FA Journal

A professional journal for US Field Artillerymen

An Ode to Molly Pitcher

Issue 4, 2023

Presented by:

USFAA

United States Field Artillery Association

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FA JOURNAL SUBMISSION GUIDE

The Field Artillery Journal serves as the professional forum of the branch across all ranks, Marine, Army, and Civilian. We exist to inform on new developments in the Branch and winning ideas from the field. The FAJ is seeking articles and short features on past, present or future programs, equipment, tactics, techniques, procedures or other issues affecting our Branch. Approximately 40% of our readers are company-grade Field Artillery Soliders and Marines. The other 60% is comprised of more senior-ranking Redlegs, servicemen from other branches and services, our Allies, corporate executives and politicians. We are a total-branch publication.

What to Submit:
Article submissions do not have to agree with current doctrine, official policy or approved techniques or procedures. Ask yourself how the topic is going to help the artillery community. Only unclassified information can be published in the FAJ. Articles must promote safe techniques and procedures. Be accurate, logical and complete in your writing. Submissions must be clearly written with an evident thesis, no more than 2500 words. Strive to educate, not impress. A message is most clear when written in simple language. If possible please include graphics, charts or photographs to supplement your article.

Preferred Topics:
- Counter-fire at the DIV/Corps Level
- Targeting
- Training at homestation for LSCO
- Fires Support Issues within the EUCOM/PACOM AOR

How to Submit:
www.fieldartillery.org/fa-journal-submission-guidelines

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PURPOSE:

The FA Journal continues the tradition begun with the first Field Artillery Journal published in 1911. To publish a journal for disseminating professional knowledge and furnishing information as to the Artillery's progress, development and best use in campaigning to cultivate, with other arms, a common understanding of the power and limitations of each to foster a feeling of hearty cooperation by all and to promote understanding between the regular and militia forces by forging a closer bond, all of which are worthy and contribute to the good of the country.

MEMBERSHIP:

Subscription to the FA Journal comes with membership in the Association. Individual or corporate memberships may be obtained through the USFAA website at www.fieldartillery.org or by calling 580.355.4677. Dues start at $30.00 per year for an individual membership for US and APO addresses (International rates may vary).

ADDRESS CHANGES:

Members can change their address, email and chapter affiliation online in the member portal at www.fieldartillery.org or by calling our office at 580.355.4677.

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BG Shane P. Morgan
Chief of the Field Artillery

A Letter from the Commandant

BG Shane P. Morgan

TEAM: Greetings from Blockhouse Signal Mountain and the United States Field Artillery School, Fort Sill, Oklahoma. There has never been a more exciting nor more relavant time to be a REDLEG!

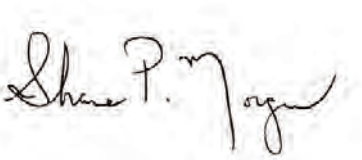
Now is the time to capitalize on the Field Artillery's decisive role in Large Scale Ground Combat Operations and the crucial role we play in defending this great nation. As Secretary of the Army Wormuth stated, "Fiscal year 23 will be the year of long range precision fires- we'll see the first Battery of the new long-range hypersonic weapon that we've developed with the Navy, as well as PrSM, our Mid-Range Capability, and the prototype of extended range cannon artillery." One needs to look no further than the tranformation happening at JBLM, our new Multi-Domain Task Forces, or the persistent growth across our branch to realize fiscal year 24 will be just as transformative.

Our number one priority remains fielding the Artillery Force for the Army of 2030 and the cornerstone of that success lies in the men and women who make up that force. We must continue to recruit, train, and retain the best talent to maintain our title as the King of Battle. Our troops embody the spirit of determination, resilience, and discipline, which has been the hallmark of the Field Artillery for centuries. By investing in their professional development, providing them with state-of-the-art equipment, and fostering a culture of innovation, we will continue to dominate the battlefield and secure victory for our nation.

Just like in our Army Targeting process, D3A, we are top down planning and need your bottom up refinement. In an effort to stimulate intellectual debate within our chosen profession we are asking for your input for articles to publish in our journals. In the previous four journals, 50% of the articles came from Captains and Majors. While we want the same audience to continue sending their nominations, we encourage our Warrant Officer and NCO populations to continue writing. I ask Brigade and Battalion Command Teams to challenge their formations to consider writing on topics such as: what are you doing to establish a warfighting culture; how are you building and sustaining Field Artillery Readiness; what are your impediments to achieving your METL? Iron sharpens iron and your articles forge the drive which stimulates the necessary change we need to embrace. We exist to support the operational force and your input drives our initiatives. We proudly maintain our title as the King of Battle. There's never been a more exciting nor more relevant time to be a REDLEG!

Zero Mils!

King of Battle!



From the Desk of the CSMOB

Redlegs–

First and foremost, I want to thank all the Redlegs for your continued efforts to ensure we are the most disciplined and lethal branch in the Army. My number 1 priority as the Command Sergeant Major of the Field Artillery is to ensure the growth of our force and manning the force 2030. To maintain our rightful status as King of Battle, we must persistently strive to recruit, train, and retain the most exceptional talent among us. By investing in their professional development, providing them with state-of-the-art equipment, and nurturing a culture of innovation, we shall continue to dominate the battlefield. This is reinforced by our primary role in large-scale combat operations and multi-domain operations. BLUF—we need our Redlegs trained and focused on the fundamentals, lethal and ready for the nation's call.

The evolving nature of modern warfare compels us to adapt and modernize continuously. To outmaneuver and outmatch our adversaries, we must whol heartedly embrace cutting-edge technologies, seamlessly integrate advanced fire control systems, and harness the power of data analytics. The future battlefield will be marked by interconnectivity, demanding our readiness to employ integrated systems and engage in network-centric operations. Our unwavering commitment to modernization shall ensure that our forces retain their agility, lethality, and unwavering ability to deliver decisive effects in any operational environment.

While the towed howitzer remains an invaluable asset, our relentless pursuit of modernization shall propel us to unprecedented heights of success. Through the unwavering dedication and unmatched skill of the men and women who form the backbone of our Artillery Force, we will proudly preserve our esteemed title as the King of Battle.

CSM Paul I. Fluharty
Command Sergeant Major of the Field Artillery

From the Desk of the CWOB

Greetings Lethal Redlegs.

The U.S. Army is pulling every lever possible to solve its recruiting challenges. So too are Army Senior Leaders looking at innovatively accessing younger talent to mitigate the Warrant Officer retention problems. Current challenges in retaining career Warrant Officers have forced Army Senior Leaders to develop near-term programs aimed at addressing structural Warrant Officer retention issues. This convergence of efforts adds a new dimension to the way proponents access Warrant Officer talent.

In this unprecedented "war for talent", the U.S. Army Combined Arms Center is piloting a program that expands the pool of qualified Warrant Officer applicants by targeting younger soldiers in the lower enlisted grades. By Fiscal Year 2024, every branch is charged with identifying four potential applicants in the Private First Class or Specialist ranks who have the desired talent and demonstrate the potential to be successfully accessed into the Warrant Officer cohort. To improve Army readiness, address forecasted strength gaps, and take advantage of the depth of talent across the Army, there is a short-term need to reevaluate the Warrant Officer accession criteria.

To meet the personnel demands of Army 2030 and beyond, the philosophy for Warrant Officer accessions will temporarily be expanded from eligibility criteria based on time-in-service and rank to eligibility criteria based on talent, skills, and potential. To that point, I will be reaching out to the Senior 131As at the installations to begin dialogue for identifying four potential candidates.

King of Battle!

Becoming scholars of our profession!

CW5 Rolando Rios
Chief Warrant Officer of the Field Artillery

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A Letter from the MARDET Commander

Col Jarrod W. Stoutenborough
Commander,
Marine Detachment, Fort Sill

It truly is an exciting time to be a Fires professional and effective posturing in support of transformation efforts requires a continued commitment to our battle tested fundamentals. A subject matter expert is one who can break down the complex into simple, easily understood components, and today's security environment magnifies the requirement for Fires experts to simplify the all-domain Fires options available to the Commander to best inform their timely, effective decisions. Fire support expertise continues to be in high demand across the Joint Force and the capacity to maintain the requisite levels of proficiency is challenged by expansive requirements associated with all-domain distributed operations, critical interoperability across Joint and multinational force kill webs, and enhanced fires command and control requirements at echelon.

The Marine Corps, as well as our Joint and Coalition partners, continue to transform in preparation for the current and next fight, and a continued emphasis on the mastery of basic fire support fundamentals remains the foundation of training and education across the Fires community. The basic fundamentals are grounded in three basic questions: 1. What fire support assets are available to the Commander? 2. When are those fire support assets available? 3. What additional fire support assets must be requested to satisfy the Commander's objectives? Built into the basic fire support fundamentals are the timeless requirements for redundancy, resiliency, survivability, and sustainability. The increase in all-domain effects available to the operational Commanders requires today's fire support expert to plan for, coordinate, and employ an increasing amount of fire support assets when developing a plan to effectively synchronize and coordinate employment in support of the Commander's objectives. Instead of allowing the complexities associated with the growth in domains, and associated effects, to limit the fire supporter's ability to properly advise the Commander and provide them with feasible options, relying on the battle tested fundamentals, or three basic questions, can provide the initial framework for a very executable fire support plan.

With anticipation of accusations that this is an oversimplification, please note that I never said any of this was easy. In fact, the very reason basic fundamentals must be utilized today, more than ever, is due to the tendency to bog down on complications associated with domains, authorities, permissions, target engagement authority, etc. There is no doubt that those complications must be integrated into the fire support plan development, and the utilization of the basic fundamentals will aid fire support planners at all echelons in determining the added coordination and deconfliction required to satisfy the Commander's objectives. Additionally, accounting for what fire support assets are controlled by the Commander, as well as the ones that must be requested, will aid in the development of an executable fire support plan with the above-mentioned redundancy and resiliency. The requirement for fire support advisors to present options to the Commander based on the realistic timelines associated with authority and permission requests, as well as availability of assets under their control, remains a key informant of fire support guidance in today's complex security environment. In order to maintain relevance and utility to today's maneuver Commander, we must continue to educate and train fire supporters of all ranks on the basic fundamentals while allowing them to develop methods to integrate the new capabilities associated with continued transformation efforts.

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LtCol (R) Michael Grice Writing Award 2023

The LtCol (R) Michael Grice Writing Award was established by LtCol (R) Michael Grice and the United States Field Artillery Association to promote involvement in the creation of content for FA Journal publication. It was meant to encourage creative thinking and sharing of ideas among both officers and enlisted, Soldiers, Marines, National Guardsmen and Reservists throughout the branch. Eligibility was open to any new article that appeared in the last four FA Journal issues. The voting panel consisted of Field Artillery Leadership from both the Army, National Guard and USMC. They reviewed these issues and each selected a first, second and third place based on the topic of this year's contest, "Challenge the status quo; What can we as artillerymen do better?". The votes were then complied to reveal the third-annual winners.

FIRST PLACE

MAJ Christopher Walker, CPT James (JJ) Howse, CPT Joseph Dami, and WO1 Kory Engdall

1st Armored Division, Combat Aviation Brigade

AH-64 Digital Call for Fire with AFATDS

Issue 4, 2022

SECOND PLACE

SPC Charles Leitner

1st Infantry Division

Fire for Effect: Notes on the Forward Observer

Issue 3, 2023

THIRD PLACE

MAJ Mikhail Jackson

1-30th FA Battalion

Supply Team Certifications: Sustainment Tables for Supply Certifications

Issue 3, 2023

HONORABLE MENTIONS

- The Ambiguity of Shaping Deep - MAJ Benjamin Franzosa - Issue 4, 2022
- Artillery Maneuver - MAJ Shaun Callahan, CPT Jacob Pachter & CPT Dana Meyers - Issue 4, 2022
- The 149th Field Artillery Battalion: A Case Study of LSCO in the SWPA - Dr. Chris Rein - Issue 4, 2022
- When the Call Comes - MAJ Rich Ingleby - Issue 4, 2022
- Moving the Army JFO Program Forward - 1LT Austin Wilhelm & SSG Bismark OBrien - Issue 1, 2023
- The Kill Web - COL Michael P. Stewart - Issue 1, 2023
- Joint Fires Support Team - CW3 Jacob Land, CW2 Andrew Goebel, CPT David Brister, MAJ Benjamin Risher, and LTC Joe Nirenberg - Issue 1, 2023
- Training Jagic at Home Station - MAJ Bruce Archambault - Issue 2, 2023
- Putting the "Forward" back in "Forward Observer" - 1LT Christopher Lipscomb - Issue 2, 2023
- The Measure of Effectivness - CPT Harrison Hains & CPT Zachary Schmidt - Issue 3, 2023
- FA Task Organization for LSCO - COL(R) Greg Lankford - Issue 3, 2023

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LtCol (R) Michael Grice Writing Award

Submit your article today for eligability in the 2024 Writing Contest!

Articles published in Issue 4, 2023 through Issue 3, 2024 will be eligable for the 2024 writing contest and awards.

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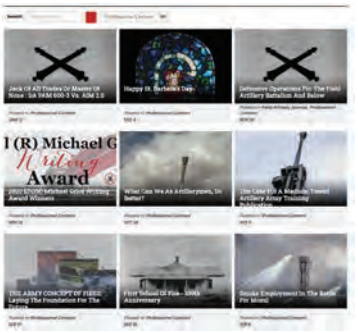

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and

Musical Tattoo

On Saturday November 4th, 2023, USFAA inducted the Class of 2023 into the US Field Artillery Hall of Fame at a dinner held at the Patriot Club. In attendance were 225 persons from the USFAA Board, leadership from Fort Sill and the Field Artillery Branch, Lawton Officials, friends, family, and community members.

Each inductee recieved a personalized, cherry-wood plaque and medals from LTG (R) David Halverson and MG (R) Brian McKiernan during the presentation. Each inductee received a lapel pin upon their arrival so that guests could easily identify them during the cocktail hour. In conjunction with the Hall of Fame, two members of the FA Branch were also honored with a Musical Tattoo, LTG (R) Kenneth Hunzeker and MG (R) Mark McDonald.

Musical Tattoo Honoree, MG (R) Mark McDonald with LTG (R) David Halverson and MG (R) Brian McKiernan

Hall of Fame Inductee, CSM (R) Tommy Williams recieves a medal from LTG (R) David Halverson

Musical Tattoo Honoree, LTG (R) Kenneth Hunzeker with LTG (R) David Halverson and MG (R) Brian McKiernan

Hall of Fame Class of 2023 LTG (R) Edward Anderson, LTG (R) JT Thomson, COL (R) L. Scott Lingamfelter, COL (R) Frank Siltman, LTC (R) James Carafano, CW5 (R) Donald Cooper, SMA (R) Michael Grinston and CSM (R) James McKinney

Members of the Class of 22 and 23 pose for a photo with the Hall of Fame Display in Snow Hall

2024 US Field Artillery Hall of Fame Nominations Open Now!

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Molly Pitcher: Who Was She?

By: Constance M. McDonald

Originally printed in the August 1990 Field Artillery Journal

This article is an abbreviated version of a larger, carefully documented college research paper on the same subject. Based on Mrs. McDonald's and others' research, the US Field Artillery Association plans to change the name of "Molly Pitcher," now listed as Mary Ludwig Hays, to Mary Hays McCauly in the next printing of its various publications referring to Molly Pitcher if no evidence to the contrary surfaces as a result of this article.

The story of Molly Pitcher of American Revolution fame gives pride to her community of Carlisle, Pennsylvania, and the United States Field Artillery that claim her as its heroine. Her battleground in New Jersey boasts of a Molly Pitcher Well and a monument dedicated to her contributions during the Battle of Monmouth. The flesh and blood woman who fought at Monmouth, Mary Hays McCauly, served her country well. Because her tale has been retold many times, details conflict in different versions. In addition, assumptions in a few historical documents have led to controversy over whether the famed Molly Pitcher's real name was Mary Hays McCauly or Mary Ludwig Hays. Though many disagree, I only can conclude from research and historical documentation that the heroine Molly Pitcher was Mary Hays McCauly.

The Battle of Monmouth

Molly Pitcher's fame began two years after the signing of the Declaration of Independence by the American Colonies. The fight for independence had yet to take a favorable turn toward the Colonials. As the war continued, 28 June 1778 proved to be another day of fighting with stories of b r a v e r y .

Monmouth rocked with musket and gun fire. The Colonial cannon line under General Stirling aimed the barrels of its guns straight down on the British Redcoats as they attempted to cross a causeway. Stirling's left-wing cannons bought time for General Washington to take command and regroup General Lee's scattered forces. The gun line met the demands of its mission.

The heat of June 1778 soared to 96 degrees as the guns barked at the British. The cannon barrels smoked, and men fell from heatstroke. In the heat, a woman walked back and forth from a well (or possibly a nearby creek) carrying water to the hot men and smoldering guns. Her husband manned one of the valuable cannons. They were making a difference by holding the causeway.

As American men fell from wounds and heat, the woman's bucket of water (or "pitcher") became more precious. The men among the cannons began to call her Molly Pitcher. A large woman, she reportedly carried wounded men away from the line to shade trees as she made her trip back to the well.

During one of her many returns to the line, she saw her husband fall. A Colonial officer ordered his gun moved to the rear to make room on the line; he had no one left to man it. But Molly Pitcher stepped forward to keep her husband's gun roaring—every cannon was important. As if she had been trained for the task, Molly kept the cannon booming. The artillerymen around her noticed her swift, accurate action in keeping the gun firing. No longer were they asking for water from her; she had become one of them—a gunner. The tale of her efforts passed among the men that evening, and as each gunner spoke, the story's details changed.

Memories of Molly

Carlisle holds the memories and remains of Molly Pitcher. The "Old Graveyard" in Carlisle is where she was laid to rest with a military parade but with no stone marker for her grave. All that was left of her story lived in the memories of those who had known her and a few diaries describing the Battle of Monmouth.

The citizens of Carlisle knew their heroine as Molly Pitcher, a woman who could neither read nor write. Therefore, the written accounts of Molly's contributions at Monmouth weren't by her. The written story depended on the people of Carlisle.

One such citizen recorded some of his memories of Molly Pitcher six weeks before the centennial of the Declaration of Independence. Wesley Miles recounted his time as the charge of Molly Pitcher in an article that appeared in The Carlisle Herald. Miles' mother died when he was small. Molly had nursed his ailing mother and helped raise him after her death. He wrote, "The heroine of Monmouth, Molly Pitcher, otherwise known to us when a boy, as Molly McCauly, her real name...." He was the first to put the real

name of Molly Pitcher in print. Miles continued, "The remains of this Irish woman rest in the Old Graveyard of Carlisle...Perhaps, not even a rude limestone marks her grave."

A stonecutter from town, Peter Spahr, remembered Molly McCauly. After reading Wesley Miles' article, he pursued the idea of a gravestone suggested by Miles. The community raised $100 to mark her grave, and Spahr cut the stone to mark the spot. He carved:

> Molly McCauly
> Renowned in History as
> Mollie Pitcher
> The heroine of Monmouth
> Died 1833
> Aged 79 years.
> Erected by the Citizens of
> Cumberland County
> July 4, 1876

Research later would prove that some numbers on the stone were wrong. Her death notice in the local paper was dated 1832. A stonecutter later corrected the date as requested by the city leaders. Tax records also showed her age of death wasn't 79. The obituary in the The Carlisle Herald dated 26 January 1832 revealed her age to be 90 at her death. The stone marker did show, however, the citizens of Carlisle were not willing to let her story die.

The people of Carlisle returned to the grave of Molly McCauly to erect yet another marker. On 28 June 1916, 138 years after the Battle of Monmouth, the Commonwealth of Pennsylvania unveiled a monument to stand near Molly McCauly's grave.

A life-size statue of Molly holding a rammer staff stands atop a marker containing legendary information about Molly's life. The face of the statue was modeled after a composite picture of five of her great-grandchildren.

A local legend states, "If a little girl stands in front of Molly's buxom statue... looks up into her face, makes a wish, closes her eyes then walks around the statue three times...and looks up at Molly's face again, the wish will come true." The Patriotic Order of the Sons of America added a cannon, flagstaff and bronze relief to depict the heroic deeds of Molly Pitcher.

Making of a Legend

During the aftermath of the Battle of Monmouth, the tired and hot men retold the story many times—the story about acts of bravery by one of the gunner's wives. Because the events happened during the confusion of battle, many details went unnoticed by different witnesses. After the day's skirmish, the story's life was dependent on its being retold, and each witness added to or subtracted from the details. Many conflicts with a few consistencies put the Molly Pitcher tale into the category of legend and folklore.

Folklore versus Fact

But a legend she was not. The memory of those who marked her grave proved correct when the search for another unmarked grave in the area began in 1892. Mrs. Patton of Carlisle, searching for the graves of her infant brother and sister, requested digging in the area. She felt certain the grave then marked as Molly McCauly's was the grave she sought.

Mr. Frederick Hays, Molly's great-grandson, agreed to allow Mrs. Patton to dig up Molly's grave. He and Mrs. Patton's attorney stood near as the remains of an adult woman were uncovered at the spot marked as the grave of Molly McCauly. Molly Pitcher had been flesh and blood.

Ludwig Hays versus Hays McCauly

Accounts of the Battle of Monmouth reveal differing details of Molly Pitcher. Many are based on an assumption that Molly's husband was John Hays.

While preparing the bicentennial celebrations at Monmouth, Samuel Steele Smith searched for documented information about Molly Pitcher. Digging into the local archives of Carlisle, Smith found ev-

idence that Molly's husband's last name was Hays but that his first wasn't John.

Ludwig Hays. An eyewitness account from the battle revealed that Molly's husband was "a man of the artillery." Historians had found a marriage certificate for Mary Ludwig and Casper Hays. Next, the historians examined the listing of men at the Battle of Monmouth in artillery units. A John Hays surfaced as an infantryman who had been there.

Initially, John was the only Hays identified as present at the Battle. The historians inferred that Casper had a second name, John. From this came the assumption that Molly Hays' full name was Mary Ludwig (or Ludwick) Hays.

Hays McCauly. A later search by Samuel Smith found tax records in Carlisle showing William Hays, a returning Revolutionary soldier. After his death, property was listed in 1788 to "Mary Hays administrator of the estate of William Hays...." Continuing tax records show her as Mary and Polly. Since Mary couldn't write, this left the recording of her name to Carlisle officials.

Mary Hays remarried a John McCauly. Spelling variations of McCauly show that her second husband, John, couldn't write either. The records show that McCauly was assessed for the holdings of the widow of William Hays. (But no marriage certificate has been found for William Hays and Mary.)

The search then went back to the listings of the men at the Battle of Monmouth who would have manned the artillery guns. Smith found a William Hays in the Pennsylvania State Regiment of Artillery. The unit became the 4th Continental Artillery Regiment that served "notably at Monmouth...." Hays' service record states, "Gunner: William Hays, Place of birth, Ireland, Date of Commission May 10, 1777." A later document shows, "Hayes, William, discharged January 24, 1781, re-enlisted July 27, 1781."

Researchers initially had overlooked the Pennsylvania unit at the Battle because of its name change, and prior to their discovering it, they only had been able to determine one Hays (John, an infantryman) had fought at the Battle. Some erroneously inferred that Casper Hays to whom Mary Ludwig was married also carried the name John. But finding William in the Pennsylvania unit introduced a second Hays at the Battle of Monmouth—an artillery gunner.

If the man whom Molly Pitcher followed to war was not John Hays, then she was not Mary Ludwig Hays. Therefore, the name of Ludwig shouldn't be a part of Molly Pitcher's fame. Should researchers find a marriage certificate for William Hays and Mary, if one still exists, it would reveal Mary's correct full name.

German versus Irish

Based on whether Molly was Mary Ludwig Hays or Mary Hays McCauly, the controversy extends to whether she was of German or Irish descent.

German. A second monument placed at Molly's grave bears the name Ludwig. The book The Germans in Colonial Times lists her as a heroine with "Teutonic blood." Fairfax Downey wrote in Sound of the Guns, "Mary Ludwig Hays was a plain, ruddy-faced farm girl, as Pennsylvania Dutch as sauerkraut."

The first to try to connect Mary Hays to the Mary Ludwig found on the marriage certificate was William Stryker, the author of The Battle of Monmouth. Stryker claimed he even knew the name of her father, "John George Ludwig, who came to this country with the Palatinates."

Indeed, Mary Ludwig Hays' father may have been John George Ludwig of Germany. However, Mary Ludwig Hays wasn't married to William Hays, the artilleryman of the Battle of Monmouth—Mary Hays (and later McCauly) was.
Many secondary sources on Molly Pitcher relied on Stryker's use of the marriage certificate. Mary Ludwig Hays' parentage has been well-researched, whoever she was.

As interest grew during the centennial celebrations, publi-

cations of Revolutionary journals surfaced. Diaries and journals that previously had been published without accounts of Molly Pitcher appeared later with accounts added in. Dr. Thacker's Military Journal, 4th Edition, has a story of Molly Pitcher that the first, second and third editions did not have. Stryker's reliance on the marriage certificate of Mary Ludwig and Casper (assumed also to be John) Hays gave birth to more publications erroneously printing Mary Ludwig's name as Molly Pitcher's real one.

Irish. The majority of Carlisle was populated by Irish and Scottish immigrants during the Revolutionary days. Captain John B. Landis wrote "Investigation into the American Tradition of a Woman Known as Molly Pitcher" in 1905, which appeared in the Journal of American History in 1911. Landis wrote, "The real Molly, then, was a young woman of German parentage, living among the Scotch-Irish...." But locals described Molly Pitcher as an Irish woman. The people of Carlisle who knew Molly didn't use the word German to describe her; "Irish" appeared in every local account where nationality was mentioned.

Among those who remembered Molly was Harriet Foukle, daughter of Dr. George M. Foukle of Carlisle. Molly had worked for Dr. Foukle as domestic help. Harriet described her: "She wore a short gown, white or calico, a linsey striped skirt, very short and full, woolen stockings, heavy brogans, and a broad white cap with wide flaring ruffles." Brogans are coarse, heavy shoes made in Ireland.

Molly's former charge, Wesley Miles, in his article for The Carlisle Herald, described Molly and used the word Irish three times in his article: "...an aged Irish woman.... The Irish woman was employed by my father...." and "The remains of this Irish woman rest...."

Molly's Consistencies

Among all of the conflicts in and confusion about the story of Molly Pitcher, some detailed consistencies persist. Regardless of her name or national heritage, Molly was a buxom, plain woman who used rough language.

Buxom. The physical descriptions were similar. Harriet Foukle remembered, "She was homely in appearance...average height, muscular, strong and heavy-set." Wesley Miles described her as "...an aged Irish woman, past sixty, healthy, active and strong, fleshy and short of stature...." Fairfax Downey stated that Molly Pitcher was a "plain, stocky, ruddy girl, with a tuft of hair on her nose." In his poem, Downey describes her:

"A sturdy lass, a buxom lass, Good Pennsylvania Dutch.
On Molly Pitcher's ruddy face, No trace of beauty's touch."

Common Language. Molly's choice of coarse language often appeared in descriptions of her character. Stryker, in an explanatory note, quoted a Miss Ege, who knew Molly: "Molly was a rough, common woman who swore like a trooper."

An eyewitness to Molly's deeds at Monmouth, Joseph Plumb Martin, recounted her reactions during the Battle. While reaching for a cartridge to load her cannon, a British shot came "directly between her legs without doing any other damage than carrying away all the lower part of her petticoat. Looking at it with apparent unconcern, she observed that it was lucky it did not pass a little higher, for in that case it might have carried away something else...." Wesley Miles remembered, "to go beyond her presence, and to street to play, childlike, with other boys, would excite her passion to profanity."

Controversy Continues

The Carlisle Historical Society published an article, "Goodbye, Molly Pitcher" in the Cumberland County History, Summer, 1989. The author corrected many of the misconceptions about the Molly Pitcher story. The article is compiled from the notes of D.W. Thompson with additions by Merri Lou Schaumann, a Pennsylvania genealogist. The original work was published around 1976.

The people of Carlisle reacted unfavorably to their tampering with a local legend. Local television crews came to the Society to interview the author. The public of Carlisle resented the implications that what was literally engraved in stone was wrong.

Conclusion

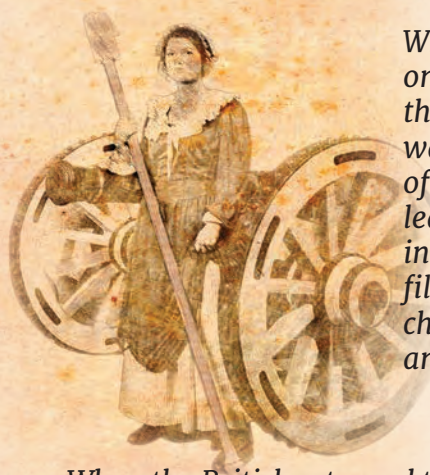
Carlisle benefits from the Molly Pitcher story. The town boasts of "Molly Pitcher Clubs." If her deeds of bravery and valor cause these groups to use her as a model, then she deserves to have her life properly documented.
Mary Hays McCauly was not just a figure of folklore; she lived. Molly Pitcher stories always will be retold with errors, but Mary Hays McCauly, as a historical figure, deserves the truth to be told.

ABOUT THE AUTHOR:

Constance M. McDonald, wrote this article as a brief of a college research paper. She graduated from Cameron University, Lawton, Oklahoma, majoring in History and had previously attended the University of Tennessee at Chattanooga. To document her research, Mrs. McDonald has copies of several of the original Carlisle records on Molly Pitcher and of articles and accounts that have appeared in various publications. Connie served on the Board of Directors for USFAA and worked for over 4 years on concepting the requirements for the Esteemed Artillery Order of Molly Pitcher Award. It is now given to senior Artillery spouses around the globe. This is a lasting legacy to the work Connie contributed to the Association. As an Army wife, she has lived in Oromocto, New Brunswick, Canada; Fort Liberty, North Carolina; Fort Sill, Oklahoma, Garmisch, Germany, Washington DC, Fort Knox Kentucky, Redstone Arsenal, Alabama, and Vicenza, Italy. McDonald and her husband Mark now enjoy retirement in Tennessee.

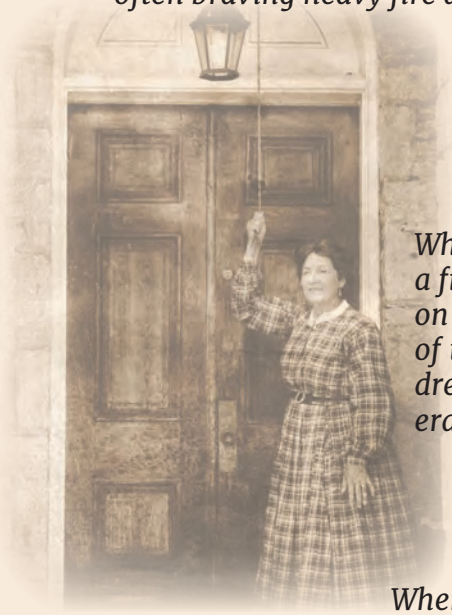
An Ode to Molly Pitcher

By Kayla Walker and Rachal Smith



When Mary Hays McCully picked up her Field Artillery Husband's ramming staff on the battlefield at Monmouth in 1778 so that the cannon crew could continue in the fight with the british opposition, the ideal archetype of a field artillery spouse was born. Molly showed fearlessness in the fight, a strong patriotic heart and a love of the branch. However, she also showed a caring compassion in the long months leading up to the Battle at Monmouth. You see she was like so many wives, leaving the homestead and following the new, and undermanned continental army to fill positions as cooks, nurses, laundresses and many more roles. This ideal would change over the many generations since, but still carry the compassion, strength and patriotic duty that is the core of a Molly Pitcher.

When the British returned to our new nation to try and take back the hard fought victory of the Revolution, I continued to support the Field Artillery by traveling with the troops. I served as a nurse and laundress for the Cantonments. During heavy artillery fire I would carry red-hot cannonballs to the 6-pound cannon often braving heavy fire and the risk of our own cannons exploding.



When our border with Mexico was in danger of being breached by the Mexican Army in a fight for Texas, we were a young country expanding westward. The western frontier on a military post was not an easy life, and with our artillerymen deployed in defense of the border, it was even harder. I took over as the post teacher, educating the children. It was the best way I knew to help the families and ensure we had a future generation to lead when the time came.

When war broke out between the states I gathered tools, cookware, jewelry and even heirloom silver to be melted down and made into ammunition and cannon balls. I collected linens and curtains and even donated my petticoats to be torn into long bandage strips for the field hospitals set up to help the wounded. I prayed and waited for word from the southern battlefields that my artillerymen wouldn't be on the list of dead or wounded.

When we were called into the Great War in France, I continued to care for the homefront. I marched and went to political rallies. I knew the right to vote for women was important to the shaping of our nation, and through service and sacrifice I helped claim full citizenship for women. I wrote letters every week to my artilleryman in France, and waited months for a reply. I never gave up hope.

When the terrible tragedy of Pearl Harbor took us back to foreign shores our men left their jobs in the factories so I donned a work uniform and went to work in their place making rounds to send to the front. I sent care packages and kept my figures crossed that it would reach my artilleryman and bring him a bit of comfort from home.

When the North Koreans invaded the peninsula, and our troops left to defend once more I helped organize home front initiatives, and volunteered with the post officer's wives club to help with the welfare of the families stateside. I also volunteered with the USO helping support troops leaving for the front. I gave a little bit of comfort to those nervous young men.

When our Artillerymen were called upon again to support our country in Vietnam, things at home remained politically turbulent. I built a community with the families of fellow soldiers in our FA unit. I organized dinners and often traded child care to help other spouses get a break when needed. We tied yellow ribbons around trees, like the old song says, and were proud that our soldiers were serving their nation.

When the first Gulf War started we picked up those support groups that had gotten so many of us through the wars before, however now we were formally recognized in supporting family readiness. We took care of each other and shared information about our partners units, which brought a sense of connection to our Family Members fighting in the vast deserts of the Middle East. These times were the beginnings of new opportunities for military spouses in all sorts of workplaces and some of us even served in various roles alongside our Artillerymen.

Post 9-11 saw a huge change in the previous traditional roles of "Mollys". As the style of war has changed, so has my role. You can still find me taking care of the home, serving in support roles and helping with family readiness and staying strong during the constant change of continuous deployments. But you can also find me on the front lines serving our country as a Redleg, you can find me on Capitol Hill lobbying for benefits and support for Soldiers, Marines, and families of those who have given all. My role is broad but the support I give to the Artillery community is vital.

Through the years Molly's spirit has been reflected in thousands of faces, of every race, religion and sex. The need of voluntary support is never lacking, and the call is repeatedly answered with a resounding outpouring. Our Artillery "Mollys" will fill new roles as we head into the future, but they will always be there to pick up the ramming staff and carry on.

Training Multinational Corps on Joint Air Land Integration

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

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

Joint Air-Land Integration Initiative

The training and readiness of the U.S. Army and U.S. Joint Force may not be enough to win the next war alone. We will need to fight alongside our partners and Allies to bring the strength and capabilities of a coalition to the fight. Future U.S. Army efforts must center on the training and readiness of the entire coalition to achieve battlefield success. The current conflict in Ukraine highlights the complexity of large-scale combat operations (LSCO) and the need to continue to ready U.S. and coalition forces to ensure integrated deterrence or to fight and win if called upon. Interoperability remains a constant challenge but shouldn't prevent efforts to train land and air forces on integrating capabilities, and training staffs to fight in LSCO. Recent changes in command structures across NATO have simplified command and control for the land and air components. This unity of command and intuitive leadership allows subordinate commanders to lead efforts to train and integrate more than has ever been done before in Europe. Joint air land integration is one area that we see renewed interest and focus as we continue to learn lessons from the current conflict in Ukraine. Many nations across the globe question how their forces could conduct air land integration in LSCO at echelon. In short, staffs at the Division and Corps levels must continue to train the basic principles and find ways to exercise and learn how to fight their formations. How then do you train both a U.S. and multinational staff outside of a major warfighter exercise/combat readiness evaluation, or prepare them to participate and excel?

One approach to the training we are adopting in USAREUR-AF, is to develop a scalable and repeatable training program of instruction (POI) to train these staffs. A shortfall of relevant experienced coupled with an immediate demand for capability across NATO force structure drives the need for both short and long-term approaches to building expertise. The basic premise is to utilize existing organizations and enhance the Combat Readiness Evaluation (CREVAL). Naturally, it will take time and resources to institutionalize ALI training creating a sustainable model within NATO Force Structure (NFS). While that system comes online, the immediate solution focuses on a small mobile training team (MTT) that attempts to visit each of the ten multinational corps and train them on air land integration. If this MTT can increase the organic capability of a Corps or Division to accomplish their wartime mission, we consider this success. We also recognize this is the "commercial off the shelf solution", and the need exists to institutionalize this process across NATO and develop doctrine and SOPs to promulgate lessons learned and drive change for future

operations and training.

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

The four-day model explained:

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

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

Day 3: This day focuses on the measures and controls necessary for synchronization. To enhance understanding and build the team, a practical exercise portion will reinforce concepts introduced earlier in the POI. This practical exercise demonstrates the building of a unit airspace plan (UAP)
to underscore the importance of accounting for all planned airspace usage. Further experience is generated through a battle drill focused practicum. This demonstration of how a JAGIC operates in specific scenarios emphasizes the importance of the skills need, and arrangement of the cell.

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

JALI ACADEMICS

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

cussion on developing a sustained training plan.

Beyond Academic Foundations

The logical progression of training for NATO Corps is development of individual skill proficiency for the staff team. This can be gained through a variety of training sources including National Institutional Training, NATO Schools, and unit on the job training. Beyond the individual level the progression to collective training requires more deliberate planning and resourcing. Opportunities available during the near term, short of tier one exercises, include AIRCOM Find, Fix, Track (F2T) events, USAFE Air Warfare Center (UAWC) training network and simulation, Unit level digital skills training (DST). F2T events provide a short duration training experience with NATO air assets participating in live fly events that could scale to include land forces participating in sequence with dynamic targeting events. UAWC operates on up to 13 different networks and has the capability of connecting remote systems to facilitate scenario-based training. Units partnered with USAREUR rotational forces bring both experience and access to battle labs enabling DST like training for partnered forces.

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

Conclusion

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

ABOUT THE AUTHORS:

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

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

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

JALI Proficiency Roadmap

2023	2024	2025
• Individual Training (ex NJTS) • Initial Academics 4x Corps o MNC-NE o Euro Corps o RRC-FR o MNC-SE • JAGIC SOP Development • Finland JALI Conference • NATO F2T	• Transition to Collective Training • Additional Corps Academics • SOP Implementation • CREVALs • Expanded Discreet Training Events • Sustained Training • Over the Shoulder Coaching • Increased Systems Interoperability	• Improved Academics • Institutional Base for NATO • CREVALs • Discreet Training for Sustainment • Exercise OC/T Support • Systems Interoperability

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Reorganizing for Intelligence Success:

The Case of DIVARTY

By: CPT Raymond M. Ferris

Statement of the Problem

The Division Artillery's (DIVARTY) intelligence section is unable to self-sustain itself as the division's premier intelligence cell in support of targeting without additional personnel or equipment. With only limited intelligence equipment and a lack of organic maintenance support for intelligence systems, Division Artillery risks being unable to provide the timely and accurate intelligence necessary to satisfy the priority intelligence requirements of brigade or division. When an intelligence system fails, DIVARTY is entirely reliant upon the division G-2 for support, which requires significant coordination as DIVARTY is not cleanly co-located with the division headquarters. This creates gaps in intelligence capability and leads to a desynchronization of intelligence with division operations.

The Division Artillery

As the Army progressively moves toward a more large-scale combat operations-oriented force posture, the need for capable long range fires units has become increasingly vital to the success of DIVARTY's operations. According to the U.S. Army, the mission of the DIVARTY "is to provide long range precision fire support capability to the commander. DIVARTY coordinates, integrates, synchronizes, and employs fires to achieve the division commander's objectives" (Department of the Army n.d.). It is responsible for the division's deep fight. But to achieve this success, DIVARTY requires an effective and robust intelligence section.

The DIVARTY S-2, acting in a similar role as that of a brigade S-2, is essential for the success of that section. The S-2 is responsible for the construction, development, and dissemination of intelligence focused on enemy fires while also providing intelligence to support effective targeting. Tailoring products to fit the specific mission set of a unit is standard procedure for the S-2 staff. DIVARTY, however, is distinctive in that it is a functional brigade that operates essentially as an extension of the division headquarters. It has its own brigade commander, but currently with personnel the size of a battalion.

DIVARTY vs Brigade Combat Team

The standard brigade combat team (BCT) relies on its organic military intelligence company (MICO) for intelligence support. Specifically, it emphasizes the services of a 353T, an intelligence systems maintenance and integration technician (https://recruiting.army.mil/ISO/AWOR/353T). This Soldier is the warrant officer equivalent of a 35T, a military intelligence systems maintainer and integrator (https://www.goarmy.com/careers-and-jobs/career-match/signal-intelligence/languages-code/35t-mi-systems-integrator.html). A standard brigade combat team has one 353T, one 35T30 (E-6), two 35T20s, and five 35T Soldiers (E-4 and below) per the Modified Table of Organization and Equipment (MTOE). This accounts for a total of nine 35T personnel to provide support to the intelligence war fighting function within the brigade.

The DIVARTY has zero slots on its MTOE for any type of intelligence systems maintainer or technician. The same is seen with combat aviation brigades and sustainment brigades. However, it is crucial that the DIVARTY integrates 35Ts due to the direct mission set of supporting the division's maneuver elements. This lack of manpower and equipment dramatically impacts the S-2's ability to provide the DIVARTY commander, who also serves as the division's fire support coordinator, with accurate federated intelligence. It is a limitation that creates mission risk.

Risk to Mission

The lack of intelligence personnel considerably decreases the DIVARTY commander's decision-making capability because of inadequate intelligence and analysis. Consequently, the commander must rely on the intelligence assessment by the division G-2. Typically, the intelligence products from G-2 are too strategic or broad in scope to provide effective support to the DIVARTY commander's decision-making process. With no personnel trained on intelligence systems maintenance, the DIVARTY S-2 must coordinate with the division G-2 to provide out-

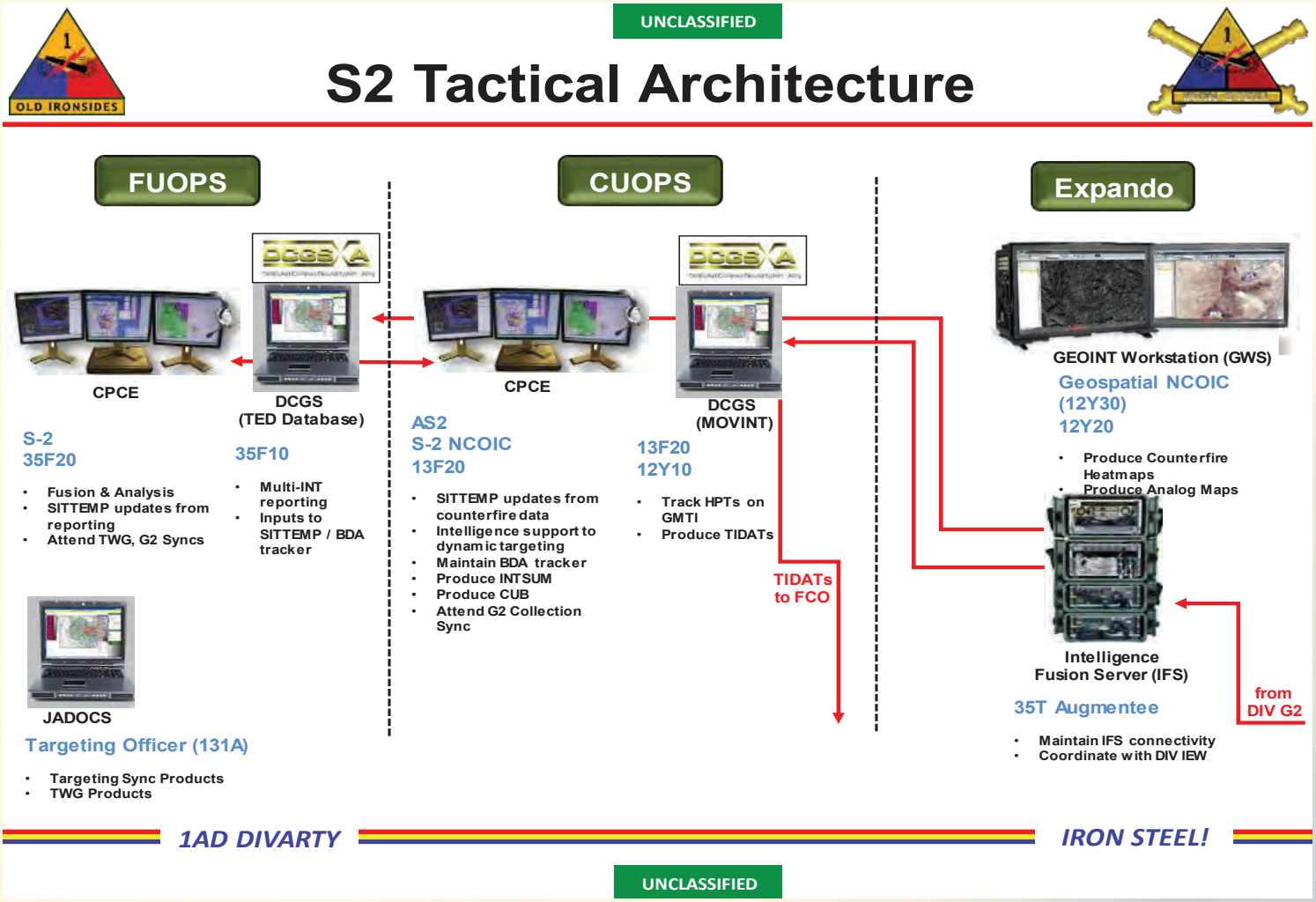
side support. This creates a single point of failure for both DIVARTY and division. Additionally, there is only one IFS stack that exists within the DIVARTY, whereas a brigade combat team has three IFS stacks to mitigate the risk of relying on only one server.

When intelligence systems fail at division and DIVARTY, maintenance support is over-extended thus significantly eroding the ability to win the deep fight. As a direct consequence the commander will lack accurate and timely intelligence necessary for future combat operations. This was an issue the 1st Armored Division, Division Artillery faced during its rotation to the National Training Center (NTC) in September 2023. The S-2 section had a very knowledgeable NCO on intelligence architecture, however this NCO did not have administrative rights on the singular IFS stack and therefore could not provide a full solution to the issue of IFS stack failure. This forced the unit to await divisional support, which was already facing issues with their own stacks in addition to limited bandwidth on manpower. This resulted in an extreme delay producing an accurate and updated common intelligence picture for the commander. As divisions become the new unit of action and adjust their training plan to incorporate rotations to combat training centers, it is necessary to have capable and enabled sections at echelon. To address this problem there are two possible solutions that can complement each other upon implementation.

Possible Remedies

The first possible remedy is to request a change to the MTOE in terms of equipment and personnel. A change to the DIVARTY MTOE allocating 35T support, specifically, personnel, and additional IFS stacks to facilitate the necessary redundancy for mission accomplishment. The additional stacks also mitigate the risks associated with a single point of failure. The Army must adjust the MTOE to include an allocation of a minimum of two IFS Stacks, and more preferably, three to DIVARTY. This is particularly pertinent as the DIVARTY transitions to reabsorbing the fires battalions from the BCTs according to the redesign plan of Army 2030 (United States Army/U.S. Army Training and Doctrine Command/U.S. Army Combined Arms Center). This would align with those allocated to a BCT. Further, the Army will need at least one 353T, one 35T30, and three 35T10s for a total of five 35T personnel assigned to DIVARTY to maintain the intelligence systems.

These allocations would enable the intelligence section to operate independently and serve as a companion to division, rather than a combat minimizer. The DIVARTY S-2 would then be self-sustaining and not reliant on divisional support for intelligence architecture if the



IFS stacks were in need of maintenance. As we advance to large-scale combat operations in our doctrinal development, transferring personnel from brigade combat teams and repositioning them within divisional elements is a possible strategy for identifying the personnel necessary for the implementation of this solution.

The second proposed remedy is similar to the first in that it requires a change to the MTOE, albeit only in terms of equipment. With the Department of Defense facing a recruiting shortage across the joint force, requesting additional personnel might be challenging. But if the DIVARTY was able to add an additional IFS stack and cross train the senior 35F on intelligence systems maintenance, then this intelligence deficiency exists no longer as a critical capability gap, but a combat multiplier. Cross-training the senior 35F or the Soldier with the most training on intelligence systems maintenance, allows the S-2 section to maintain its equipment without external support. Coordinating training with division's 353T and gaining administrative rights to maintain DIVARTY's intelligence equipment would enable DIVARTY to self-recover. This remedy increases the capability of the intelligence section to become self-sufficient. This ability for independent action is especially valuable when there are system disruptions or unanticipated frictions. The assignment of an additional IFS stack to DIVARTY allows for redundancy and mission continuity in the event of server failure. The intelligence section can continue to operate off the second IFS while the first server is under maintenance. This remedy is also highly feasible since it only requires additional equipment and no additional personnel. The cost and logistics associated with this solution is minimal, with time being the major factor. A training session coordinated with the division 353T can achieve this desired effect. This is a conversation between the 353T, DIVARTY S-2, and the Division G-2 to obtain enough training on the system to remedy basic system issues and common intelligence system malfunctions such as the inability to pull data from higher or connect intel systems to the stack. Unless the 353T determines a specific course, the home station can remedy the issue with the major cost being time.

Summary and Discussion

Without a capable and robust intelligence section within DIVARTY, significant intelligence capability gaps exist, making the division vulnerable to enemy attack. Understanding this vulnerability is critical as Army doctrine emphasizes the division as the unit of action within large-scale combat operations. The Army must consider the proposed remedies for the improvement of the intelligence capabilities of DIVARTY.

With each possible remedy, the DIVARTY intelligence section becomes capable of sustaining itself and providing the commander with federated intelligence. It also allows the intelligence systems to operate independently, without the support of division's G-2. Subordinate and adjacent units to the division must be able to sustain themselves without the need for divisional support, especially DIVARTY. To prevail in the division's deep fight and shape operations for the maneuver elements, an intelligentization of DIVARTY is necessary to increase the lethality of the Army's divisions. By providing multiple IFS stacks, 35T personnel positioned within the DIVARTY, and cross-training the senior 35F or the Soldier most capable on intelligence systems maintenance and integration, DIVARTY can provide a robust response to our nation's enemies.

ABOUT THE AUTHOR:

CPT Raymond Ferris is currently a student at the Military Intelligence Captains Career Course (MICCC). Among his previous assignments, he served as the assistant S-2 for the 1st Armored Division, Division Artillery, and as an executive officer for Bravo Company, 532nd Military Intelligence Battalion, 501st Military Intelligence Brigade.

BALTIC THUNDER

In Klaipeda, Lithuania, on 27 July, 3-16 FAR, during a NATO Partnered Live Fire shoot into the Baltic Sea, 3-16 FAR shot its first live-fire degraded (manual) mission in over eight years. The Battalion Master Gunner (MG) SFC Davila set conditions earlier that week by establishing a Fire Control Alignment Test (FCAT) location that met the requirements to conduct an FCAT on the M109A6 paladin. With the help of the Lithuanian land forces, a Vs-17 panel is emplaced 2.47 Km across the Baltic Sea to serve as a distant aiming point. Due to the condensed training area, this was the only way feasible to create an FCAT site. Leveling the trunnions was difficult on the softer terrain, but it was possible with careful and precise measuring. Our 91Ps (Self Propelled Artillery Maintainer), Gunnery Sergeants, and BN MG conducted a successful FCAT ensuring all optical sights are accurate. Two Aiming circles are calibrated, and a declination station is used to manually lay the gun on the azimuth of fire. Our Alpha Battery Platoon Leader laid the gun, and it is safed by the BN MG.

The following day came, and the first mission is set to come down with the M109A6 being laid manually on the azimuth of fire and using its optical equipment M117A2 panoramic telescope, and M145A1 mount to lay on target with the aid of its M1A2 infinity collimator. Data is checked and verified by the Section Chief, and the command to fire is given. Forward observers called back splash, and all rounds observed safe.

Rocket Artillery, the DIVARTY, and Long-Range Shaping Fires at the Tactical Level

By: CPT Mike Kelly & CPT Jack Skillman

The U.S Army's pivot towards large-scale combat operations (LSCO) has directly resulted in a force-wide emphasis on massed, long-range precision fires. Significant strides have been made regarding the development and acquisition of new systems as well as the modernization of existing ones. Barring any major disruption, the "modernization complete" Army of 2030 will be well equipped to strike a near-peer
adversary in depth and at scale.

The Army has already answered the question of what systems and munitions will be used to achieve this end. It has not definitively answered the question of who will use them and in what quantity. We believe each division (DIV) should be task organized with two organic rocket batteries at a minimum. This task organization is essential if divisions are expected to operate as combined arms units of action within LSCO, shaping for their subordinate brigade combat teams (BCTs) while reducing their level of dependance on corps FABs.

TASK ORGANIZATION OF THE DIVISION IN LSCO, THE DIVARTY, AND THE LIMIT ATIONS OF CANNON ARTILLERY

Historically, the DIV is the smallest unit capable of independently conducting combined arms operations and sustaining them over time. There is widespread understanding across the force they will act as units of action in LSCO. There is also a common misconception regarding how they will task organize and deploy to conduct those operations. Divisions will not deploy in their "garrison configurations", where the Division HQ all its organic BCTs and functional brigades (BDEs) forward. Instead, a Division HQ will rapidly deploy or already be forward deployed once a conflict begins. BCTs and supporting units will be drawn from across the force and deployed. They will be task organized to that Division HQ upon entering theater and in effect, fall in under a two-star flag which isn't their own.

A division executing LSCO can ex pect a ratio of one cannon artillery Battalion per BCT at minimum. Divisions can also expect to receive additional cannon Battalions not aligned to a BCT. This augmentation is feasible with the advent of division artillery (DIVARTYs), which have the capability to command and control multiple Battalions and manage changes to command-support relationships during the course of an operation. During warfighter exercises, it is common for DIVARTYs to control as many as eight separate artillery battalions at a given time, though the number is usually closer to five.

A large quantity of general support (GS) artillery allows a division to effectively shape within its close area but fails to address a larger dilemma. The proposed battlefield framework of multidomain operations (MDO) will require divisions to assume responsibility for a deep area extending over 100km beyond its forward line of troops (FLOT). Division GS cannon artillery will only be able to mass on targets out to roughly 30km. This figure also assumes the use of unguided extended range projectiles, and the assumed risk of firing from position area for artillery (PAAs) near the FLOT. This results in the division fighting within a BCTs area of responsibility, operating concurrent to those BCTs and not shaping for them in advance.

THE FIELD ARTILLERY BRIGADE

At present, the Army's rocket artillery battalions are housed within Field Artillery Brigades, each of which is modified table of organization and equipped (MTOEd) 16 total launchers. The FABs primary mission is to serve as the force Field Artillery headquarters or counterfire headquarters to a corps. It can assume the same roles for a theater land component or joint task force. In practice, FABs are likely to act as force providers to divisions during LSCO as well. They provide trained and equipped rocket battalions attached to divisions and controlled by the DIVARTY. FABs will engage targets short of a corps FSCL, many of which are likely to be within a division's area of operations (AO). This is especially true in the context of counterfire. As a result, divisions benefit from corps FABs sharing some of the burden associated with the long range counterfire fight.

THE DEEP AREA IN MDO

This calculus is likely to change in the future. FABs will receive extended range munitions enabling strikes into what MDO framework defines as the "Deep Operational Fires Area". The leading edge of this area is projected as roughly

HIMARS fires during a combined fires mission during exercise Al Tehreer.
Photo by: Master Sgt. Matthew Keeler

150km beyond the FLOT. Multi-domain task forces (MDTFs) will contribute to this effort with systems of their own. It should be noted however, each MDTF is authorized only one longrange precision fires battalion, based on the expectation corps level shooters will be placed in a reinforcing support relationship to the MDTF. FABs must meet corps level requirements while simultaneously supporting theater level ones via their relationships with MDTFs, limiting the level of support they provide to divisions, who will have to bear an increased level of responsibility for servicing targets at their level. MDO battlefield framework defines this area as the deep maneuver area. It is best described as a combination of the division deep and corps close areas when using current verbiage. BCTs cannot range it, and corps shooters lack the resources to simultaneously take responsibility for it. The obvious conclusion is that this area, ~40-150km past the FLOT, is the responsibility of the division.

GS ROCKET ARTILLERY FOR THE DIVISION

The most effective solution to this problem is to provide the DIVARTYs with organic rocket artillery battalions, capable of operating in a GS role to the division. The DIVARTY has two primary obligations to the division during LSCO: suppression of enemy air defense (SEAD) and counterfire. Both are key enabling tasks and cannot be reliably accomplished with GS cannon units due to their limited range.

The DIVARTY simultaneously functions as the division force Field Artillery headquarters and counterfire headquarters. Success in the counterfire fight is essential to the success of the division at large during LSCO. Adversary forces employ a large volume of surface-tosurface systems and will seek to rapidly attrit friendly maneuver formations using constant, massed fires. BCTs are manned and equipped to execute reactive counterfire, but their ability to effectively do so in practice is highly limited. Their organic cannons will fail to range most targets, even if positioned just short of the BCTs FLOT. Furthermore, counterfire is an activity where seconds matter and every friction point significantly increases the likelihood of target decay. If a target is acquired and ca not be ranged, BCTs cannot afford the time needed to pass the mission to a higher unit. If cross boundary fire is required, they cannot afford the time required clear another unit's ground. If the trajectory will break the coordinating altitude, BCTs cannot afford the time needed to clear air via the division aviation element. With these factors considered, DIVARTYs lead role in the counterfire fight is not merely convenient, but necessary. Rockets provide the range needed to meet this requirement, and the organization of the DIVARTY allows for consolidated, expedient mission processing.

Rocket artillery is also essential for effective surface-to-surface SEAD. U.S. forces will enter LSCO enjoying an advantage held for decades prior; a far superior quantity of sophisticated rotor and fixed wing air support platforms. The enemy will attempt to negate this advantage by employing a large and robust integrated air defense systems (IADS) network. Adversaries are aware that U.S. and coalition commanders are averse to the notion of friendly aircraft entering surface-based weapon engagement zones. So long as this limiting factor is in place, ground forces will be forced to engage the enemy on more equal terms. Joint SEAD operations will likely precede the commitment of ground forces into an AO, but they can still expect to contend with a formidable surface-to-ai threat. At the division level, DIVARTYs assume the task of breaking the IADS network and enabling air-to-ground strikes in depth. While this would enable close air support (CAS) and aid interdiction (AI), it is especially vital given the role of the combat aviation brigade (CAB) in LSCO. The CAB is the most lethal asset available to a division and is capable of destroying large enemy formations if given the freedom to maneuver. It is unlikely that cannon artillery will be able to range most targets within the enemy IADS network, most of which will array themselves within the enemy support zone.

It is important to remember that delivery is only one aspect of the targeting cycle. Identification and battle damage assessment (BDA) are also essential. A DIVARTY is significantly more capable of counterfire and SEAD at scale, as well as engaging other high-value targets/high-payoff targets (HVT/HPTs) with precision fires. The DIVARTY (and the JAGIC by extension) are more directly tied to sensors at the division level, such as Grey Eagle and DIV level request for deployment order (RDO) compiled from multiple Q-53s. Its C2 capabilities also enable the integration of sensors that exist at higher echelons, such as special operations forces (SOF), ground moving target indicator (GMTI), electronic intelligence (ELINT) acquisitions, and national or multination technical means of verification (NTM). A BCT could theoretically employ rockets, but a DIVARTY is the lowest echelon capable of integrating them into the targeting process and generating desired effects.

SUSTAINMENT REQUIREMENTS YET UNSATISFIED

There are numerous challenges that must be overcome if divisions are to receive organic rocket battalions. Unfortunately for those divisions, most of these challenges are not ones they can resolve internally. Instead, they must be addressed at the enterprise level.

Rocket battalions supporting LSCO will generate significant sustainment requirements, even more so than their cannon counterparts. Rockets are CLV intensive, due in large part to the size of their pods and the common attack guidance they adhere to. An multiple launch rocket system (MLRS) BN has a pod capacity of 288 (128 with Distro PLT, 128 with section re-supply vehicles (RSVs), and 32 on launch-

ers). High mobility artillery rocket system (HIMARS) battalions carry half, due to their common use of the family of medium tactical vehicles (FMTV) as a base for launchers, RSVs, and distro vehicles. Rocket battalions are very capable of internal sustainment but sustaining the battalions themselves is much more challenging. Division GS rocket units do not benefit from the linear battlefield framework that BCTs operate within. BCTs receive supplies from a brigade support area (BSA), which in turn receives from a division support area (DSA). DIVARTYs cannot sustain through an organic BSA, as they operate across the division AO. Instead, Divisions must devise a way in which class five (CL V) is moved to BCT BSAs and transferred to rocket battalions.

Divisions can develop more efficient ways of moving CL V to rocket battalions once they take custody of it. The greater challenge lies in getting CL V to the DSA in the first place. Assuming the common experience of DIVARTYs during warfighter exercises reflects potential real-world conditions, rocket battalions will experience the following trends. They will expend approximately 25% of their CL V every 24 hours and begin failing to meet FATs after 72 hours as they gradually begin reducing fire orders, unless they can be resupplied. The root cause of this problem is the overall quantity of CL V available at the theater level, and this is a problem that must be solved at the enterprise level. During FY22 warfighter exercises, the start of exercise (STARTEX) quantity of GMLRs available in theater stocks was approximately 700 pods, roughly 75% of which were M31 Global Positioning System Multiple Launch Rocket System (GMLRS). M31s carry a 200lb unitary warhead. They are effective against point targets, but not the BTRY sized FA and ADA formations DIVARTYs must target in order to shape effectively. A standard counterfire order is 4 pods when using dual-purpose improved conventional munition (DPICM), this number is often doubled to 8 pods when units are forced to shoot M31 in counterfire role. There is often an abundance of M26 (unguided DPICM) available, but these rockets have a max range of 32km. They can only be employed by launchers firing from just short of the FLOT, significantly reducing their effectiveness. The M26A2 variant has an extended range of 45km, but there are so few in worldwide stock that they are all but irrelevant from a targeting perspective. At present, M26A2 has been phased out of use, and there are no plans to adopt a more modern unguided rocket with extended range. M31s have been highly effective during the GWOT, but the Army must seriously reconsider the role of DPICM in LSCO. It must also reevaluate the importance of cheaper, unguided rockets.

The Army must also build the capacity to sustain these new rocket formations, regardless of what munitions it ultimately equips them with. The Army would need to stand up 11 new Brigade Support Battalions, assuming each DIVARTY in the active force receives organic rocket units. This not only requires the facilities and equipment, but the personnel as well. Consider the maintenance requirements for example. HIMARS chassis are maintained by 91Bs (Wheeled Vehicle Mechanics) while MLRS chassis are maintained by 91Hs (Bradley Fighting Vehicle Systems Maintainer). Furthermore, the launcher modules of both are the responsibility of 94Ps (Multiple Launch Rocket System Repairer). Keeping these new Battalions mission capable would require a noticeable expansion of the Ordnance Branch MOS population.

CONCLUSION

Providing Divisions with organic rockets is the most means of shaping on behalf of BCTs in depth. It allows the Army to bridge the critical gap between long range fires in the operational deep area, and massed cannon fires in the close fight. Doing so will be a challenge that requires the adoption of new doctrine and training, and it will stress the systems of enterprise level acquisition and fielding. It is necessary despite the challenge. Shaping operations at echelon are only effective if continuous and cannot be gapped in the ~40- 150km range. If Divisions are to be units of action, they must have the means to shape decisively. Failure to do so means that Divisions are more likely to face and enemy fighting on its terms, and U.S forces have no intention of fighting fairly.

ABOUT THE AUTHORS:
CPT Michael Kelley: I am originally from Mount Hope, WV and commissioned from West Virginia University ROTC in 2018 with a degree in International Studies and Economics. Following FA BOLC, served in the 41st FA BDE and 7th Army Training Command in Germany from 2018-2022. After CCC, I am headed to 1-2 SBCT at JBLM.

CPT Skillman commissioned through Ohio University ROTC and is currently an FACCC student. He previously served as a member of 2-15 FA and the 10th Mountain DIVARTY.

A U.S. MLRS fires a reduced-range practice rocket during Joint Operation Lightning Strike in Rovajärvi, Finland. Photo by: SGT Nicholas Goodman.

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ENCRYPTED

Cellular Communication as a Fire Support System

By: CPT David de Leon, CPT Christopher Kerasotes, and CPT Spencer Pereschino

Modern fire support systems for targeting and fire mission processing require significant coordination and time. An observer is left in the dark for sometimes as long as an hour while echelons above coordinate efforts to approve, modify, or deny calls for fire. Meanwhile, maneuver elements pay the price in tempo, audacity, and concentration. In order to have effective fires, they must be timely and accurate.

The dependency on cellular devices is not a challenge unique to United States armed forces. The weaponization of cell phone use and data collection can be the difference between victory and defeat. However, there are many benefits to effectively utilizing this phenomenon as a tool. Modern technology enables accurate location tracking within meters through mobile app location data and the triangulation of individual phone signals off cell towers. Something as simple as a "Snap Map", a device used to find and locate friends on Snapchat, can be used to accurately locate positions of forces on the battlefield. Opposing forces at the National Training Center discovered this as the single most lethal way to target rotational unit position areas for artillery and maneuver command posts. Soldiers who had most recently used mobile apps on their cellular devices were unknowingly sending time stamped location data across an unsecure network.

There are many possibilities for the use of encrypted cellular applications or tablets on the battlefield allowing for quicker communications and long-range messaging. Until now there was little to no real-world experience to learn from, only theories. With the recent war in Ukraine, encrypted cell phones may have a place in the modern battlefield. A presentation from the 41st Field Artillery Brigade (FAB) outlines some of the key takeaways of the Ukrainian Field Artillery (FA) communications architecture.

Prior to the 2022 invasion, Ukraine was encouraged by western powers to adopt and fund a "secure communications" architecture. However, when Russia invaded Ukraine the FA branch decided to mostly forgo the high-frequency (HF) systems they were outfitted with and primarily utilized handheld radios and Bluetooth/Wi-Fi cell phones. While HF is resistant to jamming, its signature stands out on the battlefield. The Armed Forces of Ukraine (AFU) prioritized their approach to communications security (COMSEC). The first is to prevent an enemy sensor from picking up their emission. The second prevents an enemy from being able to fix on the location. The third prevents an enemy from being able to characterize the nature of unit activity. In this regard, cell phones worked better for the AFU over HF and traditional means of communication. The AFU was largely successful in being able to communicate without Russian electronic warfare (EW) assets ascertaining the location of friendly positions.

With FA equipment specifically, the AFU utilized Starlink satellite internet systems and pushed it down to the battery level. The Kropyvas systems at particular locations could connect to Wi-Fi routers and cell phones would be used in Wi-Fi mode for secure voice over internet protocol (SVOIP) and text. The satellite antenna is directional and would evade enemy EW assets from picking up AFU emissions. Another advantage for the Starlink system is user friendly and intuitive use, requiring minimum training.

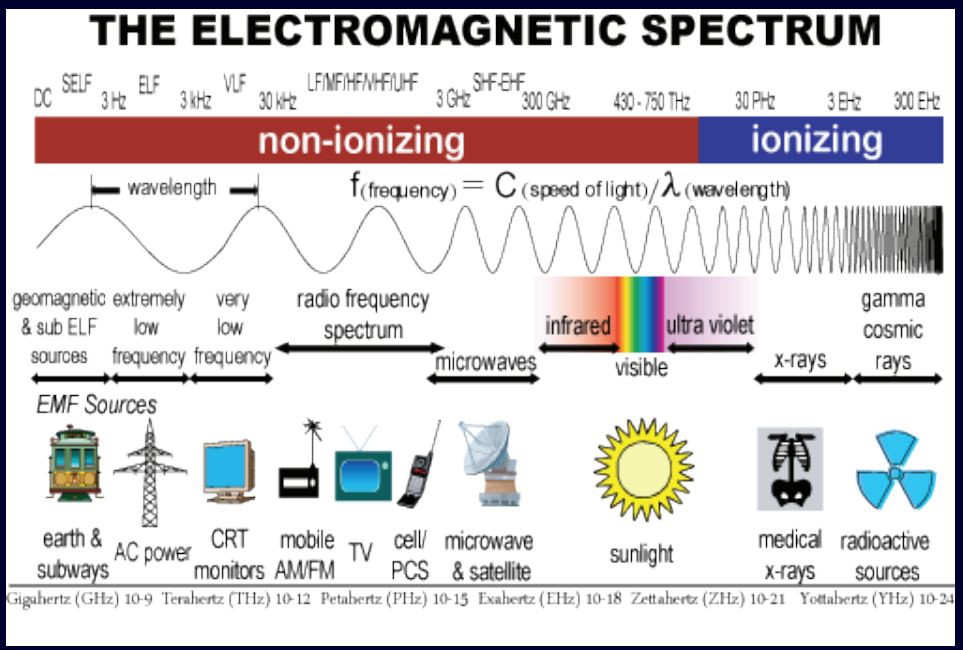
The AFU also use methods of communication readily available to the public. As noted in the 41st FAB semi-annual training brief, "many AFU artillery officers attest to using encrypted apps, especially signal, to provide targeting data to the firing elements. The most common explanation is that they consider this method superior to using radios over long distances. Once at the firing element, this data is transmitted to howitzer crews using short range hand-held radios or with voice" (UKR Observations 2022). The AFU openly uses some methods of communications the US armed forces would consider unsecure and vulnerable to EW attacks. There are risks and benefits to utilizing encrypted cell phones as means of communications. The advantages are to evade jamming and protect the locations of friendly forces from enemy EW collection assets. The downside in utilizing cell phones is that the messages sent may become compromised by enemy decryption teams. However, the AFU believed they could overcome the negatives of having their messages compromised. Operating in an environment where almost every person has a cell phone on them, the enemy must take time to differentiate civilian versus military signals. Even basic encryption requires a decryption team that is highly specialized and not available to most units. Finally,

most messages sent contain tactical information that has a short decay time. By the time the Russians would have decrypted the AFU call for fire text over signal and routed the information to the units being targeted, the fire mission would have long been shot and the shooters would have already established new position areas for artillery (PAAs).

While the use of cellular devices on the battlefield can expedite the sensor-to-shooter kill chain and allow more accurate and effective fires, it is not without risk. The modern, multi-domain battlefield is incredibly complex and saturated with threats. The electromagnetic spectrum is a foreign concept and largely intangible to the average Soldier. This lack of understanding presents openings for hazardous use of cell phones on the battlefield. Cell phones emit non-ionizing radiofrequency (RF), similar to microwaves, televisions, visible light, and heat. Just as one can see light and feel heat, cellular RF can be detected by specialized equipment. Volume and density of cellular RF can tip an enemy to the size and composition of a friendly unit. Additionally, cellular emissions can be triangulated using cell towers, thus revealing the location of the transmission. These problems exist for the radios the U.S. military currently employs; however, the risk is mitigated by extensive equipment training, standard operating procedures, and survivability criteria. The use of cellular devices as a tactical encryption and communications device is in its infancy and no doctrine or widespread training exists to dictate proper and safe application on the battlefield. Cell phone usage is a part of daily life, and this mentality can bleed into its use on the battlefield. Being able to delineate between a cell phone as a luxury of modern life and a lethal tool is imperative to its success in the world of fire support. As the U.S. military evolves and adapts to a modernized battlefield, emphasis must be placed on modern doctrine laying the foundation for risk mitigated use of the most readily available device for rapid, encrypted passage of critical information, the cellular phone.

Innovation is key to winning the next largescale fight. As the world continues to modernize, the U.S. and its partners must continue to keep pace with adversaries. While traditional methods of communication work for unit internal coordination and planning, fire support requires multiple echelons of synchronization. The short decay time of dynamic targets on the battlefield dictate the need for a dynamic response to communications. Methods such as cell phones assume an acceptable level of risk in order to achieve rapid coordination at echelon. As evident by the study on Ukraine, the short decay time relative to the lengthy decryption time displays a clear advantage to cell phone use. Any material sent through this method would need to be obsolete by the time of decryption. By adding COMSEC keys to a tablet or cell phone, the sensitivity of information would not be an issue. As previously stated, the modern, multi-domain battlefield is complex and constantly evolving. If the battlefield is changing, the armed forces should do the same.

ABOUT THE AUTHORS:
CPT David A. de Leon II is a diversified FA officer with experience in both a SBCT and FAB (HIMARS / LRHW). TAPL for 17th FAB primarily responsible for the training and deployment of four radar sections in support of 17th FAB and various I Corps exercises throughout the INDOPACOM AOR. Fulfilled the duties as XO managing CSDP and CMDP for the 17th BDE HHB, BN FSO in 1-229 AB, 16th CAB coordinating and executing the fire support plans and SEAD timelines of four maneuver companies during an NTC Decisive Action Rotation and imultaneous LFXs. Responsible for the coordination of fires between the aviation task force, SBCT, and division. Operations Officer for 7th ID G3/5/7, serving as a lead planner for many division-led exercises including CTC rotations, Pacific Pathways, and Bayonet Focus. Company FSO in 5-20 IN, 1-2 SBCT coordinating training plans with both the FA battalion and infantry battalion to maximize resources, training value, and relationship development. Responsible for the execution of fire support plans during various maneuver exercises, to include CALFEX, FCX, BN LFXs, and one NTC Decisive Action Rotation. BTRY FDO for an M777A2 equipped BN in a SBCT.



UNLEASH THE K

Legal Myt

During rotations at the Joint Multinational Readiness Center (JMRC), the Vampire and Mustang teams consistently observe units with an unclear understanding of the law of armed conflict. Brigades routinely impose unnecessary constraints on themselves that hinder the engagement of high payoff targets (HPTs) in support of brigade targeting objectives. Targeting must be a whole of staff effort, and the staff's understanding of the law of armed conflict is critical to the expedient engagement of HPTs. The targeting team must leverage the knowledge of the brigade's judge advocate to clearly understand what they can and cannot do under the law of armed conflict prior to executing operations. Brigades must move past the rules of engagement imposed on them during counterinsurgency. They must gain an understanding of how to proportionally engage distinct targets, balance risk, and make informed tactical decisions, within the left and right limits of the law of armed conflict. Without a clear understanding of what is legally possible, staffs often take appropriate options away from the commander. – LTC Tyler Donnell and MAJ Joshua Herzog, Vampire 07 and Vampire 03 at JMRC.

Today's senior commanders and lawyers are extremely versed in counter-terrorism policy and restrictive rules of engagement. They are skilled in restraint, they patiently wait for positive identification, and they justify kinetic action in terms of hostile act and hostile intent. These attributes shaped how we fought over the last two decades – executing stability operations with kinetic strikes, in support of counterinsurgency (COIN) operations. After 20 years of honing experience and training for a COIN fight, senior commanders and lawyers conflate recent policy for the law of armed conflict (LOAC). LTG Pede and COL Hayden published an article describing this as a counterterrorism "hangover." The readiness of the Army requires a retraining of the force to apply the LOAC – not legal misconceptions based on training and experience – to unleash the King of Battle and win in large-scale combat operations (LSCO).

3rd Battalion, 27th Field Artillery Regiment, 18th Field Artillery Brigade, 82nd Airborne Division, supporting 3rd Infantry Division, demonstrate M142 HIMARS operations to mulitonational Troops. Photo by Sgt. Cesar Salazar Jr.

KING OF BATTLE:
th Busters

This paper will address common misconceptions of the law observed during combat training center (CTC) exercises at the Joint Multinational Readiness Center (JMRC). The paper will discuss these observations as legal "myths" to clearly identify the legal standard and contrast the standard with recent policy. The paper unleashes the King of Battle by providing fire supporters and staffs an understanding of the law and the tools to train timely and responsive fires.

LEGAL PRINCIPLES

First, the basic law of armed conflict principles must be defined before dispelling the legal myths overheard in fire support elements (FSE) and brigade staffs.

The principle of military necessity "justifies the use of all measures needed to defeat the enemy as quickly and efficiently as possible that are not prohibited by the law of war." This principle is not an unlimited, win-at-all-costs, declaration because the principle of unnecessary suffering prohibits tactics that maim, torture, or cause wanton destruction to civilian objects. These two principles complement each other and highlight the purpose of the law of armed conflict – defeating the enemy while preserving minimizing destruction of civilian life and civilian objects.

The next two principles—distinction and proportionality—are the cornerstones of target engagement. Distinction requires commanders to distinguish combatants from civilians and military objectives from civilian objects. Title 10 of the United States Code Subsection 950p defines military objectives as "those objects during hostilities which, by their nature, location, purpose, or use, effectively contribute to the warfighting or war-sustaining capability of an opposing force and whose total or partial destruction, capture, or neutralization would constitute a definite military advantage to the attacker under the circumstances at the time of an attack." The principle of proportionality requires commanders "refrain from attacks in which the expected harm incidental to such attacks

would be excessive in relation to the concrete and direct military advantage anticipated to be gained." The principle of proportionality also requires commanders to take feasible precautions to reduce the risk of harm to civilians and other persons and objects in planning and conducting attacks. The commander must act in good faith based on the information available to them at the time when analyzing these principles.

The staff must assess the military advantage prior to engaging every target. Generally, this assessment occurs during the creation of fire support tasks and the high-payoff target list in dialogue with the commander exercising the targeting process. Military advantage is not restricted to tactical gains but is linked to the full context of one's war strategy. For example, the use of air raids solely to confuse the Germans as to the landing location during Normandy in World War II was a military advantage.

The commander may attack military objectives when civilians or civilian objects are in the collateral effects radius if the military advantage is not excessively outweighed by the incidental harm to civilians. The analysis contemplates the execution of fire missions with effects on civilians and civilian objects – the key is the commander's reasonable determination based on the information available at the time.

LSCO Legal Myths

Next, common misconceptions observed across the staff during CTC rotations must be identified and analyzed.

Unobserved Fires
This misconception is a conflation with the LOAC principle of distinction. ATP 3-09.30 Observed Fires is concerned with an observer seeing the point of impact to direct rounds onto the target and conduct assessments, not with LOAC compliance. Any rule of engagement (ROE) restrictions on unobserved fires are imposed by operational requirements, not compliance with the law of war. Clearly defining the difference between observed fires and targets identified or "observed" by a sensor must be defined by the ROE to mitigate confusion and requirements.

Positive Identification (PID)
This misconception is a tightening of the LOAC principle of distinction born out of COIN requirements. Considering the strategic context for stability operations the restriction was prudent. The LOAC standard requires a commander to take reasonable efforts to distinguish from military objectives and non-military objectives based on the information available at the time.

Hostile Act / Hostile Intent; and Self-Defense
These terms represent the application of the LOAC principle of distinction when an element is not clearly identifiable as a declared hostile force; however, in a LSCO scenario the majority of engagements are against a declared hostile force – the enemy. When units use these terms, the implication is that self-defense negates the legal requirement to conduct a proportionality assessment. In other words, the impacts to civilians don't matter because a unit is in a self-defense situation. That is simply not valid. The requirement to weigh the military advantage against the expected collateral damage is present in every operation. To be sure, the military advantage of defending friendly units is extremely high, but it does not permit every tactic regardless of the impacts to civilians.

Civilian Harm Prevention is the most important factor in a Commander's targeting decision
This statement represents a misunderstanding of the LOAC principle of proportionality. The legal requirement requires the commander to refrain from attacks when the military advantage is *excessively* outweighed by incidental harm to civilians or civilian objects. There is also a requirement to take feasible precautions to protect civilians.8 In broad terms, commanders should focus on the military advantage first, then ways to mitigate harm to civilians. Put another way, enemy first, enemy always – the most important factor in a commander's targeting decision is achieving the necessary effects on target. This is why military necessity is the preeminent LOAC principle.

Collateral Damage Methodology (CDM) isn't necessary in LSCO
This statement often implies a mistaken belief that a proportionality assessment is not required in LSCO. The collateral damage methodology is a flexible tool to inform commander decision making.9 The collateral damage methodology accomplishes several LOAC requirements: 1) the Chairman of the Joint Chiefs of Staff Instruction (CJCSI 3160.01D) requires identifying the target—distinction; 2) the CDM provides the commander an estimate of the incidental harm to civilians and other collateral concerns—proportionality; 3) and the process of weaponeering and employing mitigation techniques often satisfies the requirement for taking feasible precautions.

We don't have the software to conduct Collateral Damage Estimates (CDE)
CJCSI 3160.01D, No-Strike and the Collateral Damage Methodology, permits "field CDE" in the dynamic targeting process.10 While field CDE is not defined explicitly, it can be used to hastily mitigate collateral concerns when collateral damage estimation tools are not available to the personnel employing munitions on a target: forward observers, Joint Terminal Attack Controllers, etc. field CDE guidance and requirements are outlined and published by the respective combatant command.

Applying the Principles Above to Myths Heard on the "Training Battlefield"

Military Objective + [Military Advantage > Civilian Harm] = Engagement of Target is Permissible
Utilizing a formula-based approach allows the staff, targeting team and legal sections to quickly analyze targets and present information for a decision on dynamic targets. The above formula can be applied to the scenarios listed below by analyzing the distinction and proportionality principles of the LOAC. These scenario specific approaches aid the targeting team's preparation and training to conduct dynamic

targeting in large-scale combat operations. These scenarios are worth running through command post (CP) battle drills to streamline information presentation to ensure timely and effective decision making.

Fires into Populated Areas - "We can't fire into [insert civilian populated area]. There are still civilians in the town and until they are ALL gone we cannot shoot." Example, a battery of 2S19s, 8 x 152mm self-propelled howitzers, fire upon a friendly unit.

The friendly unit receives the acquisition and notices the enemy battery is dispersed in an area consisting of 10 structures. Intelligence assets confirmed the civilian population has mostly left the town with approximately 10% of the pre-conflict population remaining. The unit has indicated that 2S19s are #2 on the high payoff target list (HPTL) and subject of a fire support task. The unit does not shoot, nor do they brief the commander on options to shoot, due to a belief that civilians in the area make it "illegal."

Distinction [Military Objective]: Military units are per se "military objectives." 2S19s by their very presence and use contribute to military action, namely attacking friendly troops and equipment. Destruction of these weapon systems offer a definitive military advantage by preventing the 2S19s from targeting friendly elements now or in the future.

Proportionality [Military Advantage > Civilian Harm]: The FSE conducts field CDE and determines the 2S19s are in a town with about 10 civilian structures, including civilian inhabitants, but only 10% of the population remains (approximately 100 people). The friendly brigade is the inferior force and must gain the relative advantage against the enemy through the use of organic indirect fire assets to achieve the operational end-state. The FSE determines that high-explosive rounds are the appropriate munition to achieve the desired effect on the target given current supply limits on precision munitions through the weaponeering process (feasible precautions).

Engagement of Target is Permissible: The staff should present this analysis to the commander and a reasonable commander may conclude that the civilian harm is not excessive in relation to the military advantage and direct target engagement.

Unobserved Fires/Positive Identification (PID) - "We cannot shoot, we do not have full motion video of the target (PID)."

Example, the brigade (BDE) identifies a tracked vehicle formation using moving target indicators (MTI) traveling down route "Jaguar" toward a friendly position. The battle captain indicates that there are no friendly vehicles on that route. The brigade S3 indicates that there is not a reasonable certainty (PID) the column is a military target.

Distinction [Military Objective]: Although MTI is a low-fidelity sensor, when paired with the other data, it may provide the commander enough information to reasonably conclude that these elements are in fact the enemy's military units. The other data may include: the S2's enemy situation template assessed this route was a likely avenue of approach for the enemy; the BDE messaged a different route as the primary civilian movement corridor (maybe this was even agreed to with the enemy); and the BDE has not observed any large civilian movements on the route with the indicators for the past several days.

Proportionality [Military Advantage > Civilian Harm]: If the commander concluded that the column is likely an enemy tracked formation traveling on the road, then the next step is assessing proportionality. There is a significant military advantage in destroying and stopping an enemy tracked formation traveling toward a friendly position. There are no indications of civilians in the area but destroying the road (a civilian object) is incidental to the attack.
Engagement of Target is Lawful: The staff should present this analysis to the commander and a reasonable commander may conclude the MTI, when paired with the other assessments, represents a tracked enemy formation rapidly closing on the BDE's position and direct target engagement.

Of note, the commander could also look to target the road directly, "civilian objects may lose their protected status if they are being used for a military purpose or if there is a military necessity for their destruction or seizure."

Hostile Act / Hostile Intent - "we cannot fire artillery on those guys, they haven't done anything wrong yet"

In this scenario, the electronic warfare officer (EWO) identifies signal making intermittent broadcasts and assesses the frequency as a known enemy band with no known common civilian usage. The EWO obtains a cut near a hilltop overlooking a future friendly avenue of attack. Despite no known civilian structures or routes on the hilltop, the BDE fire support officer shuts down the conversation by saying "we CANNOT shoot because they may not be bad guys, we haven't seen them do anything wrong yet."

Distinction [Military Objective]: The hostile act / hostile intent comment is stray voltage. A hostile act analysis is used when a person or vehicle, not clearly identifiable as the enemy, is a lawful target. Here, the EWO identified a signal reasonably assessed as the enemy and provided an approximate location on a hilltop. The transmission is on a known enemy frequency and is located on key terrain at an ideal observation point. The commander may reasonably conclude that the signal is emanating from a small enemy observation post without the need for confirmation through a hostile act, or through a full-motion video feed.

Proportionality [Military Advantage > Civilian Harm]: The enemy is using an asset to send vital information, targeting data, to the rear for target engagement. There is a significant military advantage in destroying the vehicle. There are no indications of civilians in the area.

Engagement of Target is Lawful: The staff should present this analysis to the commander and a reasonable commander may conclude the signal producing equipment along

with enemy personnel are military objectives, ripe for a direct target engagement.

Conclusion

Uncaging the King of Battle requires a rewiring of the mental models used by commanders and staffs in the targeting process. There was a time for a bias for restraint. Now commanders need a bias for action. The heuristics developed for a highly restrained COIN fight slow the decision-making process and foreclose lawful options from command consideration. The timely and effective employment of fires demand emphasis on law of armed conflict training now, not when a formation is in the middle of the fight. The legal myths busted in this article are a solid step forward in creating shared understanding on the basic LOAC legal requirements and provides LSCO scenarios that will unleash the King of Battle in future operations.

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The German Army took delivery of 185 155mm/52 cal SP artillery systems from the now Krauss-Maffei Wegmann Kassel production facility.

TRACKED ARTILLERY STILL VIABLE

Tracked artillery, while not as popular as it once was, is still effective with the right ammunition.

By: Christopher F. Foss

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While there is a clear trend to the procurement of wheeled self-propelled (SP) artillery systems by an increasing number of end users, there is still a market for tracked SP artillery systems, although there are a limited number of options for brand new systems. While this article concentrates mainly on the platform, this is just one part of a complete system that includes the ammunition suite (projectile, charge and fuze), fire control system (FCS) on the platform as well as at battery and regimental level right through to the forward observer and, most important of all, target acquisition system and ammunition resupply.

End users are demanding more range and greater accuracy but the former means that most targets are beyond the range of the forward observer so greater emphasis is being place on real time target acquisition which can be carried out by a variety of means including radar, sound location, electronic warfare and unmanned aerial vehicles.

In addition to the development and fielding of new systems, much more emphasis is being placed on ammunition development. More range can be achieved by having 155mm artillery projectiles with a hollow base (HB), rocket assist (RA), Extended Range Full Bore (ERFB), combinations of RA and BB and more recently ramjet powered 155mm projectiles. There are also 155mm artillery projectiles designed to attack the vulnerable upper surfaces of armoured vehicles such as the BAE Systems/Nexter Bonus from France/Sweden and German Rheinmetall / Diehl BGT Defence SMArt.

While wheeled SP artillery systems have a number of advantages including lower operating and support costs and greater strategic mobility as they are on wheeled rather than tracked, they do have a number of disadvantages. These include a reduced ammunition load. A good example is the German Krauss-Maffei Wegmann (KMW) PzH 2000 155mm/52 cal tracked SP artillery system which carries 60 projectiles and changes while the baseline French N exter 155mm/52 cal CAESAR (6x6) system only carries 18 projectiles and charges. In most cases, apart from the BAE Systems Bofors Archer wheeled SP artillery system, the crew have to dismount to bring the system into action which takes time and potentially leaves them open to small arms fire and shell splinters.

For many years, the US developed M109

155mm/39 cal was the standard SP artillery system of most NATO countries as well as many other countries around the world. Some countries, for example Switzerland, upgraded these with a raft of improvements including a longer 155mm/47 calibre barrel to give an increase in range. A number of defence contractors, including the now BAE Systems of the USA, Oto Melara (now Leonardo) of Italy and Rheinmetall of Germany offered a package of upgrades that included installation of a 155mm/52 calibre barrel that meets the Joint Ballistic Memorandum of Understanding (JBMoU). As far as it is known, none of these upgraded M109 entered service, even though they would offer a step change in range capability.

The now defunct RDM Technology of the Netherlands did develop an upgrade package for the M109 which included a 155mm/47 calibre barrel from RUAG as fitted to the Swiss Army upgraded M109 and the United Arab Emirates took delivery of 85 under the designation of the M109L4 7 with final deliveries in 1999. Like other countries, Germany, in addition to the M109 155mm/39 cal SP artillery system, also deployed the US 175mm M107 and 203mm (eight inch) M110A2, but all of these have now been phased out of service. The latter was retained for a long time as it had a tactical nuclear capability. Following a competition, the now Krauss-Maffei Wegmann (KMW) PzH 2000 155mm/52 cal tracked SP artillery system was selected to meet the requirements of the German Army and a total of 185 were delivered from the Kassel production line between 1998 and 2002. This number has been reduced as some have been passed onto other countries including Croatia (12), Lithuania (21) and more recently the Ukraine (from Germany and the Netherlands).

Brand new PzH 2000 have also been supplied to Greece (24), Hungary (24 with final deliveries early in 2024), Italy (2 from Germany and rest manufactured under licence in Italy by the now Leonardo), Netherlands (57) and Qatar (24). KMW is still awaiting a potential contract from the German government for 100 new build PzH 2000 for the Ukraine, but as of I August 2023 this had not been received by the company, PzH 2000 is now back in production for the German Army as in March 2023 a contract was placed with KMW for a batch of IO units for delivery from 2025 plus an option on an additional 18 in three lots of six units. In addition there are a number

Polish Army HSW Krab 155mm/52 cal SP artillery system carrying out a fire mission.

of updates planned for the future to reduce obsolete sub-systems as well as reducing the crew by automating the ammunition handing system (AHS). While KMW is the prime contractor for the PzH 2000, the 155mm/52 calibre ordnance and associated elements, as well as the ammunition (projectiles and charges), is provided by Rheinmetall Weapons & Munitions.

As a private venture, almost 20 years ago, Krauss-Maffei Wegmann developed the Artillery Gun Module (AGM) and this was first shown integrated onto the rear of a surplus tracked US M270 Multi Launch Rocket System (MLRS) track carrier. AGM is fitted with a Rheinmetall 155mm/52 calibre barrel that has the same ballistics as the PzH 2000 but is fed by a fully automated AHS with a total of 30 155mm projectiles and charges. The weapon is laid onto target by the crew of two seated in the protected forward control cab. More recently this has been integrated onto the rear of an ARTEC Boxer (8x8) Multi-Role Armoured Vehicle (MRAV) platform and additional details are given in my Armada Wheeled Artillery article. Following a competition, the then Vickers Shipbuilding & Engineering Limited (VSEL), now BAE Systems, developed the AS90 155mm/39 calibre SP artillery system and this was subsequently selected to replace the M109 deployed by the Royal Artillery (RA). A total of 179 AS90 were built at Barrowin-Furness, UK, with the first ones coming off the production line in 1992 with the last in 1995.

The 155mm/39 calibre ordnance was supplied by Royal Ordnance Factory at Nottingham which has since closed. AS90 was demonstrated in a number of countries but never achieved any export sales and marketing ceased some years ago. The AS90 turret was adopted by Poland for its Krab SP artillery system as mentioned later in this article. It was expected that the AS90 would have been upgraded with a 155mm/52 calibre ordnance as well as a Modular Charge System (MCS) to replace the old bag charge system, this was tested but never deployed. The UK has now transferred a batch of AS90 155mm/39 calibre systems to the Ukraine which has given increased emphasis to its replacement which is called the Mobile Fires Platform (MFP) which is being run the Defence Equipment & Support organisation. This could be tracked or wheeled and to plug the capability gap due to transfer of AS90 to the Ukraine, the UK is taking delivery of a batch of BAE Systems Bofors Archer 155mm (6x6) systems based on a Volvo all terrain platform. The Polish Army has now deployed the Krab 155mm/52 cal SP artillery system which is essentially the South Korean Hanwha Defense K9 chassis fitted with a modified version of the AS90 turret made in Poland and armed with a 155mm/52 cal ordnance which is also manufactured in Poland

155mm/52 cal Artillery Gun Module installed on a M270 MLRS carrier chassis for trials

The Turkish Army deploys the locally manufactured Firtina 155mm/52 cal SP artillery system which is based on the South Korean Hanwha K9 and shown here with its Poyraz Ammunicition Resupply Vehicle to the rear

by HSW. Turkey was one of the few European countries that did not deploy the US M109 series of 155mm SP artillery systems and instead upgraded older US supplied 105mm M52 and 155mm M44 SP artillery systems. These became M52T and M44T with both fitted with a 155mm/39 calibre ordnance and many other improvements including a new more fuel efficient diesel power pack rather than a thirsty petrol engine. For some years Turkey has been manufacturing the T-155 Firtina 155mm/52 calibre SP artillery system which is essentially the South Korean Hanwha K9 optimised to meet the requirements of Turkey and an upgraded version is already deployed by Turkey. As the 155mm/52 cal ordnance meets the JBMo U maximum range firing the old M107 HE round is 11 miles (18 kilometres) while firing the M549A1 HE rocket assisted projectile range is increased to over 18 miles (30km). Longest range is achieved firing the Extended Range Full Bore Base Bleed projectile which is nearly 25 miles (40km). The T-155 Firtina is supported by the Poyraz Ammunition Resupply Vehicle (ARV) which uses some components of surplus Turkish Army M48 tanks but fitted with a new welded superstructure. This carries a total of 104x155mm projectiles which are transferred using a telescopic conveyor. One would have thought that, like the KMW Leopard 2 Main Battle Tank (MBT), their PzH 2000 155mm/52 cal SP artillery system would be accepted by most members ofNATO.

More recently however the Hanwha 155mm/52 cal K9 Thunder, which was developed to meet the specific operational requirements of the South Korean Army to supplement their large fleet of M109A3 155mm/39 cal systems, has been ordered by an increasing number of countries including Australia, Egypt, Estonia, Finland, India, Norway and Poland (chassis and complete systems). This has been continuously developed through the K9A1 and latest K9A2 which are normally optimised to meet the end users specific requirements. Poland has transferred some Krah to the Ukraine. In addition to the K9, South Korea has deployed the KIO Ammunition Resupply Vehicle (ARV) which carries 104x155mm projectiles and charges which are fed straight into the turret bustle of the K9. The KIO has also been adopted by a number of countries including Australia CASIO), Norway and Poland.

In addition there is a Fire Direction Control Vehicle (FDCV) called the Kil on the same chassis which has been ordered by Egypt and Poland. BAE Systems in the US did develop to the prototype stage the M109 International which featured a number of improvements including 155mm/52 calibre barrel, but no export contracts were made and marketing ceased. In recent years the USA has had many false starts to modernise its SP tube artillery and these include the XM2001 Crusader 155mm which, if fielded, would have been the most advanced SP artillery system in the world with a long range and high rate of fire. This was followed by the XM1203 155mm Non-Line-of-Sight Cannon (NLOS-C) which was the indirect fire member of the now cancelled Future Combat System.

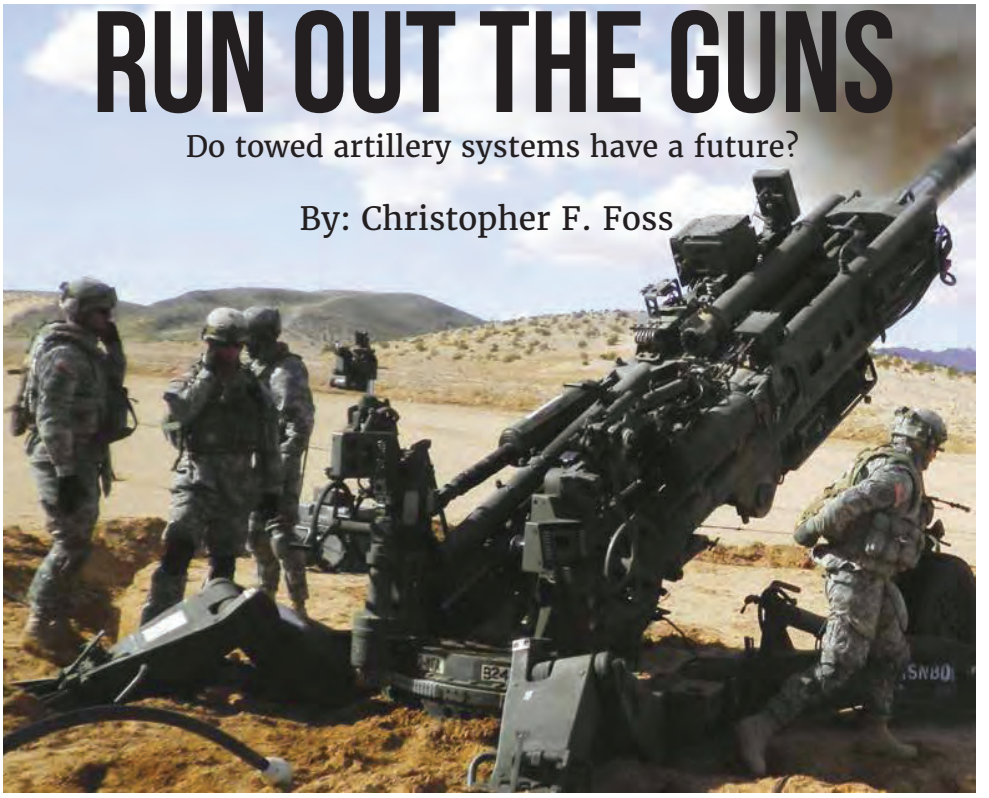
Today the only conventional SP tube artillery system in service with the US Army is the BAE Systems M109 series of 155mm/39 cal, the origins of which can be traced back over 60 years. Since then the M109 has been continuously upgraded with the latest production version being the M109A7 Paladin for which the prime contractor is BAE Systems but still retains the 155mm/39 cal barrel which gives it a limited range by today's standards. This is essentially an upgraded M109A6 turret fitted to a brand new chassis and is the main indirect fire capability of the US Army Armoured Brigade Combat Teams. The initial contract for the M109A7 was in 2017 with the latest contract being placed in July 2022 for 40 sets, which consist of 40 M109A7 and 40 M992A2 ammunition carriers which brought the total up to 310 with a value of $1.9 billion. The M992 was originally called the Field Artillery Ammunition Support Vehicle (FAASV) but is now referred to as the Carrier, Ammunition, Tracked (CAT). Production and support of the M109A7/ M992A2 takes placed at the Anniston Army Depot as well as BAE Systems facilities in York, Minneapolis, Sterling Heights, Endicott, Elgin and Aiken. The main drawback of the M109A7 is that it is fitted with a 155mm/39 cal ordnance rather than the 155mm/52 cal ordnance which has been deployed in the PzH 2000 and many other SP artillery systems for many, many years. The US Army has been working on the 155mm Extended Range Cannon Artillery (ERCA) for many years and this includes the actual 155mm/58 cal barrel developed at the Benet Laboratory with manufacture at Watervliet Arsenal and a bustle mounted automatic loader to increase rate of fire and reduce crew requirement. A new suite of ammunition includes the 155mm XMm3 RAP and a new change system which will provided a step change in range and increased accuracy when fitted with a nose mounted Northrop Grumman M1156 precision guidance kit (PGK).

The South Korean Hanwha K9 Thunder is being adopted by an increasing number of countries and has undergone continuous development. This is the K9A2 with a Soucy Composite Rubber Track.

RUN OUT THE GUNS

Do towed artillery systems have a future?

By: Christopher F. Foss



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While many countries are now being re-equipped with new tracked and wheeled self-propelled (SP) artillery systems, there is still a potential market for 155mm and 105mm towed artillery systems, although perhaps in declining numbers and with fewer contractors available to provide these weapons.

The 155mm/39 cal FH-70 towed artillery system fitted with an auxiliary power unit (APU) was developed by a consortium to meet the requirements of Germany, Italy and the UK, but today only Italy retains these of the original three users and some of these have been recently upgraded to extend their operational lives.

The former Vickers Shipbuilding & Engineering Limited (VSEL) (today BAE Systems) M777 155mm/39 cal Light Towed Howitzer (LTH) was originally developed as a private venture and subsequently sold to the US Army and Marines, Australia, Canada and India with the US now sending some of these to the Ukraine.

The M777 has seen extensive service in Afghanistan and the Middle East, as well as more recently in the Ukraine, where its light weight of just over four tonnes has enabled it to be rapidly transported by a helicopter, such as the Boeing CH-47 Chinook, to deployed in areas that are not accessible by other means.

A number of improvements have been made over the years to increase reliability and the end user normally fits its own fire control system (FCS) and muzzle velocity radar. An M777 version with a longer 155mm/52 cal barrel has been tested in the US and called the M777ER.

For many years the market leader in 105mm towed artillery systems was the Royal Ordnance Nottingham 105mm L118 Light Gun which was built in large numbers of the home and export markets with the US adopting the L119 (as the M119), which has a shorter barrel. The latter has been upgraded a number of times with the latest version being the M119A3.

The 105mm L118 Light Gun has a maximum range of 10.6 miles (17.2 kilometres) firing the standard 105mm highexplosive (HE) projectile with other natures including smoke and illuminating.

The 105mm L119 has a shorter barrel and originally fired the old US 105mm M1 HE projectile to a maximum range of 7 miles (11.2km) but since then ammunition with an increased range has been fielded.

The UK has fitted its 105mm L118 Light Guns with the Leonardo Laser Inertial Artillery Pointing System (LINAPS) which has reduced into and out of action times and leads to greater accuracy. LINAPS has been installed on many other artillery systems, towed and self-propelled.

The current out of service date (OSD) for UK 105mm L118 Light Gun is 2030 and for several years the UK Defence Science and Technology Lab has been working on the Lightweight Fires Platform (LFP) Technology Demonstrator Programme (TDP).

This is a three year pre-concept study to de-risk technologies that could provide the basis for a new Light Gun. This currently has a 127mm ordnance that is unmanned, electrically driven and fitted with a 14 round automatic loader, all within a weight limit of 6,600 pounds (3,000 kilograms). The other best-selling 105mm gun is the French Nexter LG1 which, although qualified by the French Army was never adopted by them as they prefer to use the now Thales (previously Brandt) 120mm MO-120-RT rifled towed mortar.

The LG1 has a 105mm/30 cal

105mm L118 Light Gun, without muzzle brake, installed on a SUPACAT Extenda

ordnance and firing standard 105mm HE ammunition has a maximum range of 6.8 miles (11km) but this can be extended to 10.5 miles (17km) with a Nexter 105mm HE Base Bleed Extended Range (HE BB ER) G3 projectile. Nexter can supply the complete 105mm LG1 system including the gun, suite of ammunition and on board FCS. Known export sales of the LG1 include Belgium, Canada, Colombia,

The M777 155mm/39 cal Light Towed Howitzer carrying out a fire mission and showing muzzle velocity radar mounted above ordnance.

Indonesia, Senegal, Singapore (no longer deployed) and Thailand.

Building on their extensive experience in the design, development and production of 155mm artillery systems, as a private venture the South African company of Denel developed the 105mm Light Experimental Ordnance (LEO) as well as a suite of new 105mm ammunition. The first one was really a technology demonstrator and weighs 3.8 tonnes (3,800kg) and firing a new 105mm BB projectile a range of 18 miles (29km) was claimed and with a 105mm Velocityenhanced Long-range Artillery Projectile (VLAP) range was increased to 22.3 miles (36km). As of mid-2023 development of the 105mm LEO had ceased but could be restarted if

French Nexter 105mm LG1 deployed in the firing position.

additional funding was available.

The latest 105mm towed weapon to enter service is the Turkish MKEK Boran 105mm Air Transportable Light Towed Howitzer (ATLTH) which is many respects is very similar to the UK 105mm Light Gun. This is now in production and service with Turkey and features a variable recoil system which has a short recoil of 800mm and a long recoil of 1200mm. The ATLTH

Royal Artillery 105mm L118 Light Gun Fitted with Leonardo Laser Inertial Artillery Pointing System.

weighs only 3,770lb (1,710kg) and has a maximum range of 10.5 miles (17km) using local developed HE ammunition. When travelling the complete upper part is traversed and locked in position over the closed trails. It is fitted with an on-board FCS which includes a muzzle velocity radar, inertial navigation system and a direct fire day/night sight on the right side than includes a laser rangefinder.

TRUCK BORNE 105MM GUNS

The main drawback of 105mm towed guns is that they take time to come into and be taken out of action which makes them vulnerable to counter battery fire. Over the years there have been various attempts to install 105mm guns on the back of trucks to improve their mobility.
AM General of the USA and the Mandus Group have developed the Hawkeye Soft Recoil Technology (SRT) system than can be fitted to existing towed guns including the US 105mm M119 and the UK 105mm L118 Light Gun which has enabled these weapons to be installed on lighter 4x4 and 6x6 platforms.

These include the AM General High Mobility Multi-purpose Wheeled Vehicle (HMMWV) and more recently the British SUPACAT HMT Extenda (6x6). This combination enables the weapon to come into action, carry out a fire mission and redeploy before any counter battery fire, as well as having a reduce crew requirement.

The US Army has taken delivered of two AM General M1152 (4x4) HMMWV fitted with the 105mm Hawkeye SRT system and is developing a soft recoil 155mm system under US Army contract.

The latest 105mm towed artillery system to enter production is the 105mm Boran Air Transportable Light Towed Howitzer developed to meet the requirements of Turkey.

Confronting the Counterfire Dilemma:
The power of Proactive Pattern Analysis in LSCO

By: CW3 William Woods and CW3 Benjamin Grooms

The operational environment is rapidly evolving with emerging threats. The Army gained valuable insights from recent conflicts while enjoying a technological advantage over a less-advanced adversary. Two decades of counterinsurgency (COIN) in the Middle East masked peer and near-peer threat advances in military capabilities development- a challenge to U.S. military superiority. During the Global War on Terror (GWOT), coalition forces had fire superiority and complete overmatch in the counterfire fight; such advantages will not be present in future operational environments. To prevail in large-scale combat operations (LSCO) and resolve this dilemma, the Army must fight and win the counterfire fight against an enemy with functional equivalency in counterfire capability.

The counterfire dilemma arises from the adversarial doctrine that relies heavily on high volumes of indirect fire (IDF) with reduced displacement time. Observations from Combat Training Centers (CTC) reveal that organizations struggle to process acquisitions from weapons locating radar (WLR) on time and have minimal effect on the opposing force's (OPFOR) artillery. With deception techniques, efficient reactive counterfire, and responsive ISR-shooter flow, the threat indirect fires (IDF) poses an increased problem set for U.S. counterfire. By adopting an analytical methodology that supports targeting, the Army can overcome the disadvantages of being outnumbered and outranged by our peer adversaries in LSCO.

Common Trends / Observations from the NTC / JMRC

•Units do not utilize pattern analysis to synchronize detection and delivery assets

•Units do not fully employ their field artillery battalion targeting officers or S2s and fail to integrate with the BCT S2 focusing on targetable data (Field Artillery Intelligence)

•Units fail to collaborate with S2 before targeting working group (TWG) to update event templates.

The first step in mitigating the counterfire dilemma is to look at the basic principles of pattern

The first step in mitigating the counterfire dilemma is to look at the basic principles of pattern analysis. The Army's doctrine and technique publications provide insufficient guidance on the pattern analysis function of a Target Processing Section (TPS) or Counterfire Operations Section (COS). While Army Technique Publication (ATP) 3-09.12 mentions the pattern analysis plot sheet (Figure 1) as an example of a tool that can be used to manage radar zones, it does not adequately define the outputs of pattern analysis. Similarly, intelligence doctrine such as ATP 2-33.4 fails to clearly define pattern analysis or its integration into counterfire planning and execution. Unit counterfire standard operating procedures (SOP) and observations from CTC reveal a general need for more understanding and implementation of comprehensive pattern analysis methods.

Pattern analysis begins by analyzing enemy fire support (FS) systems and updating running estimates made during the military decision-making process (MDMP). Careful consideration of terrain and threat course of action must be given during the information preparation of the battlefield (IPB) as this sets the foundation for future pattern analysis. The counterfire officer (CFO), in conjunction with the S-2, should include the following in their analysis of enemy FS systems: enemy FS capabilities and limitations, slope and communications analysis that assists in determining potential position areas of artillery (PAA), identification of ingress and

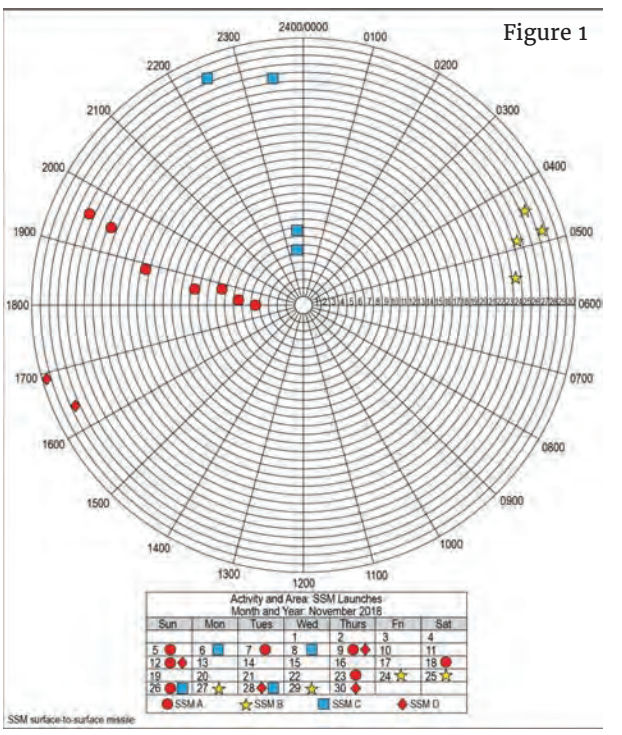

Figure 1

egress routes, the situational templates, and the event templates.

·ATP 3-09.12 (1-32) states that counterfire planning begins during the MDMP and continues throughout the targeting process by feeding the targeting working group, targeting decision board, and information collection plan.

The abovementioned analysis establishes the baseline assumptions for where artillery can and cannot operate and explains how, where, and when the enemy commander will utilize FS assets. Planners include these factors to establish radar zones, named areas of interest (NAI), target areas of interest (TAI), and radar employment considerations (positioning, azimuth of search, and cueing). Continued pattern analysis and ensuring the current intelligence assessment is updated often help the preparation of Enemy Course of Action Overlay & Descriptions that lead to the brigade's ability to conduct targeting.

The following action is to take proactive steps to analyze enemy FS systems. One approach involves identifying observable behaviors and collecting the necessary data for further analysis. This process begins by formulating analytical considerations based on the assumptions made during MDMP, determining data collection (including tools and responsibilities at each echelon), potential patterns, and outputs that support targeting. Figure 2 is "a way" that units could include in their SOPs. SOPs should further specify who will be responsible for data collection, what logging and displaying method will be used, and what observations can be derived from the data.

Analytical Planning	Planning Assumptions	Data Collection	Patterns	Outputs	Who provides analysis
Where will threat fire from?	· PAA analysis · Range TTPs	· Heat Map · Range analysis · GMTI · OPIR, etc.	· Use of same PAAs · Sequential PAA location · Type of terrain preferred (urban use, wood line, roads, fields)	· NAI/TAI · Radar zones	· WLR Section Chiefs · TPS/COS · CFO · FA S-2 · BCT S-2
When will the threat employ IDF?	· SYNCMAT (threat and friendly actions) · EVENTEMP	· Event correlation plots · Pattern Analysis Plot	· Threat COA correlation · Time of day/ week	· ICSM · TAI · Cueing (situational, Demand)	· TPS/COS · CFO · FA S-2 · BCT S-2
Why is the threat firing / what are they firing at?	· SYNCMAT (threat and friendly actions)	· POO/POI Plots · Heat Map · Volume by type/ unit	· IDF support to Threat targeting / maneuver · Threat counterfire Analysis · Deception Analysis	· EVENTEMP · NAI/TAI · Threat HPTs	· CFO · FA S-2 · BCT S-2 · BCT S-3
What systems will the threat use and how are they being employed?	· EOB · Threat Temp · EVENTEMP	· IDF usage by type · POI plot · Threat type to target · Volume	· Matching threat system to target set · Volume to size of target or size of firing element (linked to TTPs and BDA)	· NAI/TAI · updating EOB · Radar Zones updated	· CFO · FA S-2 · BCT S-2
What ingress / egress routes will the threat use?	· PAA analysis · Route analysis	· Heat Map over route analysis · GMTI	· PAA distance from main routes · Routes commonly used · Resupply methods · Hide sight usage	· NAI/TAI	· CFO · FA S-2 · BCT S-2 · S-4 · ENG
Are friendly radars being effectively employed?	· IPB · Wargaming	· Acquired vs Missed (Location, Cueing) · Shellrep/crater analysis	· Risk assessment (radar and friendly, Cueing)	· Cueing Schedule · RPA placement	· WLR Section Chiefs · TPS/COS · CFO
Other Factors that support counterfire Analysis?	· Logistical analysis (BSA, resupply TTPs, Caches) · Jamming/interference analysis · Threat counterfire				

Figure 2

Common Trends / Observations from the NTC / JMRC

·Counterfire Operations Sections struggle to integrate during the Detect phase of the Targeting Process. As a result, WLR are not deliberately synchronized and lack the necessary integration into the BCT Targeting.

·Counterfire Operations Sections often utilize its WLR to confirm the location of the enemy FS threat, but struggle to integrate acquisitions and other relevant intelligence data into further assessments or analysis.

Analog products are filled out by hand on a battle board or map overlay and are more reliable under field conditions. They provide a physical media independent of a computer system. However, the issue with analog products is time and organization. While a counterfire log, map overlay with point of origin (POO)/point of impact (POI), and pattern analysis plot sheet are valuable analog products, they can be time-consuming to maintain and harder to spot longer-term patterns. Adding additional analog tools requires a tradeoff of time, physical space, resources, and the value of the analysis at each echelon.

On the other hand, digital tools rely on a computer for storage or display. They can be anything from a spreadsheet to emerging artificial intelligence software. The benefit of digital tools is the ability to leverage computing power to organize large amounts of data and output tailored information to be analyzed. Digital Common Ground Systems (DCGS) heat map outputs are a good example

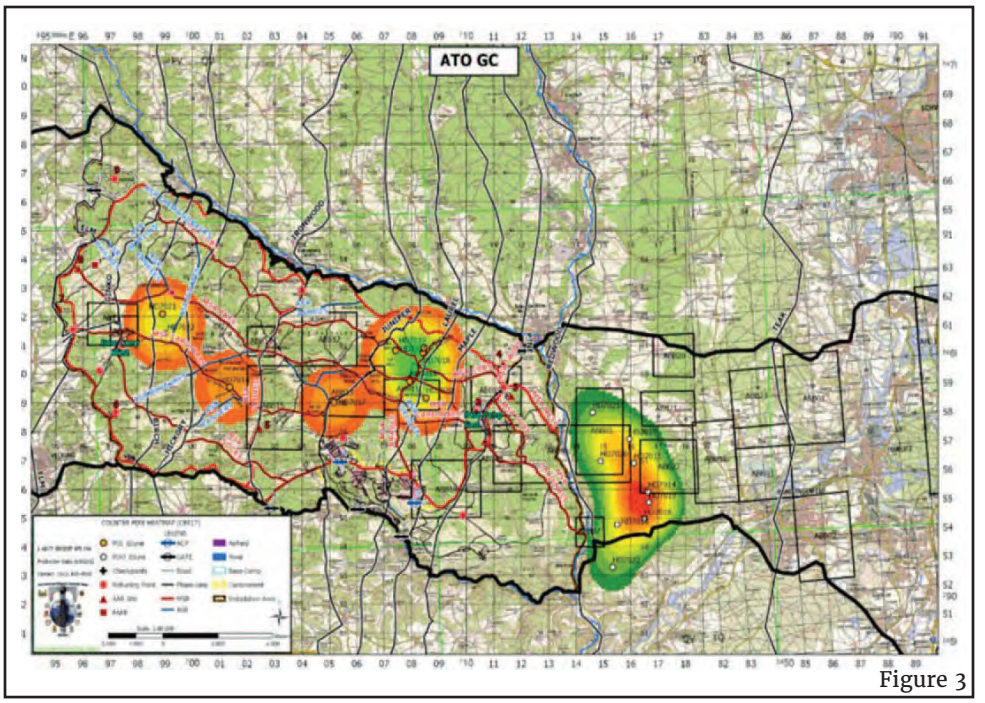

Figure 3

(Figure 3), but there are also automated spreadsheets and other digital tools. Digital tools have the potential to support operations more effectively than analog products, but they rely on computer systems, proficiency in utilizing selected programs, and additional coordination.

Even if presented aesthetically, raw and compiled data do not constitute analysis. The analysis is an output from staff members who interpret the data, identify patterns, and provide inputs for the TWG. A good example of this is a heat map. While it is an excellent tool for detecting patterns in the threat's use of the area, it cannot determine where a threat will fire from next without considering other relevant information. Therefore, it must be used with additional tools to provide insights into the threat's subsequent actions and requires collaboration with other staff members.

While the CFO has the ultimate responsibility for analysis compilation and integration into targeting processes, other staff inputs are necessary for a comprehensive analysis of the enemy's FS system. The S-2 can use various intelligence disciplines, such as geospatial intelligence (GEOINT), signals intelligence (SIGINT), and human intelligence (HUMINT), to provide valuable information on potential firing positions, enemy communications, tactics, and vulnerabilities.

Pattern analysis should be a continuous process involving collaboration at every step of the acquisition process, intelligence enterprise, and with key staff before the TWG. By codifying inputs and data collection, understanding the patterns observed and how analysis outputs integrate into operational processes, intelligence, targeting, and fires elements can effectively plan against a high payoff target set at each echelon. The CFO must create shared understanding across the war fighting functions by balancing his responsibilities on the current operations floor and collaboration with the brigade intelligence support element and future operations. This collaboration ensures that all counterfire data have been synthesized to help inform commander decision points, answer priority information requirements, and nest targeting recommendations in time and space.

The Army must confront the counterfire dilemma in a dynamic and rapidly evolving operational environment. Observations of 15 CTC rotations have illuminated the need for more comprehensive pattern analysis methods. Outputs of pattern analysis must be further defined and integrated into counterfire operations and the targeting process. Inculcating inputs such as terrain analysis, weather patterns, and enemy capabilities is necessary to analyze patterns effectively in a LSCO environment. Conducting pattern analysis at every step of the acquisition process and utilizing tailored tools and SOPs can overcome the disadvantage of being outnumbered and outranged by peer adversaries. With a deeper understanding of pattern analysis and a proactive approach to counterfire, the Army can maintain military superiority, retain combat power, and succeed in LSCO.

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

By: Dr. John Grenier, Field Artillery Branch Historian

Part I:
Background and Little Crow

Little Crow (1810-July 3, 1863) was a Mdewakanton Dakota Chief who led a faction of the Dakota in a five-week war against the United States in 1862.

Army history is replete with tales of Soldiers at isolated outposts, repelling waves of determined enemies attempting to overrun and annihilate them. Both the book and the 2020 film The Outpost—which tell the story of the Battle of Kamdesh in 2009 at Combat Outpost Keating in Nurestan Province, Afghanistan—are the most recent offerings in the genre of U.S. Soldiers defending their position and beating insurmountable odds to live another day. Almost universally—and rightly, we should add-the narratives of the determined defense of a fort in the 19th century, or a fire-support base, FSB, in Korea or Vietnam, or a COP in Afghanistan become deeply imbued with valor and self-sacrifice. Indeed, nearly every Redleg who received the Congressional Medal of Honor for service in Vietnam did so as a direct result of his heroics "above the call of duty" in defense of an FSB.

Most often, it has been artillerists who have kept the enemy at bay so relief could come "over the hill" and then rescue an outpost's defenders.

This narrative has become so commonplace in Army history that few know the 5 W's -- the who, what, when, where, and why -- of its first instance. The answers probably will surprise many: three mixed Soldier-veteran gun crews in defense of Fort Ridgely, Minnesota, during the Dakota Uprising of 1862.

We want today's Redlegs to be cognizant of and understand the details of this small but important piece of Branch history. We have chosen to present the storyline of the Battle of Fort Ridgely in a four-part series to make it more easily digestible for readers of the Field Artillery Professional Bulletin (FAPB). We explain in this edition of the FAPB the background and seminal role of Little Crow in the drama at Fort Ridgely, and we will follow with short chapters in the next three editions of the FAPB. We hope that you will follow this storyline over the next year and, in the end, find both education and inspiration in the irony-laced narrative of the Battle of Fort Ridgely, as well as a better understanding of the Field Artillery Branch's—your Branch's— distinctive heritage.

The background to and timing of the Dakota Uprising explains why the Army left only a single Ordnance Branch sergeant and fewer than a half dozen cannons at Fort Ridgely for Southwest Minnesota during the American Civil War. In 1851, the Dakotas, in the Traverse des Sioux Treaty, surrendered most of their lands in Minnesota to the United States; a further cession seven years later pushed the 7,000 Dakotas who chose to remain in the state onto two small reservations (or agencies as they were called at the time).

The Upper Agency was centered near Granite Falls, and the Lower Agency was headquartered at Redwood Falls, both in the Minnesota River Valley. In the treaties, the U.S. government promised the Dakotas a one-time $495,000 payment, cash annuities, food, and training and education to ease its men's transition from hunters and warriors to farmers and craftsmen. Many Dakotas took the government up on its offer; just as many, if not more, clung instead to their traditional ways of life. The Bureau of Indian Affairs, BIA, established a commissary and annuity-distribution office at each agency, and it permitted Protestant missionaries to proselytize among the Dakotas. In 1853, the Army, in support of the BIA, constructed Fort Ridgely on a bluff 150 feet above the Minnesota River, about 15 miles downriver from the Lower Agency. The fort was one in name only, however. It consisted of a two-story stone barracks and a one-story stone commissary building. The fort's other structures—the granary, stables, laundry, kitchens, etc.—were wood-frame buildings that surrounded a 90-yard-square parade field. The Army made no effort to palisade the fort: it expected Fort Ridgely to function as a supply depot, and the under-strength infantry companies that

rotated through it on garrison duty were to serve mostly as a constabulary force to keep white settlers (primarily German speaking immigrants from Central Europe) from encroaching on the agencies. The Army's Ordnance Branch devoted a 6-pound field gun, three 12-pound mountain howitzers, and one 24-pound howitzer to Fort Ridgely; built two small powder magazines 200 yards northwest of the fort proper; and assigned a single noncommissioned officer to maintain and manage the cannons and small arms, plus the ammunition supplies in the unlikely event they ever needed to be fired in anger. No one gave serious thought to Fort Ridgely as much more than a trading center and police station.

By the late summer of 1862, a perfect storm formed over Southwest Minnesota. The civil war between the Union and the seditious and treasonous Confederacy racked the nation, and some Dakota leaders thought that with the "Blue Coats" occupied with their "family" problems, an opportunity to win concessions from the American government had presented itself. Little Crow (Ta-o-ya-te-du-ta), once the most respected and influential Dakota among the Mdewakanton band at the Lower Agency, instead counseled caution. He had joined a Dakota delegation to Washington D.C. in 1858 to campaign for well-defined boundary lines for the agencies. Back at Redwood, he warned his neighbors that the Union Army, if the Dakotas raised trouble, could march onto the agencies from nearby Fort Ridgely and annihilate them. Few of his fellow Dakotas listened to him in the late summer of 1862—Little Crow had just lost an election as tribal spokesman—when the BIA proved late in providing them with their annuities and food disbursements, and starvation stalked the agencies.

On Aug. 17, four young Dakotas murdered five settlers outside Acton over an argument about some chicken eggs, and they rushed to Little Crow's wood-frame house to seek his protection from the "white man's law." Little Crow concluded the murderers could expect to pay for their crime with their lives. The Dakotas' "soldiers' lodge," however, seized upon the inevitable retribution for the killings as an excuse to start an uprising to "take back their lands." When Little Crow again called for calm, and a measured response, the soldiers' lodge accused him of cowardice. "Ta-o-ya-tedu-ta is not a coward, and he is not a fool," he answered. He presciently warned those who clamored for war:

> *Braves, you are like little children; you know not what you are doing. Count your fingers all day long, and white men with guns in their hands will come faster than you can count … Yes; they fight among themselves—away off. Do you hear the thunder of their big guns? No … You will die like the rabbits when the hungry wolves hunt them in the Hard Moon (January).*

Little Crow nevertheless reluctantly agreed to lead the Dakotas to war, but on the condition that they capture Fort Ridgely as their most immediate task.

Part II:
Dakota Strategy and the Emergence of Field Artillerymen as Ft. Ridgley's Main Defenders

Little Crow grasped intuitively that time was against him and the Dakotas, and they therefore must focus on the Army's sole outpost in the Minnesota River Valley. With Ft. Ridgely and its cannon in their hands, the Dakotas could impede any Army offensives up the valley, and more importantly, they could use the fort as a bargaining chip in the peace talks that President Abraham Lincoln was sure to call for. Little Crow knew from conversations with his many friends among the whites that the last thing Lincoln needed was an Indian war on the Northern frontier, especially since the Union Army had yet to beat a Confederate army in the East. Yet, other Dakotas ignored his sage advice and instead chose to unleash a campaign of terror on Southwest Minnesota's dispersed farms and towns: in the first week of the five-week uprising, they murdered over 600 settlers, torched hundreds of homesteads, and took upwards of 300 white and métis women and children as captives. Nearly 40,000 whites abandoned their homes and fled in panic to the state capital at St. Paul and into Wisconsin. The horrors that the soldiers' lodge perpetrated sealed all the Dakotas' fate in Minnesota: white survivors demanded that the Army send them troops and matériel to extirpate (preferably) the Dakotas, or expel them forever (an alternate, but no less draconian option) from Minnesota. The gun crews who helped save Ft. Ridley for the Army therefore produced profound strategic implications for both the war and American history

Ordnance 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.

far beyond the immediate and desperate fight in which they found themselves on the third and fifth days of the uprising.

On 18 AUG, at sunrise, Dakota warriors fell on whites and métis (the multi-racial children of marriages between Native American and French-Canadian fur traders) who resided at the Lower Agency and nearby farms. A wholescale slaughter ensued, and by 10 a.m., hundreds of settlers staggered into Ft. Ridgely. The post commandant, CPT John Marsh, marched half the garrison toward Redwood to investigate the refugees' panicked claims of an unfolding massacre. He left nineteen-year-old LT Thomas Gere and twenty-two able-bodied Soldiers to hold the fort until he returned. At the ferry east of Redwood, Dakotas under Mankato (M-ak'-to) ambushed March and his command: they killed twenty-four Soldiers, and less than half a dozen wounded men made it back to the fort. Near 8 p.m., Gere penned dispatches advising of the disaster at Redwood Falls and sent them to the commander at Fort Snelling (near St. Paul, 125 miles distant) and LT Timothy Sheehan, who had marched that morning with one of Ft. Ridgely's infantry companies to meet and escort the BIA teamsters who were finally bringing the Dakotas their late annuity. The most immediate question became whether Sheehan or anyone else could reach Ft. Ridgely before the Dakotas overran it.

While he organized Soldiers and refugees to withstand the expected Dakota onslaught, Gere turned to SGT John Jones of the Ordnance Branch to position Ft. Ridgely's cannons for its defense. Ordnance Sergeants were much like today's Warrant Officers, and Gere recognized Jones as the garrison's artillery expert. Jones also had seen combat and had been wounded as a Redleg fifteen years before in the Mexican-American War, so the young lieutenant, already deathly ill from mumps, may have instinctually turned to the older NCO to lead at the guns during the fighting. Jones recently had worked with SGT James McGrew at Fort Ridgely to train some of the Minnesota Volunteer Infantry in operating the post's cannons, and he asked McGrew for his assistance. Two civilians, John Whipple (like Jones, he had fought in the Mexican-American War) and Dennis O'Shea, said that they too had been artilleryman, and they could help at the howitzers. Still, there were not enough trained men to safely and effectively man all the fort's cannons on 18 AUG.

Jones concluded that the Dakotas' most likely course of action involved them rushing the parade ground through the opening between the officers' quarters and the surgeon's quarters at the fort's southwest corner. A ravine in that quadrant could conceal them for all but the last 150 yards on their approach. Jones therefore placed O'Shea with the 6-pound field gun there. He was confident that if he joined it to offer direct supervision, O'Shea's gun crew of three civilians and four infantrymen could work the howitzer fast enough to repel any Dakotas who charged from that direction. A squad of Soldiers stood nearby to provide covering fire. Jones gave SGT McGrew and Mr. Whipple command of 12-pound mountain howitzers. They should, he directed, pay particular attention to the ravine and tree line at the fort's northeast corner, where perhaps the Dakotas might approach under the cover of the heavy woods, and the northwest corner that faced the powder and ammunition magazines, whose contents promised to draw the Dakotas' attention. The relatively immobile—it was best moved with teams of horses or mules—24-pound field gun sat unused in the middle of the parade field throughout most of the battle that followed. Jones placed the third, unmanned 12-pound mountain howitzer at the fort's southeast corner to guard the prairie on which the Dakotas could find no cover if they tried to assemble for an attack. All the while, more refugees flowed into the fort. LT Gere placed the women and children in the stone barracks on the north side of the parade grounds, and garrison's physician prepared a room on the bottom floor to serve as a field hospital. Everyone expected hard business that night or the next morning.

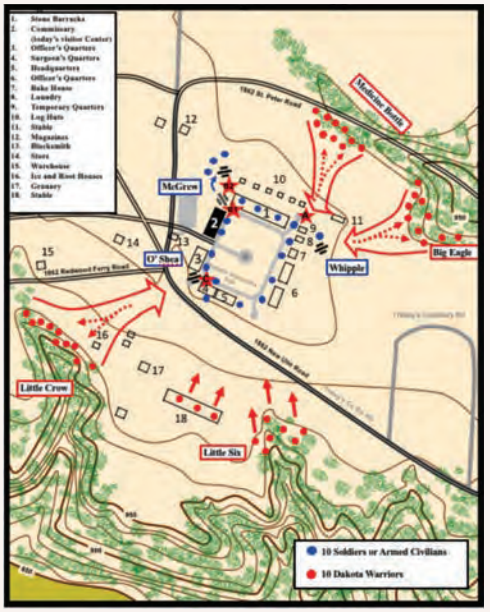
Fortuitously for the defenders of Ft. Ridgely, the Dakotas gave them more than forty-eight hours to complete their defensive preparations and become more comfortable working their guns. The soldiers' lodge shouted down Little Crow at a council of war on the afternoon of 18 AUG, and they and their followers 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 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 Sheehan, upon receiving (late on 18 AUG at Glencoe) CPT Marsh's message that "The Indians are raising hell," turned his company around and force-marched it and a party of BIA teamsters twenty-three miles through the night to the fort. They arrived near sunrise on 19 AUG, and LT 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 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 Jones or Mr. Whipple possessed combat experience. Many of the métis, on the other hand, had fought in intra-tribal wars, but the defense of 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-kaŋ-o-zhan-zhan) and Big Eagle (Wanbdí Táŋka) in the brush-filled ravine and 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 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 quicky 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 savages 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.

Upon hearing the commotion from the north side of the fort, Little Crow, near the southwest corner, exhorted the 200 warriors who had joined him to charge. Jones, O'Shea, and their crew stood gamely in the open: their "position was particularly exposed by reason of the short ravine … up which the savages swarmed to easy musket range in large numbers, compelling him [O'Shea] to deliver his fire under the most trying circumstance." LT Culver and a squad of infantrymen,



Fort Ridgely

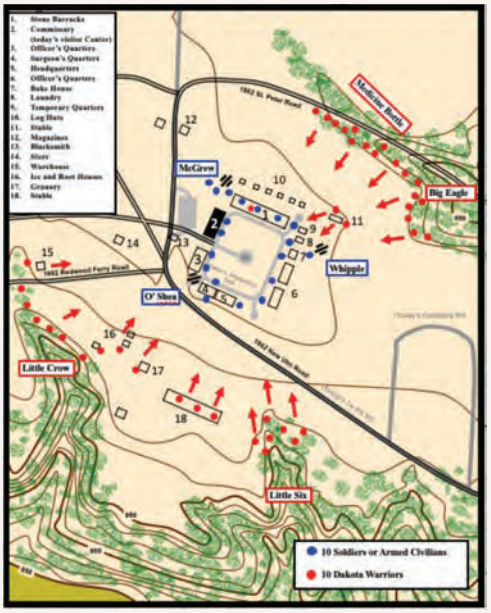
First phase of the Dakota attacks on Ft. Ridgely on 20 AUG 1862. All maps are courtesy of Combat Studies Institute's "Minnesota Sioux Uprising 1862" staff-ride package.

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 canister (an anti-personnel 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 onto 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 Soldier 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 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 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. He spent



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

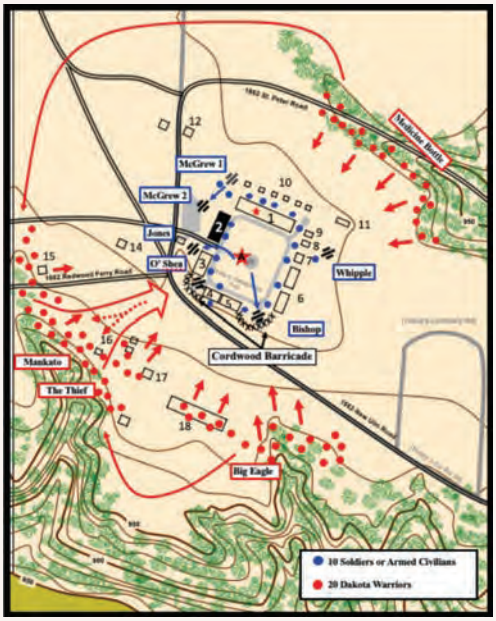
21 AUG lobbying and cajoling at the Lower Agency while other Dakotas spread the net of rape, pillage, and murder over the farmsteads that escaped their attention the previous three days. Little Crow abandoned trying to explain grand strategy, and he instead promised that Ft. Ridgely's commissary and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

Little Crow's plan was simple. He intended to encircle the fort, and upon his signal, Dakotas could rush its defenses on all sides. Medicine Bottle would again attack from the northeast. Mankato volunteered to lead the warriors to overwhelm the Soldiers who crewed the gun at the southwest corner. The Thief and his followers, convinced the hardest fighting and therefore best opportunity to win glory might take place at the southwest corner, joined Mankato. Big Eagle intended to attack from the south and southeast. Little Crow told the Dakotas that many of them might die at Ft. Ridgely, but the Blue Coats could not keep up fires to repel all of them if they attacked in unison as he directed. Little Crow instructed that the Dakotas must at all costs focus single-mindedly on the artillerists. He promised to personally and publicly give each warrior who killed a soldier at the cannons an eagle's tail feather that he could wear in his headband for the rest of his life, and he assured the warriors that he intended to be with them in the thick of the fighting. He was, after all, no coward. Once the Dakotas captured the big guns, they could make short work of the Soldiers and then, as far as Little Crow cared, plunder the fort's stores and refugees to their hearts' content.

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

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

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



Dakota attacks on Ft. Ridgely on 22 AUG 1862.

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

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

After tasting defeat at second time at Ft. Ridgely, the Dakotas abandoned all hope of taking it, and they again focused on New Ulm. Although the settlers fled from the town after repulsing the second (and more ferocious) attack on 23 AUG, few doubted that at Ft. Ridgely the Dakotas already had lost the war. Union forces from Ft. Snelling flowed into Southwest Minnesota over the next several days. While COL Henry Sibley proved frustratingly slow (at least from the settlers' perspective) in moving beyond Ft. Ridgely, ground truth was that Dakotas could not stop the Army from operating at will across all of Southwest Minnesota. The mountain howitzers, in particular, gave Union Soldiers, state militia, and Renville's Rangers a tremendous advantage over the Dakotas, and allowed them to quash uprising in its remaining battles, at Birch Coulee and Wood Lake, in large measure by killing the Dakotas' leaders. Mankato, for example, was killed by a cannon ball at the Battle of Wood Lake. On 23 SEP, the soldiers' lodge gave up over 250 prisoners to COL Sibley at Camp Release. Nearly 2,000 Dakotas surrendered to Federal and state authorities, though Little Crow fled on to the Northern Plains, and Medicine Bottle and Little Six sought refuge from the British government in Canada. The Army arrested 392 warriors, and it confined hundreds of Dakota men, women, and children in an internment camp on an island in the middle of the Minnesota River outside Ft. Snelling. A commission composed of officers of the Minnesota Volunteer Infantry sought to hold accountable the perpetrators of the uprising, and in less than six weeks' time, it tried and sentenced 303 Dakota men to death for rape and/or murder. President Lincoln reviewed each conviction, and he approved death sentences for 39 Dakotas. Several warriors who could prove that they fought only at Ft. Ridgely saw their sentences commuted since they were, in today's terms, legal combatants. Big Eagle was among them. On December 26, 1862, 38 Dakota men—including some who protected white and métis captives—were hanged in Mankato in the largest mass execution in American history. Congress abolished the Dakota agencies and declared the 1853 treaty null and void. In May 1863, Minnesota banished the survivors (hundreds died over the course of the winter) of the internment camp to present-day South Dakota. Two settlers killed Little Crow in July 1863 outside Hutchinson, Minnesota; the legislature paid $500 for his scalp and displayed it in the state's history museum for decades. The British turned Medicine Bottle and Little Six over to US authorities in 1864. The Army hanged them at Ft. Snelling, in November 1865; medical students used the corpses as cadavers.

Determining the legacy of the Dakota Uprising is a task fraught with pitfalls. The Battle of Ft. Ridgely might seem an insensitive choice for study, one that glorifies victory against a foe that likely never had a chance of winning and minimizes the Army's substantial role in the hardships inflicted on indigenous peoples during the conquest of the American West. But nuance is often elusive in history. In 2012, Minnesota's governor Mark Dayton

called for 17 AUG to be a "Day of Remembrance and Reconciliation" in his state. Emotions over the Dakota Uprising continue to run raw a decade later, and they burst to the surface each 26 DEC when the Dakotas publicly remember and mourn the executions at Mankato. The history of the Battle of Ft. Ridgely therefore should not, and cannot, be plucked from the larger currents of American history and studied in isolation, no matter how self-contained, or unpleasant on a macro level, it seems. Nor should FA professionals ignore the first instance in Army history in which artillerists defended their outpost until the relief arrived and saved it. In the final analysis, we should remember Big Eagle's words: "We went down determined to take the fort, for we knew it was of the greatest importance to us to have it. If we could take it we would soon have the whole Minnesota valley." One can only imagine how much more settler, métis, and Indian blood might have flowed if the Dakotas had indeed taken Ft. Ridgely and the entire Minnesota River Valley in August 1862 and forced the US Army to fight to regain it.

ABOUT THE AUTHOR:

Dr. John Grenier is the FA Branch/ USAFAS historian at Fort Sill, Oklahoma. He is also a frequent contributor to the Field Artillery Professional Bulletin and the FA Journal.

34TH "RED BULL" DIVARTY HOSTS ARMY FIRES, INTEL COMMUNITIES SYNCHRONIZE IN 2023 TO MAKE WAY FOR ARMY OF 2030

By 2LT Linsey Williams

From 7-8 Sept. 2023, Army personnel from the Fires and Intelligence communities, across Active Duty and National Guard components alike, descended upon the 34th Red Bull Infantry Division headquarters in Arden Hills for a second-annual symposium.

Unlike last year's Fires Symposium, this was redesignated an Intel/Fires Symposium. In keeping with the 'Army of 2030' vision that has driven the U.S. Army to implement significant force structure changes, the leadership of the 34th Red Bull Infantry Division and 34th Division Artillery constructed an itinerary which emphasized the importance of synchronizing the efforts of separate warfighting functions.

"We were very deliberate in saying that intel goes first, then fires, then targeting, because targeting is the integration of intel and fires," said Col. Eric Wieland, commander of the 34th Division Artillery (DIVARTY).

Day one of the two-day event had briefs and panel discussions which brought together some of the best representation the National Guard Bureau and the Fires Center of Excellence could provide for such an event. One keynote speaker, Lt. Col. Christopher Isch, was able to provide unique insights to the audience based on his role as the Senior Guard Advisor at Army Futures Command's Long-Range Precision Fires (LRPF) cross-functional team.

"One of the benefits that the LRPF has is that we are at Fort Sill," said Isch. "We are with our center of excellence. We are quite literally across the street from the Fort Sill [commanding general] who is the [field artillery] modernization proponent for the Army."

A consideration the Army must make, however, is that approximately 40% of the total Army force is in the National Guard. Further, 60% of Fires units in the Army are in the National Guard. There are problem sets that are unique to the National Guard when it comes to things like fielding equipment, resourcing the units, and conducting training at the individual, unit, and collective levels.

"As the National Guard stands up its [Division Artilleries] we're kind of focusing on the division for a couple of reasons," explained Weiland. "For one, the Army of 2030 has explicitly said that the division is the unit of action. It is the tactical echelon headquarters that has enough robust capabilities to do multi-domain operations. It's probably the lowest echelon that is doing multi-domain operations in large scale ground combat operations, which is a pivot from what we did before where brigades had the capability to conduct large-scale ground combat operations."

While divisions may take the helm as the unit of action, they are still powerless without the maneuver units under their purview to engage the fight. For this reason, the Intel/Red Bull Fires Symposium was a two-day event. Day two was centered around the challenges that National Guard field artillery are faced with, as well as ways forward to improve field artillery operations in the 34th ID, alongside the units who are aligned-for-training.

Headquarters and Headquarters Battery, 34th DIVARTY First Sergeant Jonah Jenniges was a primary planner for the day two symposium events. "Battalion level staff officers and battalion master gunners were the main target audience that provided the 34th DIVARTY Master Gunners the opportunity to create a shared understanding of the DIVARTY commander's vision for the 34ID Fires community for the Army of 2030."

The event offered peers the opportunity to learn from one another, as well as share and discover best practices for targeting, training, and everything in between.

"It's good to come back and engage with National Guard divisions, especially as they're going through this transformation of standing up the DIVARTYs," said Isch. "And really making a fundamental shift in the way that we fight fires across the National Guard component."

ABOUT THE AUTHOR:
2nd Lt. Linsey Williams commissioned as a Field Artillery officer in June 2023. Prior to commissioning, she served as the Public Affairs Operations Noncommissioned Officer for the 34th Infantry Division from 2017-2023. Through her enlisted service, LT Williams has deployed twice to the Middle East, participated in a National Training Center rotation with 1/34th ABCT, DIV and CORPS-level Warfighter exercises, and served in overseas exercises to include the Norwegian Exchange 2013 and Sabre Strike 16. She currently serves as Radar Platoon Leader for Headquarters and Headquarters Battery (Det.), 1st Battalion, 125th Field Artillery Regiment in Anoka, Minnesota.

PROUD TO SUPPORT THE FIELD ARTILLERY JOURNAL'S PRINT EDITION

Marines fire an M777A2 howitzer during training at Pohakuloa Training Area, Hawaii, Sept. 20, 2020.
Photo By: Marine Corps Sgt. Luke Kuennen

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FA TECHNOLOGIES
Partner Spotlight

ElbitAmerica's Sigma-Next Generation Howitzer:
Transforming Cannon Artillery in Support of the Army of 2030 and Beyond

By: Cobb Laslie
Director Howitzer Programs, Elbit Systems of America

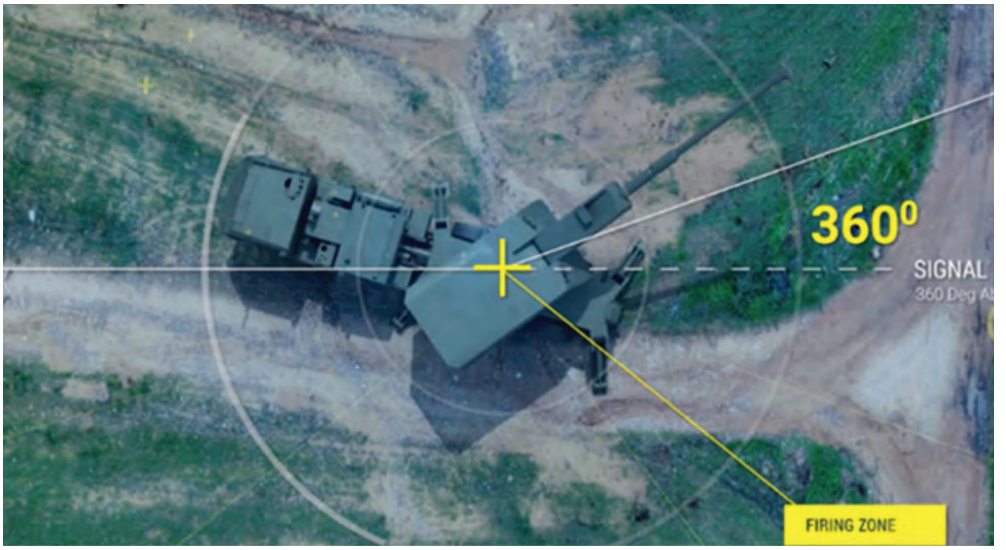
Imagine an operational scenario where a forward-deployed Infantry or Stryker brigade combat team is tasked with moving from a Divisional or Corps rear area to establish a screen along a forward boundary. Tensions are high between two dominant land powers who have already skirmished, causing both forces to reposition combat forces to gain positional advantage. Air cover is limited while this brigade conducts a tactical road march with its maneuver battalions and a field artillery battalion. The Brigade Commander directed his artillery battalion commander to provide persistent fires while the brigade moves and the Field Artillery Battalion Commander decided to leapfrog his towed firing batteries in an attempt to provide indirect fires coverage to the brigade. His challenge of regulating the speed at which the brigade moves while his towed firing batteries reposition and emplace multiple times has exhausted his battalion while slowing the brigade's movement, causing it to fail to accomplish its objective and gain a position of advantage over the adversary. This fictitious scenario illustrates the real-life challenges of mobility, survivability, and lethality that towed artillery battalions face while supporting large-scale combat operations over a distributed battlefield. Fortunately, ElbitAmerica is prepared to answer the Army's expected call for a Next Generation Howitzer providing all of this and more to the field artillery battalions in Infantry and Stryker Brigades.

The U.S. Army Field Artillery is at a precipice in the modernization of its cannon fleet. Cannon platforms in today's brigade combat teams are less lethal, less mobile, and less survivable than many of our allies and adversaries. The 39-caliber cannons of the M109A7 and M777 are outgunned, lacking the range to provide Commanders an organic, shaping, and defeat mechanism against an adversary whose close support asset resides just outside of our current maximum range. The towed cannon systems found in our Infantry and Stryker Brigades are highly vulnerable to counterfire and small unmanned aerial platforms armed with lethal payloads. Soldiers will be exhausted within days of a protracted conflict due to crew exposure to the elements, multiple slow survivability moves, and lack of protection during their normal crew drill.

ElbitAmerica – Protecting and Saving Lives through Innovative Solutions

Elbit System's Autonomous Truck Mounted Ordnance System (ATMOS) family of howitzers delivers highly mobile and lethal indirect fires solutions to its customers with a wide range of requirements. The current family of ATMOS gun systems emplaces within seconds, delivers a lethal volume of fire, closes the Sensor-to-Shooter loop in seconds, and displaces seconds later to survive on the modern battlefield. The Sigma-Next Generation Howitzer is the pinnacle of Elbit's ATMOS family of howitzers and is the answer to the needs of the U.S. Army Field Artillery as it seeks a more capable direct support artillery platform. ElbitAmerica's Sigma-Next Generation Howitzer is ideally suited to support large-scale combat operations with a highly

The Sigma-Next Generation Howitzer undergoing developmental testing in 2022.



The Sigma-Next Generation Howitzer provides 360-degree firing against all targets with increased reliability and Soldier survivability.

mobile howitzer with growth potential to support the Army of 2030 and beyond. ElbitAmerica has recently started production of the Sigma-Next Generation Howitzer at their Charleston, South Carolina facility, and will begin deliveries to the Israeli Defense Force in 2025.

Sigma-Next Generation Howitzer – Bringing Tomorrow's Capability to the Field Artillery Today

The Sigma-Next Generation Howitzer will allow the U.S. Army Field Artillery to regain its lethal edge when called to fight on the near-peer battlefield. Lethal, mobile, and survivable, the Sigma-Next Generation Howitzer is the most advanced howitzer available today. As the capabilities of peer and adversary artilleries increase across the globe the U.S. Army cannot wait and watch any longer as its direct and general support artillery battalions are left behind, out-gunned, and out-ranged by more capable systems.

Mounted on a highly mobile 10x10 wheeled platform, with a 155mm, 52-caliber cannon, and an autoloader with an unmatched rate of fire and magazine depth, the Sigma-Next Generation Howitzer is in a class of its own. Sigma-Next Generation Howitzer emplaces rapidly and is in a position ready to fire in less than 60 seconds. Built with an open systems architecture and redundancies across major systems, Sigma-Next Generation Howitzer incorporates advanced sensors and diagnostic software to monitor the health of the system and provide the crew with systems updates.
Sigma is capable of 360-degree firing across all zones and multiple round simultaneous impact, or MRSI, missions. Sigma's ability to occupy a firing point and engage multiple targets without repositioning is a capability not replicated by most wheeled and tracked howitzers. Sigma's 360-degree firing capability sets it apart from other howitzers by reducing emplacement and displacement times to only those required for survivability. The MRSI capability allows Sigma to bring lethal effects to bear against targets with the simultaneous impact of multiple projectiles. A single Sigma howitzer can conduct special missions, such as a coordinated illumination mission, that would otherwise take two or more howitzers to accomplish. These two capabilities combined with the magazine depth and range of the 52-caliber cannon enable a greater volume of fire than today's cannon fleet and make the Sigma-Next Generations Howitzer an extremely lethal capability on the battlefield.

ElbitAmerica's Sigma-Next Generation Howitzer is designed around three core systems: (1) the vehicle platform which includes a protected crew cabin; (2) the artillery turret interface; and (3) a fully automated turret composed of the loading and armament systems. Customer input on these three systems is essential. The system is vehicle agnostic meaning it can be designed to fit on most 8x8 or 10x10 military trucks. If a specific armament system is desired, Elbit can integrate this capability into the system. Once these two decisions are made, the artillery turret interface (ATI) is designed to meet vehicle and turret interface specifications. Elbit's proven track record of designing state-of-the-art howitzers is evident in the unparalleled design of the Sigma-Next Generation Howitzer.

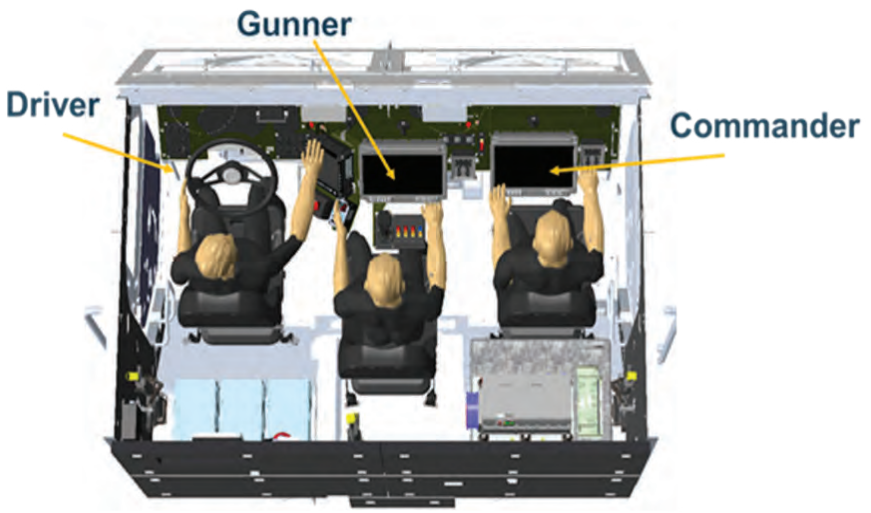
ElbitAmerica is currently building a version of the Sigma on the Oshkosh 10x10 heavy-wheeled truck for the Israeli Defense Force. Found throughout the U.S. Army and within Field Artillery battalions, this vehicle option provides excellent mobility and survivability for the Sigma-Next Generation Howitzer. Dual articulating wheels allow for a tighter turning radius giving the Sigma-Next Generation Howitzer superior flexibility when occupying firing points. Exceptional power allows the Sigma-Next Generation Howitzer to maintain pace with its supported maneuver force and overcome obstacles that typically hinder the movement of a towed firing battery. The commonality provided by the current vehicle choice allows Field Artillery battalions to reduce and simplify the challenges expected on today's modern battlefield. As the Army's next-generation howitzer requirements mature our design flexibility allows us to incorporate future vehicle configurations or a designated vehicle identified by the Command Tactical Truck modernization program.

Sigma's three-soldier crew is protected in an armored cab which provides increased survivability over the prime movers of the M777 and M119 towed howitzers and the M109A7 self-propelled howitzer. The crew is protected with up to a STANAG level 3 cabin to defend against both direct and indirect fire. Removable blast-resistant plates provide additional protection

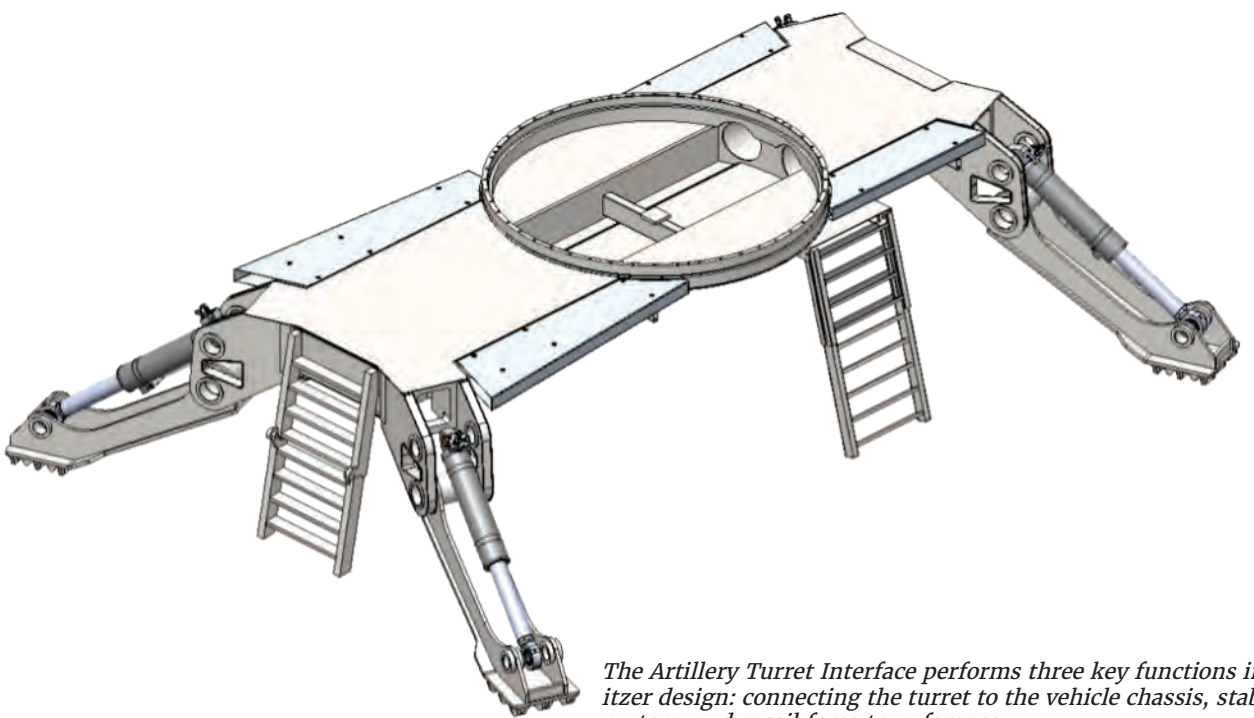
against explosive detonation underneath the vehicle. Elbit's approach to crew survivability is to provide the user the latitude to design its crew cab to its specifications.

Currently, the crew compartment on the Sigma-Next Generation Howitzer is designed for 3 Soldiers. Vehicle driver, Gunner, and Gun Commander, all operate from within the armored compartment with sufficient room for crew gear and enough sustainment for three days of continuous operation. The Gunner and Vehicle Commander operate independent command and control devices. Operating the howitzer's fire control panel, the Gunner receives fire command data and processes the mission in seconds. Working in tandem with the driver to emplace the vehicle based on the mission requirements, the Sigma-Next Generation Howitzer stops forward movement and is in a position ready to fire in less than 45 seconds. The Vehicle Commander with their own independent C4I station battle tracks, provides situational awareness to higher command and leads the crew of the howitzer. The crew compartment has three points of ingress and egress, including a roof hatch. For self-protection, the Sigma-Next Generation Howitzer can be armed with a crew-served weapon operated by the Vehicle commander or by a remote weapons station.

The Artillery Turret Interface performs three key functions in the howitzer design: connecting the turret to the vehicle chassis, stability to the system, and recoil force transference. The Artillery Turret Interface, or ATI, connects the turret module to the designated vehicle by providing a stable and reinforcing structure to the chassis. Regardless of the vehicle, the ATI is designed to meet the needs of the customer by designing the ATI to the vehicle's specifications. Secondly, the ATI provides increased stability to both the vehicle chassis and the firing platform during cross-country movement over rough terrain and firing. The stability provided by the ATI allows the turret module to be mounted on a turret ring providing the Sigma-Next Generation Howitzer 360-degree firing capability. The third function the ATI provides is the transference of the recoil force from the armament system to the ground. The ATI transfers the energy of the explosive chain from the vehicle to the ground through 4 stabilizing outriggers providing stability and highly accurate fires. The outriggers are emplaced while the howitzer gains positional and directional control to be in a position ready to fire in 45 seconds.



Sigma's armored cab provides protection for the three-soldier crew with independent stations for fire control and battle management.



The Artillery Turret Interface performs three key functions in the howitzer design: connecting the turret to the vehicle chassis, stability to the system, and recoil force transference.

The heart of Sigma-Next Generation Howitzer's armament is a 52-caliber, 155mm cannon system with a JBMOU-compliant 23-liter chamber. This allows the Sigma-Next Generation Howitzer armament system to be capable of shooting all current U.S. Army and NATO standard ammunition. Coupled with the fully automatic autoloader that relieves Soldiers from conducting the physically intensive duties of preparing and firing ammunition, the Sigma provides increased lethality in the form of timely and accurate indirect fires.

The turret of Elbit's Next Generation Howitzer boasts the largest onboard ammunition magazine of any wheeled howitzer. The howitzer provides an unmatched volume of fire to support maneuver forces with 40 onboard projectiles and 216 powder increments. The turret for ElbitAmerica's Sigma-Next Generation Howitzer will undergo modifications to meet mobility requirements allowing the howitzer to fit within European rail constraints and the cargo bay of the Air Force's C-17 Globemaster aircraft. These changes will decrease the exterior turret dimensions and reduce the number of propellant charge increments but keep the projectile count at 40 complete rounds.

The autoloader on the Sigma-Next Generation Howitzer is more than just a propellant and projectile autoloader designed to increase the rate of fire reducing Soldier burden. The projectile and propellant carousels are each divided in half, providing redundancy in the event of a mechanical failure. The 40-fuzed projectiles are loaded into two twenty-round carousels dispensing the designated projectile to a central projectile loading arm. The loading arm articulates to load the projectile into the breech assembly in a fluid motion. A hybrid flick rammer rams the projectile with consistent force. An inductive fuze setter transfers mission-specific, position, and satellite data for inductively set fuzes as part of the loading and ramming process. Individual propellant increments are dispersed from two rotating carousels onto a conveyor system that transfers the increments to the propellant loading tray before loading into the chamber.

An onboard ammunition management system manages (AMS) all aspects of the ammunition for the Sigma pertinent to the safe calculation of firing data. Each projectile and propellant increment is loaded into an individual cell with relevant data transferred to the ammunition management system. Projectile type, weight and mated fuze type, and the propellant type, lot, and temperature are all managed by the AMS. Sigma is equipped with an integrated muzzle velocity meter, measuring the muzzle velocity during each mission. That data is fed into the AMS and then passed to the fire control computer determining the firing data for the given mission.

Several safety features ensure proper shell-fuze and propellant combinations. Sensors in the projectile and propellant loading mechanisms, the propellant feed trays, and internally mounted cameras in the turret provide visual confirmation that the correct rounds are fired at the correct time. A secondary function of the inductive fuze setter is to perform a safety check on the projectile fuze combination by measuring the overall height of the projectile and comparing it against a known database of projectile fuze combinations. If the projectile height fails the safety check, the mission is stopped until the proper combination is verified. These safety measures are designed to improve the crew's confidence in the automation. Throughout Sigma's development and testing, the algorithms behind the operating systems continuously learn and improve.

Reloading the turret is accomplished through an automated means or manually by an articulating arm for projectiles while propellant increments are manually loaded. In manual mode, a projectile loading arm extends from within the turret to pick up the projectile which is placed on a loading tray by crew members. Propellant charges are loaded into a side receptacle individually. As each row of propellant cells is filled, the filled row is cycled into the magazine and another empty row is presented. The loading process with prepared ammunition takes approximately 10-12 minutes. ElbitAmerica's concept for a robust automated loading system will be integrated into the same vehicle chassis as the howitzer. Providing this commonality is important as it will reduce additional logistics burden on the artillery battalion.

ElbitAmerica – Expanding Defense Industrial Capacity to Support the Warfighter

On May 8th of this year, ElbitAmerica opened its' Charleston, South

The Sigma Autoloader features dual projectile carousels and two independent charge magazines for redundant ammunition management.

The Sigma-Next Generation Howitzer undergoing system-level live fire testing in 2022.

Carolina-based Ground Combat Vehicle Center of Excellence. ElbitAmerica began the construction of the facility over two years ago to build a facility that would be on the leading edge of U.S. defense manufacturing capabilities. This state-of-the-art facility was purpose-built and has over 135K square feet of production floor space. Designed from the floor up, the facility is fully temperature and humidity-controlled with integrated cranes and exhaust systems enabling the manufacture and integration of a variety of wheeled platforms. The Charleston facility will enable complete digital engineering by incorporating machine and equipment monitoring into the assembly and integration process. If after the delivery of a complete system and a forensic analysis of manufacturing issues is required, this facility will be able to trace backward to the exact error identifying the tool, time, and tolerances used in the assembly process.

ElbitAmerica will build the Sigma-Next Generation Howitzer for the Israeli Defense Force and the Command Post Integrated Infrastructure (CPI2) platform for the U.S. Army at the Charleston facility. Delivery of the IDF's Next Generation Howitzer is scheduled to begin in 2025 while CPI2 platform deliveries to the U.S. Army are ongoing. Across the country, suppliers from California to Wisconsin to Texas to Massachusetts are supplying the major and minor components to build Sigma with American Grit. ElbitAmerica is proud to support the warfighters of the United States Army by providing state-of-the-art capabilities that bring next-generation equipment to the men and women who depend on it the most.

Fielded with ElbitAmerica's Sigma-Next Generation Howitzers, the field artillery battalion in our fictitious scenario maintained pace with the maneuver battalions enabling the brigade to accomplish its assigned mission and gain a position of advantage over the adversary. The three firing batteries of the field artillery battalion easily moved from position area to position area providing persistent fires to the maneuvering brigade. During the move, each firing battery occupied hide positions, maintaining a concealed presence with easy access to firing points that offered 360-degree firing capability. Sigma's magazine depth, high rate of fire, and cannon range ensured that the Brigade and the maneuver battalions were always under the lethal fires umbrella of the King of Battle.

ElbitAmerica is excited to offer the Sigma-Next Generation Howitzer to the United States Army bringing next-generation capabilities to the Field Artillery and the Army of 2040.

ElbitAmerica's Charleston, South Carolina Ground Combat Vehicle Center of Excellence opened in May 2022 will be the site of Sigma's final integration.

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Molly Pitcher Trail

The 1st Annual KoB Virtual Fitness Challenge took us on the Henry Knox Trail and the 2nd took us through the Western Front in ww1 France. Our 3rd Annual Challenge took us through the deserts of the middle east during Desert Storm and highlighted the MLRS units who first fired the new equipment in combat.

Join us again this year as we pay homage to the volunteers that have served and still serve to support the Field Artillery. We travel from Monmouth, NJ, to Carlisle PA and learn more about Molly Pitcher and the places that still commemorate her today.

The event will go live November 17, 2023. The My Virtual Mission fitness app links with your cell phone, smart watch or fitness tracker so that all steps are counted towards the total. Finish before November 16, 2024 and receive the custom race medal pictured above!

www.fieldartillery.com/events for more information!

MY VIRTUAL MISSION

USFAA
United States Field Artillery Association

KING OF BATTLE

Virtual Fitness Challenge

2023-24