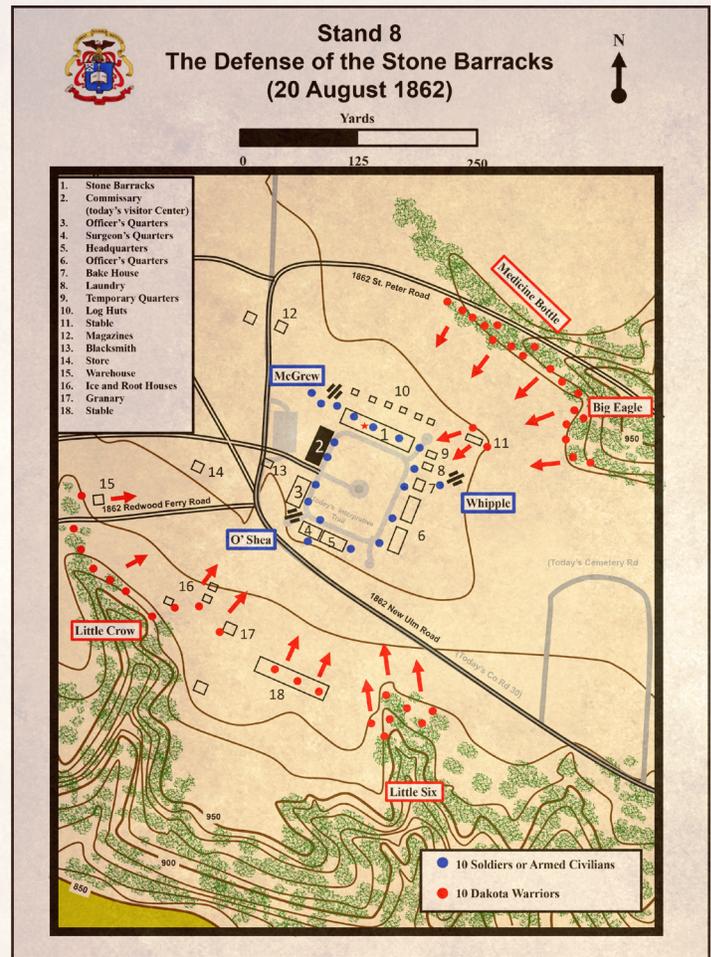
big guns, and as we were the only ones in sight he shot into us." The blast from the howitzer and small arms fire from a squad of Gere's Company B killed two Dakotas and wounded three others (two mortally), and it compelled the rest to scramble behind the line of log cabins located north of the stone barracks. The squad from Company C (under the command of LT Norman Culver) that Sheehan posted at the northwest corner to protect James McGrew's battery, took several strides beyond the barracks, pivoted east, and fired into the Dakotas. SGT McGrew recognized the opportunity to sweep the Indians with enfilading fire, and he wheeled his mountain howitzer into place. He miscalculated the fuse length on his first round, however, and the shell exploded a quarter mile beyond the target. "Running his piece quickly behind the building [the western-most cabin,]" Gere wrote, "McGrew cut his next fuse to its shortest limit, reloaded, ran the howitzer out amidst a shower of bullets, and exploded his second shell in the very midst of the extremely troublesome party, wholly dislodging the [them] from their position." Sheehan and his reconnaissance force, in the meantime, spurred their mounts in to the fort and passed between the commissary and officers' quarters, unharmed. No Soldiers, henceforth, attempted to leave the relative safety of their barricades. The Renville Rangers proved a bit more aggressive, if not reckless, later in the afternoon.



First phase of the Dakota attacks on Ft. Ridgely on 20 AUG 1862. All maps are courtesy of Combat Studies Institute's "Minnesota Sioux Uprising 1862" staff-ride package.

of infantrymen, and LT James Gorman with the Renville Rangers, offered several volleys of covering fire. For reasons known only to them, the Dakotas under Little Six (Shakopee, or Sakpedan), who from the southeast corner were supposed to support Little Crow, did not join the fight. Several “well-timed” rounds from the field gun loaded with cannister (an anti-personal round filled with small iron balls) sufficed to drive Little Crow and his people into the ravine.

Although the Dakotas’ first waves broke on Ft. Ridgely’s cannons and volleys of rifle fire from the infantry, they were not done for the day. Near 4 p.m., several Dakotas moved into the stables at the northeast corner: “bullets from the Indian forces on the east were sweeping the parade ground like a hail storm.” Others focused on the windows of the stone barracks, and some launched flaming arrows on to the shingled roofs of buildings. A fire on the roof of the officers’ quarters began to spread, and “Pandemonium and hell now reigned.” While the Dakota attacks seemed ad hoc rather than coordinated, it nevertheless became clear that Jones had made a grievous mistake in not hauling all the artillery ammunition to a central location inside the fort on 19 AUG. He asked for volunteers to run to the magazines: two privates from Company C, Charles Chapel and Charles Rose, stepped forward. No refugees joined them, though the BIA teamsters agreed to help the privates. McGrew ran out his howitzer with a squad of soldiers to provide covering fire. The runners succeeded in bringing ammunition as far as McGrew’s gun, but someone needed to carry it to the other cannons, across the bullet-swept parade ground. The refugees—one Solider remembered them, except for the few brave ones who worked the guns, as “a curse and hindrance”—again refused to leave the stone barracks. When Sheehan saw Jones crouching and rolling cannon balls across the parade field, he ordered Whipple to use his howitzer to level the stables. Two shells sufficed to first ignite the hay inside them, and then the structures. Several Renville Rangers, who had occupied the bakery to trade fire with the Dakotas and were raucously yelling insults in the Dakota language at them, found sport in shooting the Indians who tried to run from the inferno. They warned them that there would be no mercy for them—“We will eat your children before winter” one of them translated for the whites—and they were true to their word. More than a few of the Soldiers



Second phase of the Dakota attacks on Ft. Ridgely on 20 AUG 1862.

watched in awe as two rangers rushed upon a wounded Dakota as he tried to flee from the stables, violently seized him, and pitched him alive into the fire while they yelled war whoops. Probably as many Soldiers thanked their lucky stars that the *métis* were on their side.

At sunset, the Dakotas unexpectedly rode off toward to the West. Their first taste of the cannons had been bitter, and many of them wanted to get back to ravaging farms and homesteads. Little Crow was apoplectic: the Dakotas still outnumbered the Soldiers two-to-one, and darkness promised them cover under which they could overwhelm the artillery. There was little he could do, however, but to return to Redwood and try to convince the soldiers’ lodge to take a second stab at the fort.

To be continued...

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

Counterfire Trends from NTC

By CW3 David Brown

It is conventional wisdom in the Field Artillery community that *Proactive Counterfire* is targeting, and targeting is the process by which units win the counterfire fight. The good news is, at the National Training Center (NTC), this belief extends outside of our warfighting function to brigade commanders, whom the Army expects to combine arms in the close by setting conditions and shaping in the deep. The bad news is units struggle to conduct the counterfire fight in practice because they omit several planning and performance steps during rotation given the time constraints, unforgiving terrain, and contested domains they face at NTC. Accordingly, I'd like to discuss the most prevalent counterfire trends — both proactive and reactive — I've observed over the past year at NTC and provide recommendations to improve unit performance when targeting the enemy artillery threat.

Terms of Reference¹

Proactive Counterfire describes the aggressive use of all available intelligence, target acquisition, and attack assets to find and destroy as much of the enemy's indirect fire support system as possible before it has a chance to fire or to affect operations. Proactive counterfire is resource intensive, and frequently requires additional detect and deliver assets allocated from higher headquarters (HQs).

Reactive Counterfire provides fires in response to enemy artillery or weapons that have begun firing, jamming, or otherwise impacting the overall battle or unit mission. Even so, reactive counterfire is not a passive activity. It commonly takes the form of counterbattery artillery fire and, as such, requires anticipatory analysis of potential counterbattery fire requirements, and the planning and coordination to ensure that those fires are immediately available when needed.

Trends

1. Targeting officers, counterfire officers,

and Field Artillery battalion S2's does not contribute to and fail to apply the fundamentals of terrain analysis to the brigade S2's intelligence preparation of the battlefield (IPB). This often results in unobserved enemy fires from unexpected areas. Winning the counterfire fight starts in military decision-making process (MDMP), specifically step 2 of IPB: Describe environmental effects on operations. Intelligent preparation of the battlefield refines named area of interest (NAI) development and focuses collection requirements on probable enemy position areas for artillery (PAAs) according to the following environmental and enemy factors:

- Slope, Hydrology, Lines of Communication, and Intervening crests
- Enemy System Minimum and Maximum Range
- Enemy System preferred PAA Size
- Proximity to main and alternate supply routes and urban centers

Recommendation: Conduct terrain analysis and know your enemy. Utilize the Worldwide Equipment Guide (WEG) to determine the slope restrictions of the targeted enemy artillery threat. Use those restrictions as degree or percent parameter guidelines in Aeronautical Reconnaissance Coverage Geographic Information System (ARCGIS) to produce a map to show areas capable of supporting enemy fires. Apply the minimum and maximum range and preferred PAA size of the targeted enemy system to refine these areas; look for supply routes to and from those areas and site to crest issue causing terrain in those areas. By analyzing slope, intervening crests, weapon ranges, line of sight, terrain maneuverability, and survivability, you refine the brigade (BDE) S2's enemy artillery assessment. (See Figure 1 for an example PAA product)

2. Units do not hunt or plan to hunt the enemy artillery threat; they rely exclusively on the Q53 radar to locate enemy artillery: Relying exclusively on the Q53 radar to find the enemy artillery threat is equivalent to forfeiting the counterfire fight. Proactive counterfire requires proactive reconnaissance and multiple collection assets arrayed against enemy weapons during

¹ ATP 3-09.12 *Field Artillery Counterfire and Weapons Locating Radar Operations* (Washington, D.C.: HQDA, 2021), page 1-6.

their entire employment timeline. The enemy's indirect fire employment timeline includes (see figure 2 below for a notional timeline):

- Movement from tactical assembly areas (TAAs) to PAAs
- PAA establishment
- Movement to firing points and hide sites
- Firing and movement to subsequent or follow-on PAAs or hide sites

Recommendation: Targeting and counterfire officers (CFO) need to extract the specifics of enemy activity via time and space from the S2 (through NAI overlays, event template or EVENTEMPs, modified combined obstacle overlay or MCOOs, time distance analysis/rates of march, etc.) and plan primary and alternate sensors when targeting the enemy artillery threat. The enemy artillery threat has several windows of detection vulnerability during its total employment timeline and relying exclusively on the Q53 radar ignores most of them. Every intelligence preparation of the battle space (IPB) product the S2 develops during MDMP should be available during targeting working groups (TWG), especially the EVENTEMP. I routinely see TWGs executed where the S2 only brings NAI overlays, if they bring anything at all.

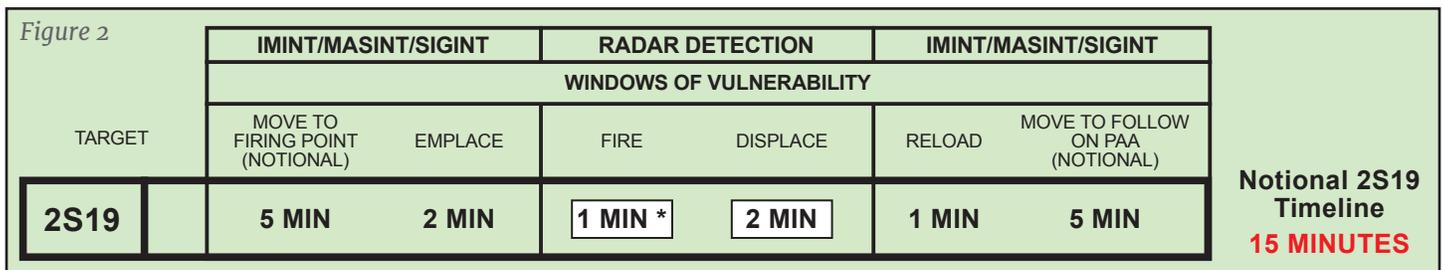
3. Units do not incorporate the Q53 on the intel collection sync matrix (ICSM) or consider it as a sensor when developing the intel collection plan (ICP): Some units make the opposite mistake: instead of overreliance on the Q53 radar, some do not consider it at all when developing their intelligence collection plan. CFOs must ensure that collection managers (CM) consider the Q53 part of the ICP because radar acquisitions can corroborate ground moving target indicator (GMTI) tracks, confirm or refine the enemy fires situational template (SITE MP), and prevent the dynamic and potentially disruptive re-tasking of other collection assets. On the other hand, poorly synchronized or absent radar planning during Targeting Working Groups between the CFO and

CM can lead to unobserved indirect fire affecting friendly units during critical events due to either problematic radar positioning or ineffective cueing triggers. CFOs that are involved in the TWG ensure that critical areas (Battle Positions, target area of interest or TAIs, Breach lanes, etc.) are prioritized as radar zones in the Advanced Field Artillery Tactical Data System (AFATDS), which speeds fire mission processing and ensures that the radars are appropriately positioned and cued to cover those critical areas at times needed by the supported unit.

Recommendation: Detail radar positions, azimuths of search, zone status and triggers, and cueing agents and triggers on the ICSM/ICP as part of the TWG. Bottom line: treat the radar like any other collection asset.

4. Field Artillery Intelligence Officers (FAIOs) and Counterfire Officers (CFOs) do not collaborate: Because they typically work in different sections which occupy different footprints, FAIOs and CFOs often struggle to communicate and cooperate with each other during the counterfire fight. However, the FAIO's proximity to S2 analysts and the various intelligence disciplines means he is often the first Field Artilleryman to see potential and developing counterfire targets, especially ones in the vicinity of radar zones, provided the CFO has shared them. See figure 3 below for an example CFO and FAIO information cross pollination / collaboration concept.

Recommendation: Share radar zones between the CFO and FAIO. Leverage reports, indicators, and multi-intelligence disciplines to assess emerging targets in vicinity of radar zones. The CFO should also report, or ensure S2 current operations (CUOPs) reports, radar acquisitions to the FAIO. Consider establishing distribution lists for Fire Mission Info Copies and counterfire targets in AFATDS between the CFO and FAIO's systems so that each section has visibility on fire missions against enemy artillery targets, especially if they



are moving. If moving, deduce whether the enemy is displacing by section, platoon, or battery and assess his next firing location.

5. Units waste time clearing ground forward of the CFL (Coordinated Fire Line): Given the purpose of this fire support coordination measure (FSCM), clearing ground beyond it during any fire mission should not be strictly necessary unless the mission violates another FSCM. I have observed that units that clear ground beyond the CFL routinely struggle with FSCM management or battle tracking generally.

Recommendation: Conduct frequent FSCM scrubs or geometry checks as part of the section/unit battle rhythm or 2-minute drills. Rehearse clearance of fire/counterfire battle drills from sensor to shooter. Develop counterfire mission routing criteria depending on the point of origin location (inside/outside AO; short/long of CFL/FSCL, etc). Delete FSCMs when no longer needed. Use the TWG as a venue to plan and publish CFL and PAA placement.

6. Units struggle to provide timely reactive counterfire (Fire for Effect) fire; acquire-to-fire response times routinely exceed 15 minutes with the biggest performance deltas at fire direction centers: Fire direction centers struggle to conduct timely tactical and technical fire direction due to infrequent rehearsals, lack of battery battle tracking, lack of standardized fire orders, positioning challenges, and intermittent communications. See Figure 4 for TC 3-09.8 fire for effect standards.

Recommendation: Consider using standardized fire orders, a dedicated counterfire battery and quick-fire net to shorten counterfire response times. Quick Fire nets take work to be effective and may not be appropriate at all times but, when resourced and rehearsed or combined with preplanned restricted operations zones (ROZs) over artillery specific NAI/TAIs, can considerably reduce counterbattery response times to the actions on the gun line. A tailored quick-fire net, one where a particular radar or sensor directly communicates with a particular FDC for a particular battle period for points of origin inside a particular NAI/TAI or for points of impact that violate specific zones, can actually make reactive counterbattery fires quick enough to catch displacing enemy artillery systems.

7. Units don't consider all available means when conducting counterfire: Units often only engage enemy artillery targets with friendly artillery, leading to lopsided artillery duels when the Field Artillery battalion (FA BN) is out of range, out of ammunition, or tied down with other missions. They fail to consider close air support (CAS), army attack aviation (AAA), and cyber electromagnetic activities (CEMA) when counterfire targets don't meet the accuracy or timeliness requirements for engagement by artillery.

Recommendation: Consider all available means to prosecute counterfire targets. Considering all available means ensures assets are not overtasked and may open up engagement opportunities for counterfire targets that cannot be engaged by artillery.

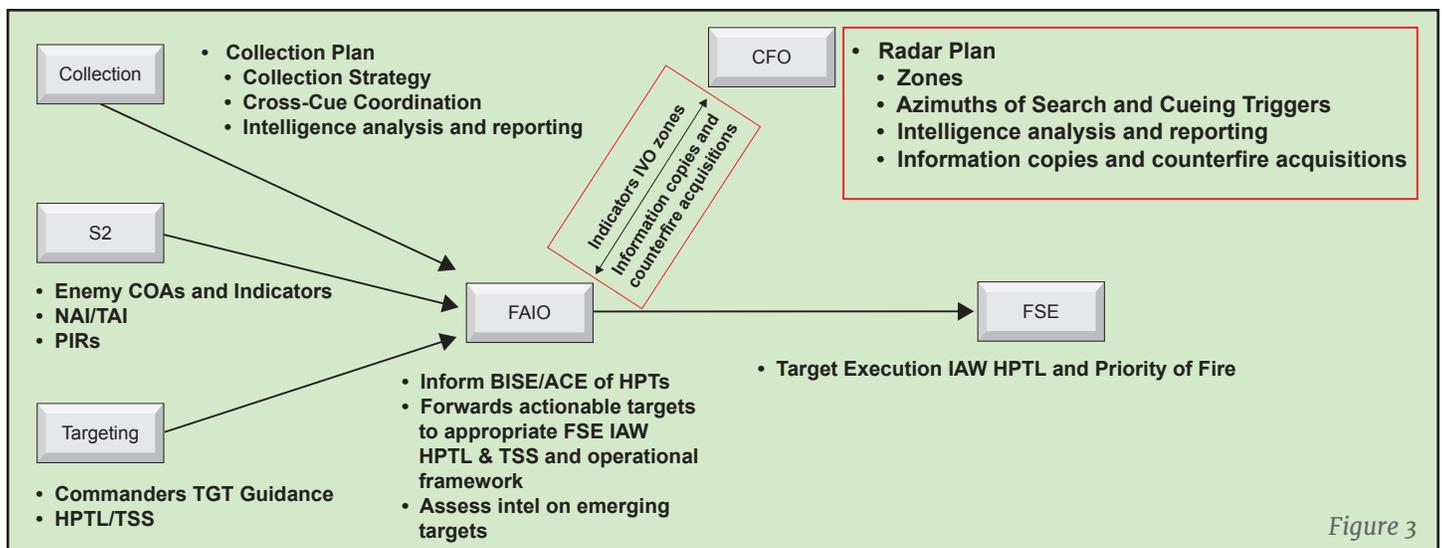


Figure 3

8. Units fail to conduct target pattern analysis: Units do not analyze radar acquisitions during the TWG as part of the assess phase of decide, detect, deliver, assess (D3A). Counterfire cells habitually fail to plot or brief radar acquisitions. Target pattern analysis (TPA) confirms or updates the enemy artillery SITEMP/EVENTEMP and gives insight into the enemy's course of action.

Recommendation: Conduct TPA during the TWG to inform, confirm, or update the S2's read of the enemy situation. Describe the volumes of enemy artillery fire in terms of time and space / task and purpose. Prioritize the analytical over the historical, the narrative over the numerical; share your analysis with the S2. Ask him or her if your analysis changes his or her estimate of the enemy's course of action. Share your analysis with the collection manager. Ask him or her if it is worth redirecting collection assets to find enemy artillery on follow on air tasking order (ATO) days. Share your analysis with the fire support officer (FSO). Ask him or her if it is worth establishing priority counterfire targets in the most likely areas of expected enemy artillery activity.

Summary

Although these trends come from the brigade

combat teams at NTC, the principles and necessity of practiced proactive and reactive counterfire apply at all echelons, especially in an era where indirect fire is the greatest lethal threat to Army Command Posts. Incorporating or modifying some of these recommendations may help you during particular battle periods or critical events during an NTC rotation, a Warfighter, or a real-life deployment. Commanders expect their fire supporters to win the counterfire fight. Denying the enemy the ability to shoot in the first place and having streamlined procedures to quickly respond when he unexpectedly does will help you win that fight.

CW3 David Brown serves as the Targeting Trainer for Operations Group Bronco Team at Fort Irwin, California. He is an Honors Graduate of American Military University and the Warrant Officer Basic and Advance courses. 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.

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Figure 4

Table D-8. Fire For Effect (FFE)

FIRE MISSION TIMES	Type of Computation		Manual/ Voice	FDC Computed	FOC
	FFE Shell/Fuze Combination		HE/Q	HE/Q	HE/Q
Observer	Initial Round				
	Each Subsequent Correction (+)				
	FFE Correction				
	TOTAL OBSERVER TIME		:45	:55	:55
Battalion FDC	TACTICAL FIRE DIRECTION TIME		:45	:45	:45
Platoon/Battery FDC	Tactical Fire Direction		:30	:30	:30
	Initial Round Technical Fire Detection				
	Each Subsequent Correction Technical Fire Direction (+)				
	FFE Technical Fire Detection		:30	:30	
	FDC TOTAL TIME		1:00	1:00	:30
Guns	Each Round (+)	105-mm	:30	:30	
		155-mm (SP)	:45	:45	:30
		155-mm (T))	1:00	1:00	
	TOTAL GUN TIME	105-mm	:30	:30	
		155-mm (SP)	:45	:45	:30
		155-mm (T))	1:00	1:00	
TOTAL MISSION TIME WITH OBSERVER PHASE		105-mm	3:00	3:10	
		155-mm (SP)	3:15	3:25	2:40
		155-mm (T))	3:30	3:40	

Note: For TOT missions, all rounds must impact within ±3 seconds of TOT time.

Officer Opportunities in 434th Field Artillery Brigade

A Unique Opportunity for Growth

By LTC Tommy Chae, 1LT Aubrey Braddock and 1LT Kyle Owens

Commissioned officers serve a pivotal role in the basic combat training (BCT) environment. In 2019, the Army included the platoon leader position for BCT on the tables of distribution and allowance (TDA), creating hundreds of positions for lieutenants across its four Army Training Centers. Increasing the number of officers enables drill sergeants to focus more time and effort executing the BCT program of instruction (POI) and provides additional leadership development opportunities for lieutenants. This article highlights how company grade officers, specifically Field Artillery Officers, benefit from serving in a basic combat training brigade as they prepare to go to their first operational assignment, attend the Field Artillery Captains' Career Course (FACCC), or pursue battery command.

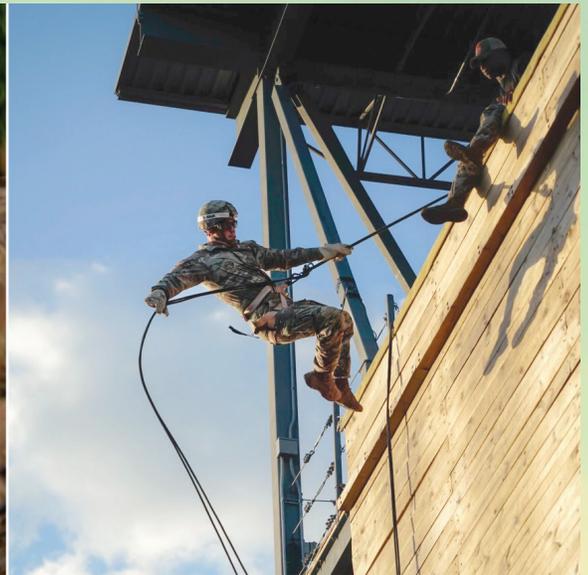
The historic 434th Field Artillery "Destroyer" Brigade at Fort Sill, OK, executes 82 BCT classes and produces roughly 13,000 Soldiers for the Army every year. Around six to eight percent of active duty officers from each Field Artillery Basic Officer Leader Course (FABOLC) class receives orders to the Destroyer Brigade and are immediately assigned as platoon leaders in a BCT battery for 12 months. Platoon leaders become well-versed with training management, risk management, and resourcing in ways many of their peers in operational units do not. Over the course of their 12-month assignment, lieutenants can expect to be involved in approximately three to four training cycles, each lasting 10 weeks. The structured

and predictable environment of BCT creates deliberate repetitions for lieutenants to learn a multitude of administrative processes. Platoon leaders master personnel actions, non-judicial punishment, administrative separations, and frequently serve as AR 15-6 investigating officers. The durable skills gained by new lieutenants in BCT allow them to report to a U.S. Army Forces Command (FORSCOM) assignment with a wealth of knowledge and prepared to be of instant value to their first operational unit.

Officers serving in BCT learn the importance and intricacies of taking care of Soldiers. Army programs such as Equal Opportunity (EO) and Sexual Harassment and Assault Response and Prevention (SHARP) are formally taught and exercised extensively in BCT. Since trainees look to their cadre leaders as role models, all permanent party Soldiers teach and enforce these programs and become experts in their employment. Lieutenants are not only active participants in these programs, but they work alongside top non-commissioned officers (NCOs) who teach and employ these programs and model the Army Values each day. Drill sergeants are among the top 10% of available NCOs across varying military occupational specialties (MOSS) and they offer valuable mentorship opportunities to junior officers as they engage in the important officer to NCO relationship.

Broadening assignments typically take individuals away from their career field and daily practice of the





Army basic training is the crucible where raw recruits transform into confident and disciplined Soldiers. It instills unwavering self-assurance and the skills necessary to face any challenge with courage and resilience, forging warriors ready to defend our nation.

technical and tactical skills needed to be successful. However, the Destroyer Brigade's presence at Fort Sill and the Fires Center of Excellence (FCoE) offers Field Artillery Officers the opportunity to attend schools and training that are often difficult for operational units to support. FCoE offers numerous Field Artillery training courses including Joint Fires Observer, Joint Operational Fires and Effects, Target Mensuration Only, Collateral Damage Estimate, and Target Material Production. Lieutenants serving in the 434th have easy access to these schools and are expected and encouraged to better themselves as officers through continuous professional military education.

2-2 Field Artillery, also located at Fort Sill, provides fires for the US Army Field Artillery School (USAFAS). Due to the nature of their mission, "Deuce-Deuce" fires more than 60,000 rounds annually and continuously conducts "Big-3" and Table V and VI certifications for both howitzers and fire direction centers. Lieutenants serving in the Destroyer Brigade are empowered to integrate with 2-2 FA as they certify their sections and conduct fire missions. All levels of leadership likewise support and encourage efforts to acquire and enhance technical skills and tactical proficiency in MOS core competencies.

When not supporting the training of new Soldiers, lieutenants are given the flexibility for developmental opportunities such as Ranger and Air Assault School and the Expert Soldier Badge.

Additionally, second lieutenants transitioning out of Fort Sill and the 434th FA Brigade do not participate in the marketplace to select their next assignment. Instead, these officers submit their preferences directly to their branch manager and typically receive one of their top three choices. This benefit gives lieutenants more flexibility and autonomy when choosing the type of unit they want to serve in for their first operational assignment.

First lieutenants arriving to the Destroyer Brigade from operational units will likely serve as battery executive officers. The number of executive officer positions in training battalions outnumbers a typical field artillery battalion by almost 50%. The executive officer position allows lieutenants to become experts in the Command Supply Discipline Program (CSDP) and managing resources. The most competent first lieutenants within the brigade can potentially take command of a BCT battery before attending FACCC. This rare opportunity for early command gives senior lieutenants a repetition as a commander and prepares them for an operational command after FACCC. Being stationed at Fort Sill makes the transition to FACCC seamless. As first lieutenants, officers continue to develop perishable leadership skills before re-entering the operational force as a captain.

The training environment of the Destroyer Brigade offers valuable experience to officers

often difficult to gain in an operational unit. Leaders gain a first-hand perspective of what it takes to lead in the Army by developing, training, and transforming civilians into Soldiers. Commissioned officers learn exactly what it takes to become a Soldier and gain a better appreciation of what that means to the people joining our Army and the Soldiers they are charged with leading. This undoubtedly helps them become better leaders as they progress in their careers.

All the positive reasons for lieutenants to serve in the Destroyer Brigade undoubtedly apply to post-CCC captains as well, with some additions. The battery command queue in a typical division or brigade combat team is two to three years. Command in the 434th FA Brigade is no longer than 90 days. This offers captains more flexibility and time after command to seek broadening assignments such as advanced civil schooling, teaching at West Point or reserve officers' training corps (ROTC), or even pursuing the voluntary transfer incentive program to a functional area.

The location of 434th FA on Fort Sill and FCoE offers unique opportunities for pre and post command captains to work for or engage with senior Field Artillery leaders that no other Army installation can provide. In addition to U.S. Army Field Artillery School (USAFAS), directorates on Fort Sill include the Army Multi-Domain Targeting Center, Capabilities Development and Integration Directorate, the Directorate of

Training and Doctrine, and the Long-Range Precision Fires Cross Functional Team.

The predictable, structured environment of the Destroyer Brigade offers company grade officers a unique opportunity for growth. As members of small cadre teams, officers must put leadership competencies into action. Leadership development amongst the cadre is a priority and widely and readily available. Field Artillery Officers assigned to the 434th FA Brigade are given access to schools that operating units often struggle to support. A common misperception is that assignments in training units are not beneficial to junior officers. Assignment to basic combat training offers a unique opportunity for personal and professional development that ultimately produces a better Field Artillery Officer.

LTC Tommy Chae currently serves as the Commander of 1-40th FA, 434th FA Brigade. He is an Armor Officer who has served predominantly in Cavalry formations throughout his 20 years of service. He is scheduled to take command of 3rd Squadron, 1st Security Force Assistance Brigade at Fort Moore, GA in June 2023.

1LT Aubrey Braddock currently serves as Battery Commander for F/1-40th FA. A Mount Morris, NY native, she served over eight years as an enlisted Soldier before commissioning through Officer Candidate School in 2020. She previously served as a Fire Support Officer for B/2-501 PIR and a Fire Direction Officer for C/3-319 AFAR.

1LT Kyle Owens currently serves as Executive Officer for C/1-40th FA. A Baltimore, MA native, 1LT Owens attended Towson University and commissioned through their ROTC program in 2019. He is a Signal Officer branch-detailed Field Artillery. He previously served as a platoon leader at 5-3 FA.



Treadwell Tower is one of the biggest challenges trainees face. The 40-tower is designed to test trainees both mentally and physically. During basic training bonds are forged through shared challenges and relentless teamwork. These lifelong connections become the bedrock of trust and support, shaping Soldiers into a unified and resilient force.

“ATTACK OPERATIONS”



TARGETING *in an* AAWDC

By MAJ Rafael Chico-Lugo

Above: A five-hundred pound bomb detonates on a target an Iraqi Tactical Attack Controller (ITAC) from the Counter Terrorism Services called in during the Phoenix Fires exercise near Al Asad Air Base, Iraq, Oct. 25, 2021. The Phoenix Fires exercise allowed ITAC and Coalition Joint Terminal Attack Controllers to call in air strike during day and night operations. (U.S. Army Photo by Staff SGT Jose A. Torres Jr.)

In December of 2022, the targeting cell from the 32d Army Air & Missile Defense Command (AAMDC) provided weaponeering solutions for a kinetic response in the USCENTCOM AOR that resulted in a strategic facility and associated personnel neutralized. A presumably normal day in the Combined Air and Space Operations Center (CAOC) in Al Udeid Air Base, Qatar started like any other. Day shift targeting analysts (13F) who, after 12 weeks of training courses and six weeks of on-the-job training (OJT), had certified and integrated into Air Force Central Command's (AFCENT's) targeting enterprise on behalf of the 32d AAMDC.

The day started out task-oriented with reviewing if current targets require a refresh of weaponeering solutions and collateral damage estimate (CDE) calls and simultaneously working in intermediate target development building assessments for a refined 32d AAMDC candidate target list (CTL). Suddenly a specific request came down from higher to assist in providing options for a response where a strategic facility and associated personnel were operating. Instantly an expected routine day transformed into one of the busiest of the deployment. Targeting synchronization meetings, product development, systems firing, a hustle and bustle of targeting professionals pouring resources into making this response a reality and 13 series personnel representing the AAMDC were at the center of it all. Thirteen series personnel forming targeting cells at AAMDCs are vital to the execution of attack operations and provide a unique expertise to address a growing theater ballistic missile (TBM) and one-way attack unmanned aerial vehicle (UAV) problem set that is dominating INDOPACOM, EUCOM and USCENTCOM.

The AAMDC mission is to execute Army Theater Air and Missile Defense operational requirements in support of combatant commander's objectives and are postured to provide a rapid global response to plan and conduct operational and strategic level air and missile defense operations to defend critical assets and protect the force.¹ The targeting cells of AAMDCs reside in the Attack Operations function which is one of the four operational elements of theater air and missile

defense² Attack Operations is also the AAMDC's link into offensive counterair operations as the other operational elements focus on the defensive counterair fight (Active Defense, Passive Defense and C4I). The Commanding General primarily maintains three roles: AAMDC Commander, Theater Army Air & Missile Defense Coordinator (TAAMDCORD) and Deputy Area Air Defense Commander (DAADC). As the AAMDC Commander, the CG has total responsibility for active air and missile defense planning within the Army forces. Under the TAAMDCORD hat, the CG synchronizes Army theater-level AMD operations and integrates with upper-tier and lower-tier AMD elements in support of the JFLCC. As the DAADC, the AAMDC CG will assist the Area Air Defense Commander (AADC) in refining the area air defense plan, advice on fire control orders, airspace coordination measures and air defense warnings and integration of AMD operations. In relation to the AADC, the AAMDC has a direct support function to the JFACC in this regard. Attack operations, as the AAMDC's bridge to offensive fires, has specified tasks to include: input to target nomination process, assisting in target definition and target development to name a few. For the AAMDC and its subordinate Air Defense Artillery units to execute its joint air and missile defense tasks it must have an advocate to alleviate the burden of threats to its function. Threats like air-breathing threats and ballistic missiles can be mitigated to ensure the prolonged survivability of air defense forces. This can be managed by a process that is designed to select and prioritize targets and matching the appropriate response to them, considering operational requirements and capabilities³ i.e. targeting. From an operations perspective, the proponent for targeting for the Army that performs the targeting process and utilizes joint fires in multi-domain operations to shape the behavior of hostile entities in pursuit of tactical and operational objectives is the 13 series branch.

Targeting on behalf of an AAMDC is probably not where many would think to see 13 series Soldiers. Field Artillery professionals who participate in targeting spend the majority of their time in maneuver echelons, Field Artillery

1 ATP 3-01.94, Army Air & Missile Defense Command Operations, April 2016

2 Ibid.

3 JP 3-60, Joint Targeting SEP 2018

Brigades and fires cells. The urgent operational need of 1991's Operation Desert Storm was encouraged by the challenge of neutralizing Iraqi SCUD missiles and alleviating the burden on the air defense force that was responsible for intercepting threats and defending critical assets along with the joint force. The doctrinal approach that ensued for identifying a process to defend the force against ballistic missile attacks fell into the realm of Offensive Counter-Air operations (OCA). Offensive Counter-Air operations are meant to destroy, disrupt or neutralize, enemy aircraft, missiles, launch platforms and their supporting structures and systems both before and after launch, but as close to their source as possible.⁴ To get after the tasks identified in OCA, Attack Operations included all actions and operations that defeated air and missile threats which include: assisting in target definition, target development, ISR recommendations and options in re-attack strategies for air-breathing threats, ballistic missiles and most recently group III and above uncrewed aerial vehicles (UAV).⁵

Arguments opposing maintaining 13 series Soldiers in AAMDCs primarily center on three specific points:

1.) The targeting proficiency for air-breathing threats (ABT) and ballistic missiles are a duplicated effort with the abundance of targeting cells at component commands, combatant commands and other agencies.

2.) 13 series were designed to provide effects in support of maneuver efforts.⁶

3.) Air defense commands do not utilize the MOS properly which results in a mismanagement of the targeting capability that can be better utilized elsewhere.

Concerning the first and second argument, fires cells that execute the targeting process reside in every echelon of the Army organization from Company through Corps, Component and

Combatant Command levels. The development of operational and theater fires commands further replicates the capability with 13 series personnel boasting a wealth of tactical and technical expertise. Should an AAMDC require targeting support, it can be requested, tasked and sourced from organizations with the expertise. The third argument references using a capability that is predominantly executed in offensive operations in an inherently defensive-minded echelon. In years past, 13 series personnel would hold positions other than those they were designed and trained for, further bolstering the perspective that the mismanagement of an MOS with a highly sought-after expertise is a waste of a capability and demonstrates the lack of applicability to an organization such as an Army Air & Missile Defense Command.

While there is room to debate arguments surrounding duplicated capabilities and the purpose of 13 series in AAMDCs, the argument fails to address the expertise gained by maintaining 13 series personnel that focus the joint targeting process on TBM-related and UAV target systems. These specific target systems are an inherent concern in offensive counterair operations. These target systems are also the primary threat to ground-based air and missile defense (GBAD) units that defend critical assets and joint forces. For GBAD units, that perform a direct support relationship to the air component, to continue to focus their efforts on active defense they must maintain an organic capability that ensures a bridge into OCA. Closer integration of 13 series, not segregation, is required to effectively address the operational needs of an AAMDC in its OCA role. This is done through the targeting process with 13 series leading to influence target development and nomination for response options against the associated threats. This guarantees the AAMDC and its subordinate GBAD units can focus on defending forces and critical assets while alleviating the burden of overmatch by attriting the threats left of launch. Naturally, 13 series MOS are predominantly assigned to support maneuver forces so being mis-utilized at an AAMDC can be a concern. This argument has merit to a certain extent as, in some cases, AAMDCs will receive inexperienced

⁴ JP 3-01, Countering Air and Missile Threats, April 2017

⁵ ATP 3-01.94 Army Air & Missile Defense Command Operations, April 2016

⁶ ATP 3-09.30, Observed Fires, SEP 2017

Within 24 hours, the identified facility carrying a target set that coincidentally met criteria with AAMDC attack operations guidance and associated personnel were neutralized.

Soldiers and leaders without an abundance of a targeting background. The ramifications of segregating the 13 series professionals from the AAMDC HQs is a loss of one of the operational elements of theater air and missile defense and a loss of integration in offensive counter air. In the case of 32d AAMDC that is not the case as the leadership and targeting cell has a history of actively participating in some degree of attack operations, especially in a deployed environment.

To aid in the proper placement and utilization, targeting professionals will execute a plan during the initial phases of their AAMDC assignment with courses centered on: Joint Air Operations Command and Control (JAOC2C), Joint Targeting Courses, Intermediate Munitions Effect Assessment (IMEA), Target Material Production (TMP), Weaponing, CDE and Joint Intermediate Target Development (JITD). By nature of AAMDC's operating as an echelon above Corps organizations, the associated targeting proficiencies within the Attack Operation cells are elevated and require access to joint courses and certifications. Focusing on the 32d AAMDC, the largest Army Air & Missile Defense Command in the world, the AOR focus is USCENTCOM where much of the numbered operations plans (OPLAN) are exclusively centered on the Middle East and its associated problem sets. This problem set created a sense of urgency to provide resources to the 13 series assigned to the 32d AAMDC as the headquarters maintains a forward deployed presence 365 days of the year. Much of the 3rd QTR FY 21 through 1ST QTR FY 23 focused on lines of effort with invigorating an inexperienced team with 13F Soldiers right out of advanced individual training (AIT) through a program that mixed targeting courses and training opportunities fixated on understanding joint operations, numbered OPLANs and doctrine. All with the intent of operationalizing the targeting cell to perform, to some degree, the attack operations function in a deployed environment. TDY's to the forward deployed

staff of 32d AAMDC in the CAOC helped to solidify federated targeting support between AFCENT ISR department and targeting flight with an OJT for the team resulting in the relationship solidified in a memorandum of understanding (MOU). With this recent success in mind, we believe that 13 series personnel that comprise targeting cells in AAMDCs provide a vital and highly prized expertise for attack operations in OCA to focus on TBM and UAV related systems and bridge the gap between OCA and DCA for the AAMDC on areas of responsibility.

After 24 hours of providing intermediate target development assessments, numerous weaponing solutions, CDE calls and precision point mensuration, a product was submitted to higher. Within 24 hours the identified facility carrying a target set that coincidentally met criteria with AAMDC attack operations guidance and associated personnel were neutralized. Eighteen months prior the 32d AAMDC targeting cell had little to no applicable experience and only carried credibility from its Chief of Targeting who was a Major. Now there is an established program, qualified and certified targeting analysts and 13 series professionals that have performed the attack operations function in an operational deployment with effects. All of which could not have been done without the support of the AAMDC and the air component. What started as a normal day concluded with an immense amount of job satisfaction...Attack Operations realized!

MAJ Rafael Chico-Lugo received a B.S. in Interdisciplinary Studies and commissioned as a Field Artillery Officer from Norfolk State University. He also received an M.A. in International Relations from St. Mary's University and a PhD in Organizational Development and Leadership from The University of Arizona Global Campus. Additionally, MAJ Chico-Lugo has numerous targeting qualifications from joint courses and experience in joint operations working through component and combatant commands. MAJ Chico-Lugo has operational experience in Operation Enduring Freedom and Operation Spartan Shield and currently serves as the Chief of Targeting for the 32d Army Air & Missile Defense Command (AAMDC).



INFORMATION DOMINANCE:
FUTURE TARGETING
AT THE
TACTICAL EDGE OF BATTLE

By CW2 Frank Gagliardo

One of the greatest needs of the U.S. Army right now is a method for collecting, managing, protecting, and making available the vast amounts of data required for effective decision-making. The Department of Defense (DoD) can solve this problem by investing in, developing, and implementing a data fabric for the Army's tactical level. Data fabric is the concept of a centralized data structure that streamlines the sharing and integration of data across systems, allowing access to the correct information at the right time (Feinberg et al, 2020). The U.S. Army needs an efficient data analysis and distribution system but instead uses many independent systems that lack interoperability. Systems that cannot effectively share information result in the inefficient application of mission command and targeting.

Future conflict with peer threats will have greater focus in the virtual domain than ever before. The U.S. Army has benefitted from a technological advantage during the counterinsurgency (COIN) conflicts of the last 20 years. Now, the Army faces a potential lack of information dominance against peer threats during Large-Scale Combat Operations (LSCO). Breaking down information dominance into two general categories involves actively denying the enemy's ability to communicate effectively and proactively enhancing our communication. The focus of this paper will discuss the latter.

Illustrations created with A.I. software.

An effective targeting process requires the correct information reaches the right person promptly before deciding what effects to apply to the target. In the future, a data fabric system will revolutionize targeting at the tactical echelon by providing decision-makers with an accessible and comprehensive view of relevant data, increasing situational awareness, and optimizing resource management. General McConville, Army Chief of Staff, stated, “Overmatch will come to the side that can make better decisions faster...”. (Army, 2021b). A properly designed data fabric will give the U.S. Army tactical overmatch. The following analysis will define data fabric and provide examples of successful applications in businesses, analyze the Army’s current tactical data structure, describe the DoD’s data fabric initiative and discuss how this initiative will enhance decision-making and targeting efforts.

DATA FABRIC DEFINED AND SUCCESS IN CIVILIAN ORGANIZATIONS

Data fabric is not just a concept of the future. There are many major organizations and businesses effectively applying this technology today. Businesses use data fabric to seamlessly connect data across different sources, formats, and locations. “A data fabric is an architecture and set of data services that provide consistent capabilities across a range of endpoints spanning on-premises and cloud-based data sources” (Feinberg et al, 2020). The use of data fabric in business is gaining popularity as organizations seek to improve their data management capabilities. Data fabric provides several benefits to businesses, such as data integration, real-time data access, data governance, scalability, and cost savings (Feinberg et al., 2020). Data integration connects multiple sources from various formats, making it easier to access and analyze. Real-time data access allows personnel to access data anytime, thus enabling quick and informed decision-making. Data governance is crucial to providing security, privacy, and compliance framework. Scalability provides room for growth and the ability to manage more data. Lastly, cost savings are a long-term benefit because it eliminates the need for multiple data management tools.

One example of data fabric used in business

today is the Banco Bilbao Vizcaya Argentaria (BBVA) bank. BBVA implemented a data fabric platform that enables the bank to integrate and manage its data from various sources. According to BBVA, the data fabric platform has helped the bank to “improve data quality, reduce the time required to integrate data, and increase the speed and accuracy of data analysis” (BBVA, 2021). The healthcare industry also actively utilizes data fabric in managing and analyzing medical data. Anthem, a healthcare provider, began using a data fabric platform to integrate and manage its data, such as electronic health records, claims data, and pharmacy data. (Anthem, 2021). These are just two examples of how data fabric is being effectively used by businesses today. Military application of a data fabric system like these will directly contribute to more effective targeting through greater efficiency of data management. The way Anthem has improved efficiency in managing records can be applied, for example, to compartmentalizing vast amounts of sensitive targeting data on specific targets. Currently, this data is shared across a number of systems and programs. Often users must transfer data manually which is time consuming. With a data fabric system, the need for emailing and manually databasing this type of data would be a thing of the past. Data would rapidly be ingested into a database from another, which operators would access through a common mission command system.

U.S. ARMY CURRENT STATE OF DATA ARCHITECTURE

The complexity of the battlefield changes drastically as current adversaries become more technologically advanced. Future LSCO will be faster-paced and more lethal than ever before, making it crucial that tactical Army leaders make timely decisions of sound judgment. In the current tactical command post (CP) structure, there needs to be more efficiency in sharing data across systems of record. For example, the joint air ground integration center (JAGIC) is the current operations center for the Army’s tactical divisions. Here, subject matter experts from each warfighting function utilize their respective systems of record to track and share data to execute the commander’s plan. The JAGIC

links the brigade's close fight and the division's deep fight. The problem is that information shared between echelons does not go through a standard tactical system of record. Soldiers and leaders often send critical information through chat services and email. Exchanging information this way takes the operator time to manually input data and wait, leaving them disconnected from other tasks. In one example, a study found that using chat in a military exercise increased cognitive workload and decreased situational

Coordination System (JADOCs) user subscribes to the DDS and populates air tracks from a Tactical Airspace Integration System (TAIS). JADOCs will continuously display all published air tracks until it terminates the subscription. Some of these air tracks may be outside the division's area of operations and are irrelevant to the user. This extra data requires an operator to "sift" through information and strains the system's processing speed. The operator loses precious minutes by having to identify the correct piece

DATA FABRIC: IN SIMPLEST TERMS, A DATA FABRIC IS A SINGLE ENVIRONMENT CONSISTING OF A UNIFIED ARCHITECTURE AND SERVICES OR TECHNOLOGIES RUNNING ON THAT ARCHITECTURE, THAT HELPS ORGANIZATIONS MANAGE THEIR DATA. THE ULTIMATE GOAL OF DATA FABRIC IS TO MAXIMIZE THE VALUE OF YOUR DATA AND ACCELERATE DIGITAL TRANSFORMATION.

awareness among participants (Knott, B. n.d.). Therefore, while tactical chat and email can be valuable tools for communication in the military, their effectiveness and efficiency are not optimized in a tactical environment.

Another misunderstood system is the Data Distribution Service (DDS). The DDS enables data communication between various systems. This information exchange is essential between tactical Army command posts (CPs), where different devices and systems must communicate seamlessly (Pandya, 2021). A common misconception is that the DDS can solve the Army's data-sharing problem because it links many systems through data, but only partially solves it. This system employs a publish-subscribe model, which publishes data via a mission command system, and users can subscribe to pull the data into their mission command system. This process is a step in the right direction but has two distinct drawbacks. The subscribing system must still understand the data; for example, MIL-STD 2525 graphics are standard tactical graphics used to create a shared understanding of units, missions, and objectives. If the system subscribing to data does not recognize the information, it will not populate correctly. Additionally, the sorting of data is an issue. Often the subscribing system populates everything published by another system in a particular category. For example, suppose a Joint Automated Deep Operations

of data they need to complete the task, in this case, integrating an attack from an aerial asset while executing surface-to-surface fires. While conducting dynamic targeting, every second counts and the window of opportunity to achieve the desired effect on a target may be lost. As this example shows, streamlining retrieval of and displaying the correct data impacts the ability to conduct dynamic targeting at the tactical level.

THE FUTURE OF INFORMATION-ENABLED TACTICAL TARGETING

To combat the issue described above, the DoD has begun investing in and developing its data fabric for the future. The Joint All-Domain Command and Control (JADC2) concept integrates information interoperability across all warfare domains: land, air, sea, space, and cyberspace (Department of Defense, 2021). The JADC2 system facilitates deliberate and dynamic targeting by furnishing up-to-date and precise data to all networked users, empowering them to use it for planning and executing current operations. Specifically, the JADC2 system will connect sensors, systems, and leaders across all domains, enabling faster decision-making and improved mission outcomes (Joint Staff, 2020). It relies on advanced technologies such as artificial intelligence (AI), machine learning (ML), and advanced networking and communications to ensure the seamless sharing of information across

different domains and platforms (DoD, 2020). The DoD is developing a data fabric as part of JADC2 that will integrate and analyze data from multiple sources in near real-time, improving situational awareness and decision-making (DoD, 2021). Computing this data will also require a common data architecture, including standardized data models, to ensure that data can be easily shared and used by different systems and applications (Joint Staff, 2020). Not having a common data architecture relates to the previous example of the DDS subscribing system not being able to display data from another system correctly. JADC2's common data architecture will eliminate this issue and create a digital environment with the most accurate data, a necessary component of applying lethal and non-lethal effects to enemy systems.

The tactical commander's targeting process will be just one, albeit critical, area that benefits from a data fabric like JADC2. The Army's targeting methodology of decide, detect, deliver, assess (D3A) combines analysis from all staff members at tactical echelons from brigade to corps. This process enables leaders to present the commander with decisions to allocate his limited resources and prioritize lethal and non-lethal effects on the right enemy system at the right time. This targeting process is ongoing, and feeds directly to the joint force's joint targeting cycle. JADC2 will connect these physically separate headquarters seamlessly, allowing them to share targeting efforts and coordinate for support in near real-time. Another benefit is eliminating the need to continue using email and chat services for coordination, saving the most precious resource, time. There may be no greater force multiplier than a data hub between tactical echelons that can provide commanders with the shared understanding required to make timely and accurate decisions.

CONCLUSION

U.S. Army tactical formations are in a technological arms race before the next major conflict. The data fabric architecture and concept of JADC2 will harmonize the many Army mission command systems and give tactical leaders the edge in information dominance. Data fabric will revolutionize tactical targeting in the future by

providing decision-makers with an accessible and comprehensive view of relevant data, increasing situational awareness, and optimizing resource management. The DoD must prioritize investments and research in the JADC2 concept to build a data fabric that gives Army tactical formations information overmatch against the nation's future enemies.

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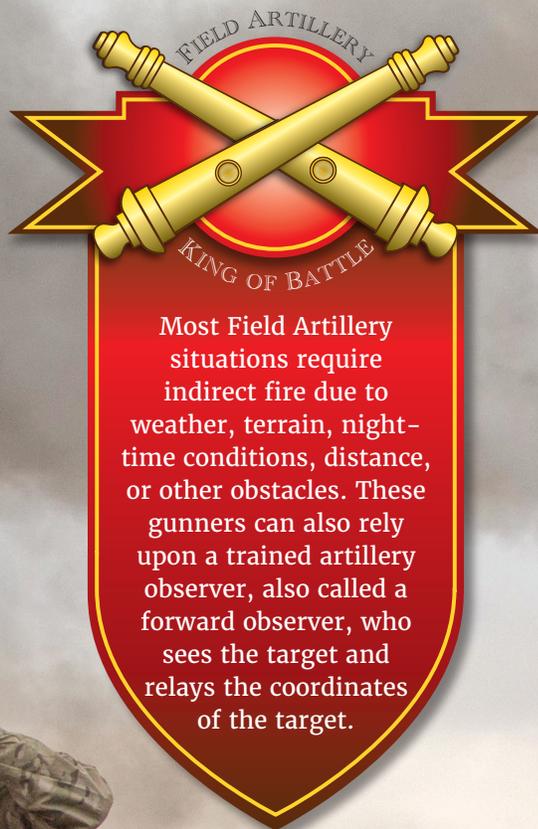
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Most Field Artillery situations require indirect fire due to weather, terrain, night-time conditions, distance, or other obstacles. These gunners can also rely upon a trained artillery observer, also called a forward observer, who sees the target and relays the coordinates of the target.





U.S. Soldiers assigned to Charlie Battery, 1st Battalion, 320th Field Artillery Regiment, 2nd Brigade Combat Team, 101st Airborne Division fire a M777 A2 Howitzer in support of Operation Inherent Resolve at Platoon Assembly Area 14, Iraq, Dec. 1, 2016. The United States stands with a global Coalition of more than 60 international partners to assist and support the Iraqi security forces to degrade and defeat ISIL. (U.S. Army photo by SPC Christopher Brecht)

Impacts of Fleeting Up

By COL Tom Goettke and CSM Freddie Thompson

Across the Army, units are experiencing leadership shortages at the non-commissioned officer (NCO) level.

This reality forces junior leaders to “fleet up,” assuming roles where they lack training and experience. In a tactical unit, a junior NCO filling the role of a more senior NCO is the most prevalent example of “fleeting up.” The current state of manning among the Field Artillery alone shows shortages across the 13F, 13B, and 13J career fields. Additionally, the branch shortage among 13B10 exceeds 2,400 in the last year alone. The Army falling short of its recruiting goal in 2022 will further exacerbate the problem in the years to come. How do company, battery and troop units manage this problem? How do battalions support the C/B/T level and still meet the training expectations? A refined appreciation of time in conducting unit training management is the most important factor in leading junior leaders to success with a manning shortfall.

Time is life's most precious resource – there will never be enough of it, especially at the low tactical level.

As a battalion commander for 3–6 FA, 1 BCT, 10th Mountain Division, I seriously overlooked this problem. As I built out a training path for a composite battalion, I purposefully inserted healthy recovery windows as I knew intense training would break equipment. My frustration grew as the unit continually fell short of established recovery timelines and goals. As this repeatedly occurred, my command sergeant major (CSM) and I thoroughly analyzed our processes to see what we had not accounted for in planning. At the outset of the training path, 13 of our 18 section chiefs held the rank of sergeant (SGT). We failed to envision potential contingencies associated with this crop of junior leaders. After much analysis, we were missing critical recovery gates because we were expecting junior leaders to perform at the level of the more senior roles they were filling. Ultimately, the short-term changes we made to account for junior leaders to get it right disrupted the training path and negatively cascaded throughout the unit.

Time is life's most precious resource – there will never be enough of it, especially at the low tactical level. Unit leaders must invest in a deeper analysis of training time when subordinate leaders are asked to step into more senior roles. The practical application of this analysis results in additional preparation time or extended training time to account for inexperience.

In the context of a training progression, one way to account for time is to take number of tasks expected of a junior leader and compare it to their current level of competency. For example, a 13B20 is expected to master 62 tasks, but imagine that same 13B20 filling a 13B30 billet. The expectation of an NCO in a 13B30 billet is to master 91 tasks, an increase of 47%. It's a safe assumption that leaders don't allocate an additional 47% of time for the young NCOs to develop and master the 13B30 tasks, but who pays the time bill? There are other alternative mitigating actions leadership can take to address this gap, but those also cost time. The disparity can be shown in a calculation in *Figure 1, bottom of page*.

The end result of this kind of analysis equates to training days at the battalion and battery level. What a seasoned staff sergeant (SSG) section chief could do in five days may take a new SGT section chief seven days based on level of experience and depth at the associated task volume. The lens of task volume introduces a level of reality to unit training management and will grow the next generation of NCOs to become masters of their craft. Unit leadership owes them that opportunity. *See Figure 2, next page.*

Training is only one component of being a small unit leader. A role as critical as section chief demands a healthy complement of life experience for success. As a first line supervisor,

Figure 1.

13 Series skill level tasks			
MOS/Skill Level	20 Level	30 Level	40 Level
13B	62 Tasks	91 Tasks	111 Tasks
13F	39 Tasks	59 Tasks	76 Tasks
13J	45 Tasks	103 Tasks	118 Tasks

Appreciation of Time:

DIVARTY's Redbook refinement will include training time guidance for leaders fleeing up

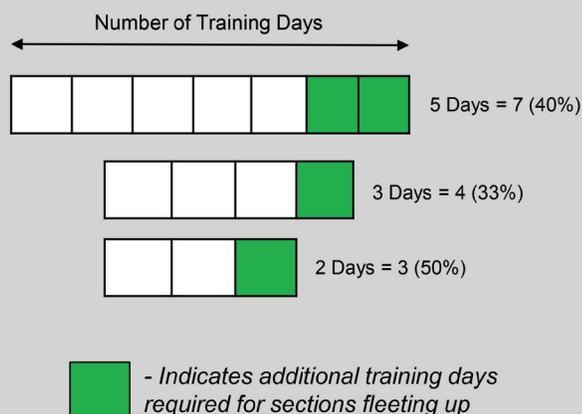


Figure 2.

there are extensive intangible expectations to take care of Soldiers. There is no guarantee that a young 23-year-old SGT can conduct the simplest of leader tasks like formal counseling their Soldiers. Now consider that 23-year-old SGT counseling a married 19-year-old private first class (PFC) with an infant. What life experience prepares them for that? They will only achieve success with the assistance of more senior NCOs. Dedicated investment in time and professional development on how to care for Soldiers is a necessary compliment to achieve success in unit training management.

Leaders at all levels must be aware of the actions and milestones that provide the experience to junior leaders during their development. NCOs in the rank of corporal thru staff sergeant provide the most influence on initial entry and junior enlisted Soldiers. As an organization, leaders should see this as a form of imprinting. Training Soldiers the correct way, regardless of the pace of initial progress, will sow the seeds for future success.

As a readiness parallel, the Center for Army Lessons Learned recently published a manual from the People First Task Force

titled *The Integration of People and Training: Considerations and Concepts*. This manual introduced the concept of a calibrated “P” which weights the impact of ‘missing’ NCOs in a formation based on their seniority to gage impact on a unit. While the calibrated “P” was an alternative way of looking at the personnel portion of a unit status report, a similar principle applies. The more senior the missing NCO is in a formation, the greater the impact on a unit. A missing platoon sergeant causes the gunnery sergeant to assume the role, subsequently causing a senior section chief to become the gunnery sergeant and another junior NCO to step up as section chief. How does a unit gain an appreciation of time in this instance? What tailored professional development can leaders design for a unit experiencing this turbulence? Units experiencing “fleeing up” at echelon must appropriately tailor their appreciation of time to desired training outcomes. Again, these desired outcomes may not solely reside in the training arena.

As a first sergeant and battalion CSM, I often address importance of a Soldiers’ “first” section chief or squad leader in my mentoring forums. A Soldiers’ first impression or interaction often lays the foundation for Soldier performance and success. However, before reaping the long-term benefits of an impressionable junior leader, a unit must invest time to develop that leader.

Failure to appreciate time on the front end of a training path increases the chances of in-stride changes to training that will disrupt the unit and achieve a less favorable outcome. The expectations that we place on our young leaders to be coaches, trainers, and mentors will never go away. A focus on protecting a junior leader’s time while they cultivate their skill set can be achieved through proper unit training management and patience with junior leaders working one or two levels up. There is no better return on investment than devoting time to junior leader development. A healthy appreciation for time on the front end of a training path reaps benefits in the form of better trained sections and platoons, more competent NCOs, and an accurate training pace.

COL Tom Goettke and CSM Freddie Thompson are the current 10th Mountain DIVARTY Command team.

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**TODAY'S ARMY IS MUCH LESS ABOUT
THE KNOWLEDGE YOU HAVE SO MUCH
AS THE POTENTIAL OF KNOWLEDGE
THAT YOU CAN BUILD.**

FA Task Organization *for* LSCO

By COL (Ret) Greg Lankford

The U.S. Army's Field Artillery is starting another massive shift in how it is organized in order to address the needs of Large-Scale Combat Operations (LSCO). The designation of the division as the unit of action and the reemergence of the corps as tactical headquarters is driving much of this change. Division Artilleries (DIVARTYs) are coming back into the forefront in active component (AC) formations and now, thankfully, also in the National Guard (NG) divisions. There is also an effort to reestablish an Operational Fires Command (OFC) at the corps level. I say reestablish because while an OFC may not end up structured exactly like a Corps Artillery (Corps Arty) of old, it should, ultimately, serve the same core purpose. Corps and divisions fight with Fires, and in that vein, having a dedicated, organic Force Field Artillery Headquarters (FFAHQ) with a fire support coordinator (FSCOORD) in both of these echelons is paramount to their successful planning and execution of decisive Fires.

So how did the corps and divisions fight prior to modularity? That is the questions our current leaders should be asking because the methods used were developed over decades of lessons learned and actual LSCO in Operation Desert Storm. This body of knowledge culminated with FM 3-09.22 Tactics, Techniques, and Procedures for Corps Artillery, Division Artillery, and Field Artillery Brigade Operations (MAR 2001). This doctrine clearly articulated how we fought with Fires at echelon before the shift to modularity. Now is the time to dust off some of these older, but thoroughly tested approaches to FA Task Org for LSCO to use as a foundation as we begin to rebuild the Fires structures at the corps and division levels.

Basic principles of FA Task Org for Combat in Support of LSCO

The base of this foundation were the principles of fire support planning known as AWIFM. The concepts behind AWIFM served as the basis for planning FA Task Org for combat through the mid-2000s. The "N" was added to become AWIFM-N in 2020 for the updated FM 3-09 to

codify in doctrine what was always stated, but never printed: we never leave artillery in reserve. Here's the basic premise for each letter as it relates to FA task org for combat:

1. Adequate Fire Support for committed units: Every echelon from the theater to the corps to the divisions to individual brigades are task organized with enough Fires assets to successfully accomplish their respective missions. This implies that the higher HQ at each echelon is allocated the amount of FA structure required to meet not only their needs, but also the assets needed by all of their subordinate units.

2. Weight to the Main Effort (ME): Aligning additional FA units to a formation is the quickest way to multiply their combat power to achieve proper force ratios. The weight (entire FA formations) will rapidly shift their alignment from one formation to another when the ME changes. This flexibility enables commanders to maximize the use of their limited FA assets where and when they are needed most. The preferred command support relationship for assets supporting the ME is reinforcing (R) since units in general support reinforcing (GSR) and general support (GS) are not providing their full weight to the subordinate ME.

3. Immediately available Fire Support: Support relationships, priority of fires, proper battlefield geometry and unit positioning, and integrated communications nets are required at echelon to facilitate timely fires. Direct support (DS) and reinforcing (R) are the most responsive at the brigade level. GS provides more flexibility for Fires supporting the division and corps levels. GSR is typically only used when there are not enough FA assets to directly reinforce a subordinate command since it is less responsive to the reinforced unit.

4. Facilitate future operations: Planning for future operations is critical when shifting Field Artillery battalions or entire FABs between commands to ensure that supporting FA assets are in the right place with the right ammunition at the right time.

Positioning guidance, ammunition allocations and restrictions, pre-established comms networks and on order missions typically factor into this planning.

5. Maximum feasible centralized control: Centralized control makes clearing and massing Fires at echelon faster and is the preferred approach up to the highest level that makes sense taking the situation and span of control limitations into account. These factors must be considered though because centralization can become detrimental to their subordinate commands or to the counterfire fight if FA assets are held at too high of a level to be effective (not immediately available).

6. Never place artillery in reserve: Having a finite number of FA assets available and more targets than can be serviced in LSCO environments means no tube or launcher can afford to be left idle or not tasked. If the adequate level of FA assets required by a maneuver unit is reduced (placed in reserve or FS not required based on their mission type), then the FA assets typically allocated to them can be shifted to provide additional weight to the ME.

The Building Blocks of FA Task Org for LSCO

How the Corps Artys, DIVARTYs and Field Artillery Brigades (FABs) worked in concert with one another and fought within their respective AOs has become somewhat of a lost art. We had to rely on Fires Brigades (FiBs)/FABs to fill all these roles during modularity which forced us to use them in ways they were not originally intended. Independent FABs are quickly coming back, so now is the time to relearn these roles before decisions are made that could jeopardize their function and value for future LSCO.

The Corps Artillery

The Corps Arty served as both the FFAHQ for the corps and as such, shapes to set conditions for their subordinate divisions and recommends the FA task org needed to resource their divisions with the Fires assets they require to accomplish their assigned missions. Corps Artys in the past had no truly organic FABs or sustainment support structure, but they did have multiple FABs habitually aligned with them that would be attached to the corps upon deployment for LSCO

based on mission requirements (adequate FS). These FABs provided the corps, as a whole, with the Fires assets they needed to support the entire corps operation. After the initial, operational-level preparatory Fires are complete, the need for rocket assets rapidly shift from the corps to their divisions so the corps would then further task-organize most (if not all) of the FABs in their entirety to their divisions. Since the divisions owned very few, if any, organic long-range platforms in which to conduct the division fight, corps allocated at least one, full reinforcing FAB to every committed division. Additionally, the corps ME division might have two reinforcing FABs. This may sound outrageous to those unfamiliar with how Field Artillery was previously task organized for LSCO, but this was considered “adequate” firepower for a division in an environment where a peer/near-peer often outgunned us. The corps didn’t need to retain much FA support since their fight was focused from the division forward boundary (often co-located with the fire support coordination line or FSCL) to the corps’ forward boundary. This means that the corps is fighting in an area where they do not control air space and the ranges to targets in that deep area can, today, only be reached by Army Tactical Missile Systems (ATACMS), joint assets, larger classes of unmanned aerial vehicles (UAVs) and potentially AH-64s (depending on the depth of the division forward boundary). As such, the corps didn’t need much support in terms of dedicated surface-to-surface firing assets based on what will almost certainly be a highly restrictive controlled supply rate (CSR) for missiles. The corps could task a platoon of High Mobility Artillery Rocket Systems (HIMARS) to service the handful of missile shots that they are allocated daily and do not need to tie up entire rocket battalions or FABs to support their fight. Holding rocket battalions as GS or GSR at the corps level makes them less responsive to the divisions since they’ll flood the corps’ fire support element (FSE) with all their requests, violating the Fire Support Principle of Immediately Available Fires. Granted, the number of launchers retained for use at the corps level may need to increase somewhat in the future as Precision Strike Missiles (PrSM) and Global Positioning System Multiple Launch Rocket System-Extended Range (GMLRS-ER) come online in larger quantities, but even then, it is likely that a single 9-launcher HIMARS battery could manage the daily mission load for the corps based on where and how they should be shaping in their deep area.

Likewise, the discussion about the corps counterfire fight is counterproductive. Since the corps' focus is beyond the division forward boundary, our radars may not be effective at the ranges required and even if they are, the time of flight for munitions and time required to clear the air above the coordinating altitude and beyond the FSCl are not conducive to reactionary counterfire based on the enemy's rapid displacement times. Furthermore, one centralized corps Counterfire HQ (CFHQ) would be unable to effectively manage the 20-40 Q-53 radars in the corps area of operations (AO), and they would severely struggle to communicate with all these radars across an entire corps front based on the limited range of their frequency modulation (FM) comms. Even if they could control and communicate with all the weapons locating radars (WLRs), a significant span of control issue would overwhelm the corps' CFHQ with a flood of acquisitions almost immediately thus violating the Fire Support Principle of Maximum FEASIBLE Centralized Control. Ultimately, the corps counterfire fight should be focused on proactive fires against long-range FS assets in their deep area. Quite frankly, this is just part of the corps' targeting process and the OFC should be leveraging mostly UAVs and joint assets to fulfill that mission.

The Division Artillery

The DIVARTY serves as the FFAHQ for the division and in that role, shapes to set conditions for their subordinate brigades and resources the brigades with the Fires assets they need to successfully accomplish their missions. Direct support (DS) FA cannon battalions were organic to the DIVARTY, but these assets were designed to support maneuver brigades out to their forward boundaries and would be task organized down to them as their missions required. The centralized tasking of these cannon battalions provided the division with the flexibility to ensure that their brigades had adequate fire support and added weight to the main effort, but the cannons lacked the range, firepower and sufficient numbers to support all of the division's requirements. Despite some heavy divisions having an organic 3x6 launcher multiple launch rocket system (MLRS) battalion in the past², the DIVARTY still didn't have sufficient long-range assets to fight the division deep and counterfire fights throughout the depth of the division AO and relied

on additional fires assets being task organized from the corps to meet the division's requirements for "adequate" fire support.

The DIVARTY was responsible for the counterfire fight from the forward line of own troops (FLOT) out to the division forward boundary, but this task was typically assigned to a reinforcing FAB so the DIVARTY could focus on shaping the division deep area and supporting the close fight. The reinforcing FAB would retain one of their rocket battalions under their control as the designated counterfire shooter for the division. Based on the FSCOORDs recommended FA Task Org for Combat, the DIVARTY would typically control the remaining rocket battalion(s) from the reinforcing FAB(s) to support the division's deep fight. Divisions almost always employed rocket battalions in a GS role at the division level. Still, they could provide rocket fires to the maneuver brigades if requested and justified. DIVARTY used the 8" cannon battalions from the FAB at the division level (GS), but they could also provide additional R or GSR fires for maneuver brigades for specific phases. This is the same role (longer-range, GS cannon artillery brought to a division as part of a FAB) that Extended Range Cannon Artillery (ERCA) could perform once operational. Similarly, standard 155mm echelon above brigade (EAB) cannon battalions from the FAB(s) were task-organized down to the maneuver brigades in reinforcing roles to the DS cannon battalions. This was the method used to ensure that the maneuver brigades had adequate Fire Support for their missions and was also a means to add weight to the ME at the brigade level. The EAB cannon battalions could be task organized back under centralized DIVARTY control (GS or GSR) for specific, key events such as division-sized wet gap crossings, breaches, or other missions that required highly synchronized, massed fires.

The Field Artillery Brigade

FABs were force multipliers that were task organized to ensure every echelon from corps to brigade had adequate Fire Support for their mission and were also used to add weight to the ME. Since the Army could not afford to organically equip every corps and division with all of the FA structure that they need for LSCO, FABs became the flexible alternative to fill those gaps on an "as needed" basis. As a result, the FABs primary role

was to reinforce divisions to provide them with the long-range assets the divisions desperately needed for the division deep and counterfire fights and to provide additional cannon battalions to augment the close fight at the brigade level. Entire FABs would be pushed from the corps to their divisions for this purpose since a full FAB could provide a division with all the FA assets they don't own organically but need for LSCO. FABs were not typically piecemealed into individual battalions unless there were not enough FABs to support all the committed divisions.

In the reinforcing role, the FAB HQ was commonly designated as the division's CFHQ. As the CFHQ, the FAB managed all the long-range WLRs across the division and executed the counterfire fight with one of their organic rocket battalions as the designated counterfire shooter. This arrangement provided a brigade-sized HQ solely focused on accomplishing this one critical, non-stop task with all the assets required to perform this mission throughout the entire division AO from the FLOT to the division forward boundary. Centralizing counterfire at the division level was highly advantageous because it was feasible at this level, it created a clean sensor-to-shooter chain where the bulk of reactive counterfire fight occurs (short of the FSCL in division-controlled ground and air), and it freed the DS cannon battalions to completely focus on supporting the maneuver brigades' close fight. Furthermore, MLRS ability to rapidly lay down huge volumes of fire on large area targets deeper than cannons made it the weapon of choice for the counterfire fight.

National Guard FABs are ideally suited to reinforce divisions since they are currently the only FABs with EAB cannon battalions (ten Paladin and seven M777 battalions in eight FABs). The National Guard's redistribution of EAB cannon and rocket battalions across the NG FABs in the 2015/16 timeframe was done intentionally to provide divisions with as equal of a rocket/cannon mix as possible in the form of rapidly deployable, complete FAB "packages." Most of the National Guard FABs have two rocket and two EAB cannon battalions along with a brigade support battalion (BSB) and a signal company—the minimum, adequate Fire Support required by a division for LSCO. For historical context, two National Guard FABs were mobilized to support Desert Storm (one attached to each U.S. Army

corps, both were tasked to support divisions) and two National Guard FABs were also mobilized to reinforce active component divisions for Operation Iraqi Freedom 1 (OIF1) in 2003. The vast majority of the Army's GS artillery is found in NG FABs which habitually trained with AC and NG divisions prior to modularity and most commonly as their CFHQ during warfighter exercises.

Current National Guard Field Artillery Brigade alignments

								
Field Artillery Brigade	169th FAB (CO)	65th FAB (UT)	115th FAB (WY)	197th FAB (NH)	45th FAB (OK)	138th FAB (KY)	142nd FAB (AR)	130th FAB (KS)
HIMARS	3-157 (CO)	5-113 (NC)	2-300 (WY)	3-197 (NH)	1-158 (OK)	1-623 (KY)	1-181 (TN)	2-130 (KS)
	1-121 (WI)			1-182 (MI)	4-133 (TX)	3-116 (FL)		
MLRS			1-147 (SD)				1-142 (AR)	
Paladin	1-109 (PA)	1-145 (UT)	1-144 (CA)	1-201 (WV)	1-178 (SC)	2-138 (KY)	2-142 (AR)	1-161 (KS)
		2-222 (UT)						1-214 (GA)
M777	1-119 (MI)		1-151 (MN)	1-103 (RI)	2-123 (IL)	2-150 (IN)	1-117 (AL)	1-129 (MO)
AC DIV	4ID	1AD	25ID	10th	1CD	101ID	3ID	1ID

Historical Example of FA Task Organization for LSCO

How does this work in actual LSCO? The FA task org structure used by the VII Corps Artillery support to 1ID on day one of the ground war during Desert Storm is a prime example in the application of AWIFM-N. On this day, 1ID was the VII Corps ME conducting a division-sized breach through a well-prepared defensive line. The material below is a modified extract from the book "Desert Redleg" by Scott Lingamfelter that describes the task organization VII Corps and 1ID used on that day.

This FA task org clearly articulates how the corps weighted the division and how the division, in turn, retained centralized control (GS) of rocket assets while reinforcing and weighting their maneuver brigades with R and GSR Fires using EAB cannon battalions. In total, VII Corps was allotted four FABs for Desert Storm and weighted their ME division on day one with three of them (75th, 42nd and 142nd). The fourth FAB (210 FAB) was attached to 2ACR (Armored Cavalry Regiment), who led the attack on the corps' left flank, followed by 1AD and 3AD. One FAB supporting the left was determined to be adequate fire support for this group during the initial phase since this supporting effort was not required to conduct a breach.

1ID Artillery Organization for Combat

VII Corps Main Effort, 24 FEB 91 (First Day of Ground War)

1ID (Mechanized) DIVARTY: Force Field Artillery Headquarters

1-5 FA (155mm SP)	DS 1st BDE (Supporting Effort)
4-5 FA (155mm SP)	DS 2nd BDE (Main Effort)
4-3 FA (155mm SP)	GS 3rd BDE (Follow and Assume)
B-6 FA (MLRS)	GS
D-25 TAB	GS

75th FAB: R 1ID (M) DIVARTY, Alternate FFAHQ O/O R 1AD 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 O/O R 1AD (UK) Division Artillery
A/6-27 FA (ATACMS)	GS VII Corps Artillery
C-26 TAB	GS

1st UK Armored Division Artillery: R 1ID (M) DIVARTY O/O 1AD (UK) FFAHQ

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 FAB: R 1ID (M) DIVARTY O/O R 3AD DIVARTY

3-20 FA (155mm SP)	R 1-5 FA
2-39 FA (155mm SP)	GSR 1-5 FA
1-27 FA (MLRS)	GS

142nd FAB: GSR 1ID (M) DIVARTY O/O R 1AD (UK) Division Artillery

1-142 FA (203mm)	GS
2-142 FA (203mm)	GS
1-158 FA (-) (MLRS)	GS O/O R 75th FAB (1AD)

After the initial push on day one, VII Corps redistributed their FA assets by allocating a reinforcing FAB to every committed division. VII Corps Arty retained only one battery of MLRS at their level as the designated corps ATACMS shooter and mostly leveraged air interdiction beyond the FSCL through the rest of the conflict. Within the chart I've added the follow-on missions for each of the main elements in red to show how the reinforcing FABs were task organized across all the divisions on day two to support each of their future operations. In this subsequent configuration, 1AD, 3AD and 1UK received their FABs and 210 was later shifted from 2ACR to 1ID on day three as that division conducted a forward passage of lines (FPOL) and 2ACR became the corps reserve. This shifting of entire FABs from one formation to another from one phase to another was not uncommon in operations of this scale. However, as a rule of thumb once the corps committed the divisions or ACR they retained

their initially assigned FAB until they went into the reserve to minimize turbulence.

This example is exactly how Corps ARTYs, FABs, and DIVARTYs were successfully fought in

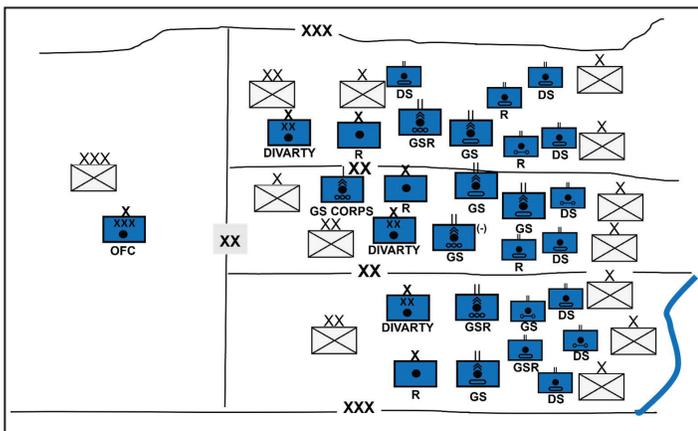


1-158 FA (MLRS) OKARNG massing fires in support of 1IDs breach, 24 FEB 1991.

LSCO right up to us losing our Corps Artillery HQs and DIVARTYs in the mid-2000s. 1ID DIVARTY maintained maximized centralized control of rocket formations for shaping while every maneuver brigade was allocated adequate and immediately available FS from cannon formations for the breach. The ME has provided additional weight at every echelon and No Artillery was left in Reserve. All three supporting FABs and 1UK DIVARTY were positioned by 1ID on day one to expedite their movement on day two to facilitate future operations. In summary, VII Corps Artillery and 1ID DIVARTY expertly applied AWIFM-N as described in FM 3-09 during this operation.

What would a modern adaption of these FA task org concepts look like in a current corps fight? The examples below show the use of an OFC, DIVARTYs and reinforcing FABs at the division level and the flexibility of employing these assets in various command relationships to meet their needs and those of their subordinate brigades.

FA Support Relationship Examples



Above: Corps Example 1; Below: Corps Example 2.

Corps example: three divisions are fighting as part of a corps attack. The corps has an OFC as its FFAHQ and three attached FABs, each of which are task organized to reinforce separate DIVARTYs. Division 1 in the north has been augmented with a Reinforcing NG FAB. The DIVARTY (as the FFAHQ) tasks the EAB cannon battalions from the NG FAB to reinforce the two forward BCTs FA BNs and controls one HIMARS battalion in a GSR role. The NG FAB is designated the CFHQ for the division and retains operational control of their other HIMARS BN as the division's primary counterfire shooter. One BCT is performing operations in the division's consolidation area and retains its FA BN. Division 2 in the middle has an active component FAB reinforcing and serving as the CFHQ. A M270 BN is designated as the division's counterfire shooter as another M270 BN and a HIMARS BN(-) supports the division deep fight under DIVARTY control. The HIMARS battalion is also tasked to provide one battery to serve as the corps' ATACMS shooter. The FA battalion from the reserve BCT is tasked to reinforce the FA battalion in the division's Main Effort BCT. Division 3 in the south is conducting a wet gap crossing and has all three BCTs forward. A NG FAB is reinforcing and serving as the CFHQ for the division with one dedicated M270 BN. The FABs HIMARS BN is GSR in support of the DIVARTY and the crossing brigade. All three BCTs retain their DS BNs, but both of the FABs EAB cannon BNs are under centralized controlled of the DIVARTY, one in a GS role and the other in a GSR role to support the wet gap crossing.

Bottom Line

The FA structure and mission specific task organization used prior to modularization was incredibly flexible and ensured that every echelon from corps to brigade had the Fire Support needed it to accomplish their missions. If OFCs are built at the corps level and once the NG divisions have rebuilt their DIVARTYs, the total Army will again have corps and division level FFAHQs and 12 independent FABs to support LSCO (excluding 210 FAB from the count based on their permanent mission). This is enough combat power for at least a three-corps fight with every committed division receiving at least one reinforcing FAB in a full mobilization scenario. That should, once again, become the norm as we prepare for future LSCO so retaining, realigning, equipping and retraining our independent FABs to function in this capacity is absolutely critical.

COL(Ret) Greg Lankford enlisted in 1984 as a E1 13B and ended his career as an O6 13A in 2018 with 34 total years in the OKARNG. During his 30 years in the 45 FAB, he served in multiple operational roles including battalion S-3 and XO, FAB O&I Officer, FiB S-3 and DCO. He commanded A and C batteries of 1-171 FA (MLRS), 1-158 FA (HIMARS) and the 45 FAB. His combat deployments include Operation Desert Storm in 1991 and Operation Iraqi Freedom in 2008-9. COL (Ret) Lankford currently works for the FA Commandant's Office as a contract facilitator for the FA Pre-Command Course and mentor for FACCC.

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The
Need
for a
Wheeled
Howitzer

*By CPT Kyle Meurer, 1LT Nathan Crane,
CPT Nicholas Principe and CPT Gathot Triwibowo*





U.S. Soldiers of the 1st Battalion, 9th Field Artillery Regiment, position their M109 Paladin to a firing position during exercise Allied Spirit at Drawsko Pomorskie Training Area, Poland, June 10, 2020. Exercise Allied Spirit is a Defender-Europe 20 linked exercise involving approximately 6,000 U.S. and Polish soldiers. The modified exercise will test a division-sized unit's ability to conduct a deliberate water crossing, integrate with alliance capabilities and establish a common intelligence operational picture. The exercise, modified in response to COVID-19, operates in accordance with the guidance directed by DoD and host nations. All U.S. Soldiers and civilians involved in the exercise completed a 14-day quarantine and were tested for COVID-19 upon arrival with additional health screenings if necessary. (U.S. Army photo by SGT Julian Padua)

As the military continues to increase its focus on preparing for Large-Scale Combat Operations (LSCO), the Army must equip its units properly with weapon systems that are survivable and able to compete with weapon systems it would face from a near-peer or peer enemy. Specifically, Army artillery batteries require howitzers that are mobile, maneuverable, and able to survive in the face of sustained counter-battery fire from peer threats. Although armored brigade combat teams (ABCTs) have this necessary delivery asset with the self-propelled M109 Paladin; infantry and stryker brigade combat teams (IBCTs and SBCTs, respectively) do not. These units require a self-propelled, wheeled howitzer able to shoot, move, and more effectively provide timely and accurate fires for the maneuver forces they support.

The Limitations of Towed Artillery

Maneuverability is the greatest problem towed artillery systems face. Although the M777 155mm Howitzer and the M119 105mm Howitzer are incredibly mobile in terms of global deployment, their towed nature limits their tactical maneuverability. In a combat environment, towed howitzers like the M777 and M119 will be hindered in their ability to maneuver and respond to threats because they are incredibly time consuming to emplace and displace.

Towed howitzers need a large amount of personnel to efficiently emplace or displace the weapon system. For example, a fully manned crew of eight Soldiers and a section chief is needed to emplace and operate the M777 Howitzer to standard. Fully manned sections like this are often rare. Digging firing positions and conducting firing crew drills for a howitzer are exhausting tasks for all personnel involved. With extended-duration operations, the effects of this fatigue on the crew will compound. Beyond fatigue, the attrition of section members during intense combat will also quickly degrade the crew's ability to shoot and move, and ultimately provide effective fire support for friendly maneuver forces. These factors will also affect the crew's ability to displace, especially in response to enemy counter-battery fire. A howitzer section that cannot displace quickly following detection is very vulnerable to counterfire. Enemies equipped with advanced counter-battery radars and delivery

assets are the primary threat to our artillery assets in a LSCO environment.

Effective cover and concealment are also primary concerns for effective emplacement of towed artillery batteries. Batteries need large and open areas to create dispersion between pieces and allow large fields of fire for the tubes to be able to range the maximum number of targets. These factors severely limit the locations where batteries are able to emplace. Howitzers need to be able to be tucked into tree lines, where they can conceal themselves and still be able to fire effectively. Desirable positions like these are challenging to maneuver in and out of with towed howitzers. Depending on the terrain conditions, these firing positions can take up to an hour to fully set up. Without quick mobility and the ability to maneuver the weapon system in tight spaces, these batteries are degraded in their ability to cover and conceal themselves. All these factors combined make towed howitzers less effective in surviving and providing adequate fire support for their maneuver units over extended periods of high-intensity combat against peer threats.

The Benefits of Wheeled Howitzers

The primary benefit of a wheeled howitzer is its ability to emplace and displace quickly. A self-propelled howitzer, tracked or wheeled, can average 1-2 minutes for emplacement/displacement. Compare this to a towed M777, with a skilled, fully manned crew that will average around five minutes for emplacement/displacement at best. This time difference directly affects the survivability of these weapon systems and their overall batteries. A Howitzer able to fire and displace between 1-2 minutes can complete a fire mission and quickly jump locations to avoid enemy counter-battery fire. With near-peer and peer enemies able to acquire firing unit locations and counterfire on them within minutes, mobile howitzers are necessary for units to maintain firing capability.

Another benefit of a wheeled howitzer is that its speed is based on the system itself and not as dependent on a large crew to conduct emplacements and displacements. Towed howitzers depend heavily on manpower to unhook the weapon from its prime mover, lay the gun, dig the spades in, and prepare it to fire. With the weapon system on the vehicle

chassis, a wheeled howitzer does not face the same limitations. A wheeled howitzer relies less on its crew to emplace the gun physically and is thus less affected by crew fatigue. In a future LSCO environment, artillery batteries must be ready to conduct operations over an extended period. In this type of conflict, personnel will be incredibly taxed and affected by fatigue and attrition from the enemy. It is a fair assumption that there would rarely be a time when howitzer crews would be fully manned and/or fully healthy and rested. This would heavily degrade towed artillery units but would only have a marginal effect on self-propelled artillery units. These results are evident from the performances of artillery units at U.S. Army Combat Training Centers. At training centers such as the Joint Multination Readiness Center in Germany, paladin units generally outperform M777 units during the 14-day exercises. Because the self-propelled paladins are less dependent on their crew to emplace, shoot, and displace, they can be more effective against the opposing force (OPFOR), especially over the long run. This will translate to battlefield effectiveness in a LSCO environment. A wheeled howitzer would see the same increase in effectiveness in support of IBCTs and SBCTs.

A standard crew of eight Soldiers is needed to maximize the efficiency of a single M777 Howitzer. If the Army were to switch to a self-propelled wheeled artillery piece, the needed manning could drop to as little as three personnel in a crew. When looking at the potential advantages of self-propelled wheeled artillery, the M142 HIMARS (High Mobility Artillery Rocket System) can be a reference. The HIMARS uses a minimal manning of three personnel to emplace, use and maintain the system. Additionally, HIMARS crew members are protected in a cabin and can execute any mission under more cover than a towed M777 crew. The advantage of self-propelled wheeled artillery is, like the HIMARS, minimal manning and more protection for Soldiers.

In terms of sustainment, a wheeled howitzer would have also benefited from consolidating effort and resources as a single-piece weapon system. ATP 3-09.50 states, "Success on the battlefield directly relates to the unit's ability to maintain equipment and material in effective operating condition." Maintenance becomes more critical for a self-propelled wheeled artillery piece because firing capabilities are directly related to

the firing system and the chassis it maneuvers on. Maintenance support would be more readily available if the Army were to create a self-propelled wheeled artillery with the chassis of another vehicle. Wheeled mechanics in a unit can support maneuver vehicles and the firing systems. Additionally, neighboring units could help support maintenance operations of a standard vehicle chassis. The advantage of self-propelled wheeled artillery is that maintenance operations can be more efficient and easier to plan.

Wheeled Howitzers: A Case Study from an Indonesian CAESAR 155mm Battery Commander

The Field Artillery faces various challenges related to the adjustment of weapon systems to maximize their implementation in future conflicts. Wheeled self-propelled artillery systems answer problems often faced in the field by artillerymen. They broaden the spectrum of threats and the more advanced the opponent's observation technology is undoubtedly encouraging us to put forward several ideas on why the concept of a wheeled howitzer is essential to research and adjust. Most importantly, a wheeled howitzer, in my experience, allows artillery units to better support maneuver troops by using hit-and-run tactics.

Mobility is the primary concern with the development of future systems. Wheeled howitzers enable the ease of maneuvering weapons as quickly as possible to the desired firing points and allow us to support maneuver forces efficiently. Our mobility directly affects our lethality and allows us to dominate the battlefield. The wheeled howitzer can better support the field artillery's tactical hit-and-run maneuver. Artillery units can better support maneuver elements with hit and run because their focus will be to shoot and then move, leading to a higher tempo and better unison with the infantry units they support. With wheeled howitzers, this tactic is an essential answer to how to support the infantry with fires better. Additionally, wheeled howitzers conducting hit-and-run tactics are able to counter the advancement of enemy observation systems and counterbattery delivery systems. Adapting weapon systems to be able to support the development of this tactic is imperative for artillery forces.

Conclusion

As we continue to modernize and prepare for Large-Scale Combat Operations, we must develop and acquire weapon systems able to survive and be effective against peer and near-peer threats. For artillery units, tactical mobility is the vital factor to improving our effectiveness in high intensity combat. A wheeled Howitzer would provide the mobility necessary to make artillery units more lethal in support of IBCTs and SBCTs in future LSCO conflicts.

CPT Kyle Meurer graduated from Texas A&M and completed BOLC in June of 2019. Meurer served his Lieutenant time in the Second Cavalry Regiment (SBCT) in Rose Barracks, Germany. In 2CR, he served in an M777 Battery as a Platoon Fire Direction Officer, Firing Platoon Leader, and a Battery Executive Officer. As a unit, they participated in several training exercises and rotations in support of NATO and partner nations. Following his time in Europe, he completed FA Captains Career Course in May 2023 and now currently serve as a Battalion Fire Support Officer in 2d Brigade Combat Team, 101st Airborne Division at Fort Campbell Kentucky.

CPT Nathan Crane is currently the 3rd Combat Aviation Brigade Assistant Fire Support Officer. Crane deployed to Iraq in 2020 with 1-25 ID where he worked as a targeting officer. After deployment he moved to a CO FSO position where he further developed his skills to employ lethal fires. Crane's last position as a lieutenant was as an FDO, where he learned about the friction points of towed artillery and the need for a wheeled howitzer within our BCTs.

CPT Nicholas Principe commissioned after graduating from the University of Alabama and is currently the Assistant Fire Support Officer for the 1st Combat Aviation Brigade, 1st Infantry Division. During his time as a Field Artillery Officer, he has served as a platoon leader, battery executive officer and battalion fire direction officer.



U.S. Soldiers assigned to 2nd Brigade Combat Team, 1st Cavalry Division, supporting the 4th Infantry Division, utilize an M109A6 Paladin howitzer to fire upon designated targets during a platoon live fire exercise at Bemowo Piskie, Poland, March 15, 2023. The 4th Inf. Div.'s mission in Europe is to engage in multinational training and exercises across the continent, working alongside NATO allies and regional security partners to provide combat-credible forces to V Corps, America's forward deployed corps in Europe. (U.S. Army National Guard photo by SGT Lianne M. Hirano)



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From *the Red Room*: *The Field Artillery has a site problem.*

Written by David B. Nance

High-Angle Site, the bane of every basic officer leadership course lieutenant's existence. Why is this concept so difficult, and is this small correction even worth calculating? The Field Artillery branch has mulled this calculation for years. To the point where the TC 3-09.81 April 2016 (TC) and the FM 6-40 April 1996 (FM) says that the fire direction officer (FDO) can ignore high-angle site. (Chapter 8-21, 8-12, respectively). I will demonstrate that both high and low-angle sites are currently unnecessarily complicated and can be solved by one calculation. The site definition by the TC is "the algebraic sum of the angle of site and the complimentary angle of site and is expressed to the nearest mil." Unneeded complications have crept into the determination of site.

The 1996 FM 6-40 Chapter 8-12 sub para. C states, "High-angle site is determined by using the complimentary site factor using the tabular firing tables (TFT) or the 10-mil site factor from the graphic firing table (GFT). **Using the GFT is the preferred method.** The reading from the 10-mil site factor scale is the actual site for each 10 mils of angle of site. The site is computed by multiplying the angle of site divided by 10, by the 10-mil site factor. The 10-mil site factor is always negative." The 10-mil site factor gives us the ability to visually extract small values from the GFT that were too small to capture using manual methods before the invention of the modern four-function calculator.

The 2016 TC 3-09.81 states instead that the **10-mil site factor is the preferred method (Chapter 8-23)**. While the FM 6-40 described the GFT as the preferred method due to its ability to make calculations faster, the TC does not give us the same leeway. The statement that the 10-mil site factor is the preferred

method has forced the artillery into teaching an unnecessarily complicated math formula for manual computations of high-angle site. The 10-mil site factor is a useful tool when utilizing the GFT but is an unnecessary step when calculating site manually.

The formula for determining high angle site manually as described by the TC 3-09.81 is:

$$\text{High-Angle Site} = (\angle \text{SI} / 10) * 10 \text{ MSF}$$

Breaking this down into individual pieces for a positive vertical interval, we have the following variables:

$$\text{Vertical Interval (VI)} = \text{Target Altitude} - \text{Battery Altitude}$$

$$\text{Angle of Site } (\angle \text{SI}) = (\text{VI} / \text{RG in 1,000s}) * 1.0186$$

Complimentary Site Factor (CSF): Extracted from the TFT, accounts for non-rigidity in trajectory due to charge and ballistic coefficient.

$$10 \text{ Mil Site Factor (10 MSF)} = 10(1 + \text{CSF})$$

Putting this first portion into practice:

Let's say we have a target altitude of 463, Battery altitude of 438, and a range of 4830 firing a charge 1L projectile HE M795.

$$463 - 438 = \text{VI} = +25.$$

We then take this VI and divide it by our range in thousands so:

$$\begin{aligned} (\text{VI} / \text{Range in thousands}) * 1.0186 &= \angle \text{SI} \\ (+25 / 4.83) * 1.0186 &= +5.3 \end{aligned}$$

Our angle of site is +5.3, but now we introduce the 10-mil site factor.

The formula for the 10-mil site factor with positive VI is: $10(1+CSF)$

We then use Table G from the AR-2 (2016) and extract our CSF.

$$CSF = -1.176$$

$$\text{So then } 10(1 + -1.176) = -1.76 \sim 10 \text{ Mil Site Factor} = -1.8$$

Finishing it up, we calculate:

$$(+5.3/10) * -1.8 = -0.954 \sim -1$$

If we build the entire formula using the values, we found we end up with:

$$(((+25/4.83)/10)1.0186) * 10(1+-1.176) = -0.954 \sim -1$$

If you look at the formula closely you can see that we divide by 10 only to immediately multiply the value by 10 again. Manual computation of the 10-mil site factor adds an unnecessary step and introduces complexity to the math problem.

We can remove that step and use the formula for high angle site= $<SI(1+CSF)$

Using these same values, we find that:

$$(+25/4.83)1.0186) (1+-1.176) = -0.928 \sim -1$$

We end up with the same value for high-angle site with a more streamlined math step for both positive and negative vertical interval demonstrated by the following proof:

Positive VI	Negative VI
$\frac{<SI}{10} \times 10(1+CSF)$	$\frac{<SI}{10} \times 10(1-CSF)$
$\frac{<SI}{10} \times 10(1+CSF)$	$\frac{<SI}{10} \times 10(1-CSF)$
$<SI (1+CSF)$	$<SI (1-CSF)$

Using the above formulas, we can achieve a more accurate high-angle site value due to the reduction of artillery expression error, making

high-angle site both faster and more accessible. Notice that the raw data is different prior to the final artillery expression from the whole site value. This is because there is an included artillery expression error inherent with using the 10-mil site factor. However, using the formula $<SI(1+CSF)$, only two instances of artillery expressions are needed, increasing accuracy while also increasing the speed of the computation.

Let's take another look using a larger charge:

Range 20,000, charge 5H M232A1, M795 Shell HE, Target Altitude 400 Battery Altitude 268, High Angle

10-mil Site Factor	$<SI(1+CSF)$
400-268 = 132	400-268 = 132
VI=+132	VI=+132
$132/20.00 * 1.0186 = +6.72 \sim +6.7$	$132/20.00 * 1.0186 = +6.72 \sim +6.7$
$<SI = +6.7$	$<SI = +6.7$
$10(1+-1.349) = 3.49 \sim +6.7$	$6.7(1+-1.349) = -2.09 \sim -2$
$+6.7/10 * -3.5 = -2.345 \sim -2$	SI=-2
SI=-2	

The Field Artillery must update the TC 3-09.81 Chapter 8 "Site" to show that the 10-mil site factor from the graphical firing table is the preferred method with a positive VI due to the ability to quickly extract values from the GFT. If the target range exceeds the last listed 10-mil site factor, then we will use the last listed value on the GFT. If the target range is below the first listed 10-mil site factor, then we will use $<SI(1+CSF)$. According to the TC, high-angle site with a negative VI must be computed manually using $<SI(1-CSF)$.

Low-angle site is far less controversial; however, it is also more complicated than it needs to be. The TC states that both high angle site and low angle site are the algebraic sum of the angle of site and the complimentary angle of site and is expressed to the nearest mil. So, if the formula $<SI(1+CSF)$ is true for high angle

site it must be universally true for low angle site.

The current low angle site formula is: $\angle SI +$ complimentary angle of site (CAS).

Positive VI will have a positive $\angle SI$ and a negative VI will have a negative $\angle SI$ shown below.

Positive VI	Negative VI
$\angle SI + CAS$	$-\angle SI + CAS$
$CAS = \angle SI \times CSF$	$CAS = -\angle SI \times CSF$
$\angle SI + (\angle SI \times CSF)$	$-\angle SI + (-\angle SI \times CSF)$
$\angle SI (1 + CSF)$	$\angle SI (1 - CSF)$

Using the algebraic rule of $X + (X \times Y) = X(1 + Y)$ we once again find that $\angle SI(1 + CSF)$ appears. Putting this into practice we have:

Range 4500, charge 1L M231, M795 Shell HE, Target Altitude 400 Battery Altitude 268, Low Angle

$\angle SI + CAS$	$\angle SI(1 + CSF)$
$400 - 268 = 132$	$400 - 268 = 132$
$VI = +132$	$VI = +132$
$132 / 4.5 \times 1.0186 = +29.87 \sim +29.9$	$132 / 4.5 \times 1.0186 = +29.87 \sim +29.9$
$\angle SI = +29.9$	$\angle SI = +29.9$
$CAS = +29.9 \times 0.131 = 3.91 \sim +3.9$	$29.9(1 + 0.131) = +33.8 \sim +34$
$+29.9 + 3.9 = +33.8 \sim +3.9$	$SI = +34$
$SI = +34$	

Range 21,000 Charge 5H 232A1, M795 Shell HE, Target Altitude 200 Battery Altitude 500, Low Angle

$\angle SI + CAS$	$\angle SI(1 - CSF)$
$200 - 500 = -300$	$200 - 500 = -300$
$VI = -300$	$VI = -300$
$-300 / 21.0 \times 1.0186 = -14.55 \sim -14.6$	$-300 / 21.0 \times 1.0186 = -14.55 \sim -14.6$
$\angle SI = -14.6$	$\angle SI = -14.6$
$CAS = -14.6 \times 0.278 = -4.0588 \sim -4.1$	$-14.6(1 - 0.278) = -18.7 \sim -19$
$-14.6 + -4.1 = -18.7 \sim -19$	$SI = -19$
$SI = -19$	

As you can see from the above examples, this formula is more efficient and works every single time no matter the inputs. This streamlines both high and low-angle site into the same easy-to-digest formula. This eliminated the need to have separate formulas for low and high angle site. Not only is this a faster way to compute site, but it is also more accurate. Every time we artillery express, inaccuracies are introduced due to "rounding errors." These improved formulas reduce the number of rounding errors by 33.3% due to the decrease in instances of artillery expression. Additionally, this will turn an 8-hour quadrant elevation theory class into a 2-hour block of instruction with an increase in student retention and accuracy.

We must change our site doctrine in all institutions and immediately implement site:

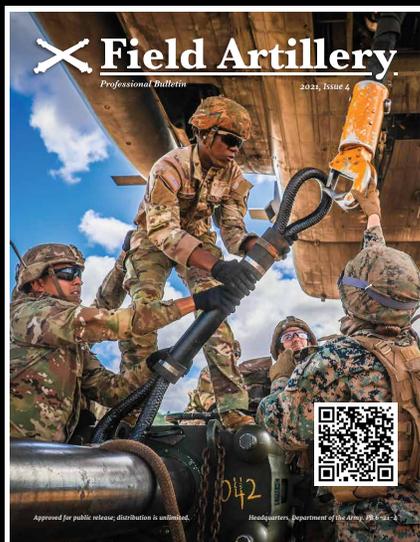
Site Positive VI $= \angle SI(1 + CSF)$
 Site Negative VI $< \angle SI(1 - CSF)$

Written by David B. Nance / Proofed by CPT Richard Shea

"High-Angle Site, the bane of every Basic Officer Leadership Course (BOLC) lieutenant's existence."

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Back to Basics:



Massing Multiple FA Units (DIVARTY and FA Brigades)

By CPT Matthew Ramin, Brigade Fire Control Officer

In March of 2023, 18th Field Artillery Brigade (FAB) participated in the 82nd Airborne Division Artillery's (DIVARTY) base piece live fire exercise (BPLFX). This was the DIVARTY's first LFX with all three battalions since 2004. 18th FAB supported this effort as a General Support-Reinforcing High Mobility Artillery Rocket System (HIMARS) Brigade in support of the 82nd DIVARTY's mission. The two main training goals of the exercise were to integrate with another Field Artillery headquarters (FA HQ) and exercise changes in support relationships to reflect what might be seen on the modern battlefield. The exercise consisted of two days of rehearsals followed by a live fire day for the howitzers. The HIMARS shot simulated fire missions for the duration of the exercise.

18th FAB is XVIII Airborne Corps' rapid deployable long-range precision fires formation. The brigade is equipped with M142 HIMARS and can provide rocket and missile fires up to 300km in support of operational objectives. A FAB conducts corps-level strike operations and augments division-level shaping operations. A FAB can serve as the Force FA HQ for a corps or joint task force (JTF), or the Counterfire HQ for a JTF, corps, or division. The 18th FAB has repeatedly demonstrated the ability to deploy firing elements down to the platoon level and process fires mission over extensive operational distances between headquarters elements and firing elements.

The 82nd Airborne DIVARTY plans, prepares, executes, and assesses fires using precision and area munitions for the division. The DIVARTY is the Force FA HQ for the division. The 82nd DIVARTY currently has three composite FA battalions organic to it with firing capability up to 40km and can integrate all forms of Army, joint, and multinational fires, and conduct targeting.

Over the past year, 18th FAB has begun conducting exercises with the 82nd Airborne DIVARTY and the 82nd Airborne Joint Air Ground Integration Center (JAGIC) to build proficiency being supported by and supporting another FA HQ. This paper will explore the integration of a FAB with a DIVARTY HQ, command support relationships used, technical hurdles faced, and knowledge gaps encountered throughout the exercise.

Scenario: HIMARS Support to a Division

In a large-scale combat operation (LSCO) fight there are numerous scenarios where a FAB would support a division. During a joint forcible entry (JFE), 18th FAB fills the general support role to XVIII Airborne Corps, providing shaping fires before the JFE, and Joint-Suppression of Enemy Air Defenses (J-SEAD) fires in support of the JFE and the corps objectives. Additionally, one HIMARS battalion might reinforce the 82nd ABN Division directly providing the shaping fires they need before the JFE. Post JFE, a HIMARS battery could be air-landed as a direct support artillery unit to the JFE brigade from the 82nd to shape their objectives as they expand their lodgment and prepare for follow-on missions.

Scenario: Division Support to a Field Artillery Brigade

Another scenario exercised was if a FAB, as the Counterfire HQ, had a howitzer artillery battalion reinforcing the brigade to service counterfire targets that did not warrant a rocket or missile. As the Counterfire HQ, the duties include planning and coordinating sensor management (ATP3-09.24). The Counterfire HQs can position all sensors in their area of operations, and having a reinforcing howitzer artillery battalion allows the Counterfire HQs to service targets at all ranges.

Command Support Relationships Explored

In the latest exercise, the 18th FAB and the 82nd DIVARTY exercised three main support relationships: reinforcing (R), general support-reinforcing (GS-R), and direct support (DS). Reinforcing is a support relationship requiring a force to support another supporting unit (FM 3-0). Only similar units can enter a reinforcing support relationship. In a reinforcing relationship, calls for fire are answered in priority for the reinforced FA unit. A liaison is furnished to the reinforced unit, is positioned, and has its fires planned by the reinforced FA unit. General support-reinforcing is a support relationship assigned to a unit to support the force as a whole and to reinforce another similar-type unit (FM 3-0). The priority of a FA unit assigned a GSR support relationship is to furnish artillery fires for the maneuver force as a whole; the second priority is to reinforce the fires of another FA unit. In a GS-R relationship, calls for fire are answered in priority for the supported unit, the FA HQ, and

the reinforced unit. A liaison is furnished to the reinforced FA unit HQ, positioned with its fires plan that is supported by the unit. Finally, direct support is a support relationship requiring a force to support another specific force and authorizing it to answer directly to the supported force's request for assistance (FM 3-0). A FA unit in DS of a maneuver unit is concerned primarily with the fire support needs of only that unit. The fire support element (FSE) of the supported maneuver unit plans and coordinates fires to support the maneuver commander's intent. During the exercise, we were able to effectively exercise all command support relationships. The 18th FAB reinforced the 82nd during a DIVARTY time on target mission, HIMARS batteries were direct support to each 82nd Brigade to reinforce them with fires, and the 18th FAB was GS-R to 82nd DIVARTY during a SEAD schedule of fires.

Technical Challenges

During the exercise, communication between the 18th FAB fire control element (FCE) and 82nd DIVARTY's FCE was primarily upper-TI, and secondary FM-Digital. The 18th FAB and the HIMARS batteries communicated via FM-Digital and FM-Voice with the artillery battalions. Throughout the exercise, participating units faced a few technical hurdles. First, was a HOPSET issue. HOPSET refers to where communications are conducted over multiple frequencies (up to 999) that change rapidly in a predetermined pattern. While all units are on the same monthly COMSEC (encryption) for voice and digital communications, HOPSET can vary from corps to division and division to division. Within a HOPSET, units are assigned communication nets to accomplish their missions. For example: command net, fires net, admin net, logistics net, etc. This was an unanticipated hurdle because the assumption was HOPSETs were universal, much like COMSEC. In the scenarios we faced where HIMARS batteries had to communicate directly with DIVARTY or FA Battalion fire direction centers (FDCs), we were initially unable to communicate due to different loaded HOPSETs. We quickly learned that on our two-channel radios, we could load different HOPSETs allowing units to talk within that HOPSET to corresponding units. For example, on channel one we had XVIII ABN Corps HOPSET

loaded so we could talk within the 18th FAB, and on channel two we had 82nd ABN HOPSET loaded so we could talk directly to battalion FDCs.

Another issue faced was having to integrate Advanced Field Artillery Tactical Data System (AFATDS) communications networks. Communications cards for brigades and battalions are often built, made the standard operating procedure (SOP), and then not changed. In the communications diagrams, there is often no



space built for reinforcing or attached units. This is particularly true for AFATDS networks. AFATDS networks are built down to the battalion and battery level and then codified in the SOP. In the scenario where a platoon of HIMARS is direct support to a division space, a slot must be generated in the communications diagram for the platoon FDC. A platoon operations center (POC) or a battery operations center (BOC) is a necessity when attaching HIMARS to another unit because HIMARS uses DCOMMS as the primary digital

communication method to send fire missions to the launcher. DCOMMS hardware is only MTOE'd to POCs and BOCs and therefore limits who can send missions digitally directly to a launcher based on specific hardware/software requirements.

Knowledge Gaps

While the artillery branch speaks a universal language, there are some differences in tactics, weaponeering, and planning for HIMARS launchers versus other howitzer platforms. First, HIMARS and multiple-launch rocket systems (MLRS) fight differently than howitzers do. HIMARS and MLRS typically operate under a “shoot and scoot” mentality. HIMARS spend their time in a hide site usually within 100 meters of their firing point when able. When a launcher receives a mission, it moves from its hide site to the firing point, drives on heading, lays the launcher module on target, and the crew fires the munition. After the munition is fired, the launcher will stow the launcher module and move back to its hide site (or the reload point if necessary). In the howitzer world, a fire mission can be sent down to a howitzer and the crew can lay the tube on the target, report up laid, and remain laid on the target for as long as necessary. For HIMARS, the launcher should not remain laid on target for long periods of time for several reasons. First, it places strain on the hydraulic system used to raise and lower the launcher module. Second, you are exposing the launcher away from its hide site longer than necessary. Third, HIMARS are typically on the enemy’s high-value target list (HVTL). Deliberate thought must be placed in the munitions used to action a target. HIMARS munitions have a minimum range of 8–15 kilometers, and they create a large signature, both visible on radar and when shot. Weaponeering must be appropriate for the target at hand so as not to expose a launcher or engage an insignificant (or non-high payoff) target. HIMARS must be employed appropriately to justify the risk to a critical weapon system. Finally, HIMARS platoons should be allocated a 3-kilometer by 4-kilometer position area for artillery (PAA) to doctrinally be able to have adequate area for three firing points per launcher, a hide site within 100m of each firing point, and two reload points per platoon far enough away from firing points to avoid counterfire. When HIMARS are attached

to a division, deliberate planning must be done to ensure there is sufficient area for HIMARS to operate and conduct survivability moves.

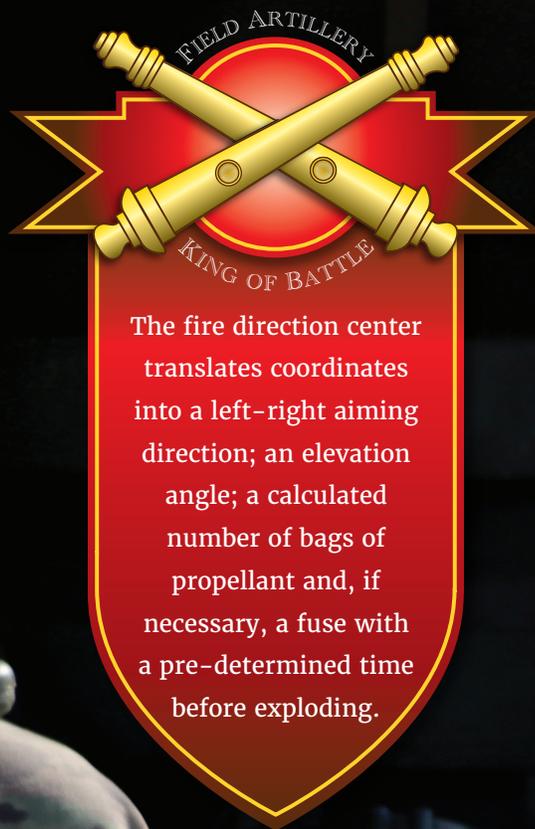
Conclusion

The Army has made the division the unit of action and units of all types may be attached or tasked to support the division depending on mission requirements. This is especially true for field artillery. Divisions currently do not possess



the organic capability to shape their deep area which will require HIMARS or MLRS units to service their targets. To have the most responsive fires, FA units must be able to rapidly adjust to changes in support relationships to support the mission set. FABs and DIVARTYs working together will increase in the future as the Army trains for LSCO. Through DIVARTY and FAB integration during home station training, units can rehearse and rectify issues before combat training center (CTC) rotations or deployments. Seamless integration of rocket and howitzer fires at echelon requires units to understand support relationships, technical challenges, and how the systems are employed to make the Field Artillery branch more cohesive and able to meet any mission set.

CPT Rabin is currently serving as the Brigade Fire Control Officer for 18th Field Artillery Brigade. His previous assignments include Battalion S4, Battery executive officer, and fire support officer. He was commissioned in 2017 through the Norwich University ROTC program.



The fire direction center translates coordinates into a left-right aiming direction; an elevation angle; a calculated number of bags of propellant and, if necessary, a fuse with a pre-determined time before exploding.



(Photo by Edward Muñiz, Fort Sill Public Affairs Office)





A M109 Paladin from 1st Battalion, 145th Field Artillery Regiment, 65th Field Artillery Brigade, Utah National Guard, and its crew sit silhouetted on a hill waiting for a fire mission during Western Strike 22, at Orchard Combat Training Center, Idaho, June 10, 2022. Western Strike 22 is an exportable Combat Training Capabilities exercise led by the 65th Field Artillery Brigade, Utah National Guard, that provides National Guard Soldiers immersed training similar to a combat training center and aims to increase participating unit's readiness and lethality. (Photo by SGT James Bunn, 128th Mobile Public Affairs Detachment)

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