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Fires

Adaptable Fires for multi-domain operations

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Purpose

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

Cover: *Lance Cpl. Taiji Hirose, an artillery mechanic with Bravo Battery, 3rd Battalion, 12th Marine Regiment, 3rd Marine Division, provides security during the Artillery Relocation Training Program (ARTP) 19-1 at the Combined Arms Training Center Camp Fuji, April 20, 2019. (Cpl. Josue Marquez/U.S. Marine Corps)*

Col. Mark Holler
U.S. Army Air Defense Artillery School commandant

Fighting air defense in multi-domain operations

There are those who will argue that the concept of multi-domain operations (MDO) is nothing new; that it is essentially a return to "business as usual" (with the addition of space and cyberspace domains). After all, we have understood the significance of fighting peer adversaries across multiple domains (air, land, and sea) since World War II. In fact, the need to synchronize operations across multiple domains to support maneuver against numerically superior enemy forces was central to "Air-Land Battle," which served as our operating concept for a quarter of a century.

To think of MDO in these terms fails to account for the complexities of the current global operating environment, and the challenges they present to our joint and combined forces. As discussed in TP 525-3-1, our adversaries employ "layered stand-off" across all five domains in both competition and conflict phases to negate our ability to project power and globally integrate the actions of the joint force. Arguably, the military problem set associated with this is exponentially more complex than those we have faced at any other time in our history.

Air and Missile Defense (AMD) is vital to our nation's efforts to negate our adversaries' layered stand-off capabilities. In fact, it is integral to the **central idea** behind MDO, which calls for the joint force to prevail in **competition**, and when necessary, **penetrate and dis-integrate** enemy anti-access and area denial (A2AD) systems and **exploit** the resultant freedom of maneuver to achieve strategic objectives, forcing a return to competition on favorable terms.

The good news is, as a branch we are well-versed in the role we play when it comes to the key actions that support the "competition" aspect of MDO. This is attributed to the frequent employment of ADA forces in "shape" and "prevent" operations over the past two decades. What we are less familiar with are the key actions we must support in the wake of failed deterrence. Essentially the joint force's efforts to penetrate and dis-integrate the enemy's A2AD: Exploit the resultant freedom of maneuver to achieve strategic objectives and then return to competition. A look at AMD's role across these key actions (italicized below) and the large scale combat operations (LSCO) associated with them helps to inform us of the skills we need to hone and the capabilities we need to develop across the ADA force.

Competition, the condition when actors in the international system have incompatible interest but neither seeks to escalate to open conflict…yet! Since Desert Storm of 1990, the U.S. Army's Patriot Force has played a key role in this ongoing completion for influence across the globe. Patriot is a national strategic asset vital to stability in volatile regions of the world. Our deployment of Patriot to foreign soil sends a strong message of commitment and resolve to protect U.S., allied and regional partners national interest.

Penetrate A2AD

Our formations will play a significant role during joint and combined operations launched to penetrate the enemy's A2AD systems. Perhaps our most significant action during this stage of LSCO will be to the protection of aerial port of debarkation, sea port of debarkation, Strategic locations and C2 nodes. Forward presence, early entry, and allied/partner AMD assets must defeat the long-range aerial threats that will be directed against these assets. Our theater AMD assets; THAAD, Patriot and

Sgt. Garcia-Gordon, team chief with the 5th Battalion, 4th Air Defense Artillery, watches a Stinger missile launch during a live-fire exercise as part of Saber Guardian 19, in Capul Midia, Romania, June 20, 2019. Saber Guardian is an exercise co-led by the Romanian land forces and U.S. Army Europe June 3 - 24 at various locations in Bulgaria, Hungary and Romania. (2nd Lt. Ashley Goodwin/Mich. Army National Guard)

indirect Fires protection capability (IFPC) will also contribute to joint and combined efforts to *degrade the long-range intelligence, surveillance and reconnaissance assets* that are so vital to our adversary's A2AD system. As joint forces maneuver across strategic and operational distances to contest the enemy's maneuvering forces; Army ADA, operating across all echelons and integrated through common, networked C2, must be able to converge capabilities to *neutralize the enemy's long-range systems*. Our theater SHORAD assets must also enable freedom of cross-domain maneuver to *deny the enemy's objectives.*

Dis-integrate A2AD systems

Upon successful penetration and early entry of capabilities, joint forces will seek to dis-integrate our adversary's A2AD systems to allow for expanded theater operations and cross-domain maneuver. AMD sensors (Patriot, lower tier air and missile defense sensor, Sentinel, and forward-based mode (FBM) radars) assist in efforts to *refine intelligence preparation of the adversary's A2/AD systems,* contributing to the air and space portion of the wide area surveillance effort and ensuring common understanding of the air domain. Additionally, these AMD sensors, along with our networked C2, help enable *defeat enemy long-range Fires systems* by "seeing" long-range Fires systems during launch and providing point of origin (POO) data to Army and joint strike capabilities. As offensive Fires and other strike assets are used to destroy long-range enemy Fires, theater Army AMD assets (Patriot, THAAD,

An Avenger Weapon System fires at a live-fire short-range missile range near Shabla, Bulgaria, June 10, 2019 during exercise Shabla 19. The system was operated by Soldiers with 5th Battalion, 4th Air Defense Artillery Regiment. SHABLA 19 is a bilateral, Joint Air Defense Live Fire exercise hosted by Bulgarian Armed Forces in Shabla, Bulgaria, from June 10-14, 2019. SHABLA 19 is a designed to improve readiness and interoperability between the Bulgarian Air Force, Navy and Land Forces, and the 10th Army Air and Missile Defense Command, U.S. Army Europe. (Capt. Aaron Smith/ U.S. Army)

FBM), integrated with joint and multi-national AMD forces, must defend against launched aerial threats. Concurrently, AMD forces (IFPC) must be prepared to assist in efforts to *neutralize enemy mid-range Fires* that target C2 and critical support nodes, while our M-SHORAD formations protect maneuver forces as they seek to *defeat the enemy system through deception and maneuver.*

Exploit freedom of maneuver

As the enemy's A2AD system are dis-integrated and defeated, the Army and joint force will seek to exploit opportunities in the close and deep maneuver areas to dislocate and defeat its defenses. In order to allow friendly forces to converge capabilities at these critical points in time and space, AMD forces (IFPC) must be prepared to counter enemy mid-range Fires that target C2 and critical support nodes. As with the long-range systems discussed earlier, the POO data AMD sensors and C2 provide Army, and joint strike capabilities are crucial to the *defeat of the enemy's mid-range Fires.* Similarly, as the division engages in the close fight, the ability to neutralize the enemy's short-range systems becomes paramount. It will need to converge capabilities to achieve this objective, integrating its M-SHORAD and IFPC assets with the joint air campaign. As our ground forces *maneuver to isolate and defeat the enemy's land forces,* these M-SHORAD and IFPC elements support the effort by providing early warning, supporting the de-confliction of the air domain and defeating aerial threats

Soldiers with the 5th Battalion, 7th Air Defense Artillery Regiment stand ready to conduct a quick-response missile transport and reload training in Koper, Slovenia, June 3, 2019, as part of the joint exercise Astral Knight 19. AK19 is a multinational combined exercise designed to test integrated air and missile defense capabilities. The exercise involves a combination of flight operations and computer-assisted scenarios. (Sgt. Erica Earl, U.S. Army)

which could disrupt/interdict the division's scheme of maneuver.

Re-compete to consolidate and expand gains

The defeat of our adversary's forces is not the endstate. Joint forces must work to *produce sustainable outcomes* as we return to competition. As the field army consolidates gains, AMD forces will re-position to defend critical assets and forces. Additionally, Army AMD forces, in concert with joint and coalitions AMD assets, re-calibrate their force posture to *help set conditions for long-term deterrence* of any attempts at exploitation of the air domain by the defeated great power or their proxies.

So, what are the "take-aways" from this discussion? First, I would submit that we will need an ADA force that can:

- Protect maneuvering forces, as well as corps and division level critical fixed and semi-fixed assets.
- Defend critical assets in the theater and operational support areas against complex integrated attacks.
- Converge AMD capabilities to create windows of superiority in the air domain that can be exploited by the Army's warfighting functions, joint and coalition forces and national assets.

Second, I believe that looking at our roles in MDO helps to reveal the attributes of the force we must develop. The LSCO described above will require us to employ our AMD capabilities in a manner that places an unprecedented premium on survivability, agility and the ability to respond to overmatch.

At the heart of this force will be ADA Soldiers and leaders, who understand and have prepared for this new environment, the capabilities they will employ and the missions they must execute. Victory hinges on this understanding and preparation!

First to Fire!

Brig. Gen. Clement Coward, Jr.
32nd Army Air and Missile Defense commander

Supporting global force integration while training for large-scale combat operations

Now that Air and Missile Defense (AMD) is one of the Chief of Staff of the Army's (CSA) top six priorities, the air defense artillery formations need to change how we see mission preparation and readiness. The future of AMD lies within our ability to rebuild an unfamiliar skill set in today and tomorrow's formations: air defense integrated in combined arms maneuver (CAM) in order to meet and exceed the capability of a near-peer competitor. This type of operation resides within a select few senior leaders, lieutenant colonel, sergeant major and above, who served in the pre-9/11 Army and participated in corps and division warfighter exercises.

Very few, if any, of today's company-grade and field-grade leadership are familiar with corps-level integration and support. To build proficiency and increase understanding of mission command in a multi-domain battle, we must understand that AMD is both a "vertical" AND "horizontal" process. We must integrate and support our joint partners and corps headquarters regularly and effectively.

Background

The majority of the active ADA force has been executing latest arrival date (LAD) based deployment training cycles for the past 13 years. Historically, Patriot rotations to the Central Command area of responsibility (AOR) have consisted of the static site defense of strategic theater-level assets. This mission set has caused a gradual atrophy and almost complete lack of familiarity with CAM in a large-scale combat operation (LSCO).

While all AMD commanders doctrinally fulfill the three roles of deputy area air defense commander, theater army air and missile defense coordinator, and senior ADA commander, 32nd Army Air and Missile Defense Command has two additional roles unique to CONUS: global force provider with training readiness authority that balances AMD enterprise modernization efforts. As the sole AMD force provider to every combatant commander and the owner of nearly 80 percent of the ADA force, 32nd AAMDC has the enormous responsibility of constantly generating and validating readiness to meet known requirements and dynamic force employment opportunities.

Last year, CENTCOM reduced its posture from three Patriot battalions to two. This force reduction and posture shift made more units available at a higher readiness posture than in recent years. The short-lived spike in available units provided 32nd AAMDC its greatest opportunity: evaluate ADA forces in a combat training center (CTC)-like environment in support of a maneuver corps engaged in LSCO.

Roving Sands: Capstone..... Validation.....Crucible

Roving Sands is a command-directed annual capstone exercise designed to validate readiness. The second iteration of Roving Sands was conducted in March 2019 at Fort Bliss, Texas, and White Sands Missile Range, N.M. The 32nd AAMDC exercised and evaluated one ADA brigade headquarters, four Patriot battalions in mixed software configurations, one Terminal High Altitude Area Defense (THAAD) battery, and several external enablers in support of a notional corps commander engaged in LSCO. The exercise served three purposes: validate 25 percent of the CONUS-based ADA forces combat readiness, stress battery and battalion leadership with a mix of engagement operations and force operations scenarios of increasing complexity, and teach the

Soldiers from B Battery, 62nd Air Defense Artillery Regiment, 69th Air Defense Artillery Brigade, Fort Hood, Texas, conducted Terminal High Altitude Area Defense reload training. The Soldiers have to drop the pallet, break it down, put the pallet back together and reload it back onto the launcher. This process takes about two hours. (Courtesy photo)

ADA force the necessity of training rigor at the battery level. While the exercise and readiness objectives were met, a considerable portion of the command learned firsthand what the ADA force has been lacking: familiarity with maneuver doctrine and integration. Further, it proves that centrally managed LAD-based training strategies result in the attrition of four core competencies: shoot, move, communicate and sustain. The ability to maneuver and sustain forces are the building blocks of combat readiness at the tactical level.

Upon notification of participation, units built a home-station training strategy that utilized a mix of live, virtual and digital training tools to prepare for their unit's "crucible" exercise. Because most air defenders had never experienced a CTC rotation to date, the preparation, movement and occupation were eye-opening experiences. When decisive action commenced, units learned quickly that preparation for -- and synchronization of -- force operations is far more challenging than they anticipated.

Defending against ground attacks, a myriad of ballistic and cruise missiles and air-breathing threats while coordinating with ground elements at an established location in support of a maneuver commander showed participant units the complex reality of a sustained operation against a state actor with comparable lethality. While the decisive action "box" was 10 days in duration, the preparation took months and the leader development impacts will pay dividends for years to come.

While nearly 2,500 troops and almost 600 pieces of rolling stock arrived at the Fort Bliss railyards during reception, staging, onward movement, and integration, a "real-world" mission was quietly sourced just two miles away. The 32nd AAMDC quietly deployed one THAAD battery via Strategic Air from Fort Bliss, Texas, to Israel. The operation, known as a "Dynamic Force Employment," was an "out-of-cycle" deployment intended to demonstrate ease of access

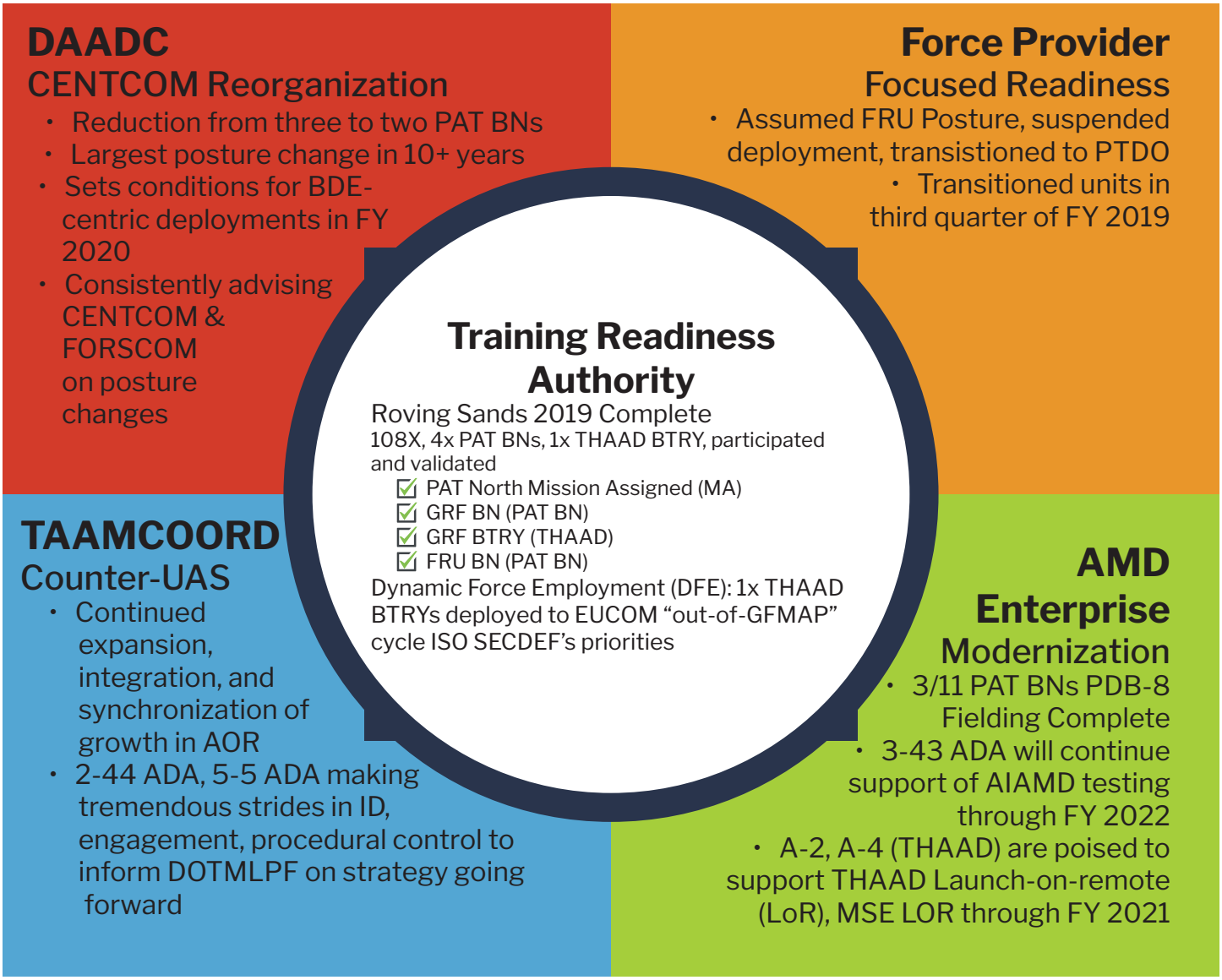

Figure 1. Efforts made over the previous year. (Rick Paape/Courtesy information)

into theater AORs while reducing predictability of deployment location, duration, transition and force posture. The unit had three weeks from notification to deployment, which it executed in commendable fashion.

During the after-action review, we used this as a real-time case study about the relevance of self-imposed training rigor and to instill a "ready now, for anything" mentality, reinforcing the message with, "this is what you train for." Pursuant to the National Defense Strategy, National Military Strategy, and the Missile Defense Review, Roving Sands in its current and future iterations will continue to build readiness and meet the CSA's "two-thirds of the active duty force ready for near-peer competition in 2022."

Modernization: Technology enables tomorrow

While current and future commanders implement lessons learned from the decisive action training environment scenario, the Patriot force continues to upgrade its fleet from post-deployment build (PDB) 7.4 to PDB-8. All 11 CONUS-based Patriot battalions will receive the technology that the previous operational tempo prevented from fielding. Soldiers and units will become familiar with the Patriot Advanced Capability-3 Missile Segment Enhancement, which is optimized by the new software. THAAD launch-on-remote capabilities are also within reach, and the Counter-Unmanned Aerial Systems market is expanding into every branch. Ad-

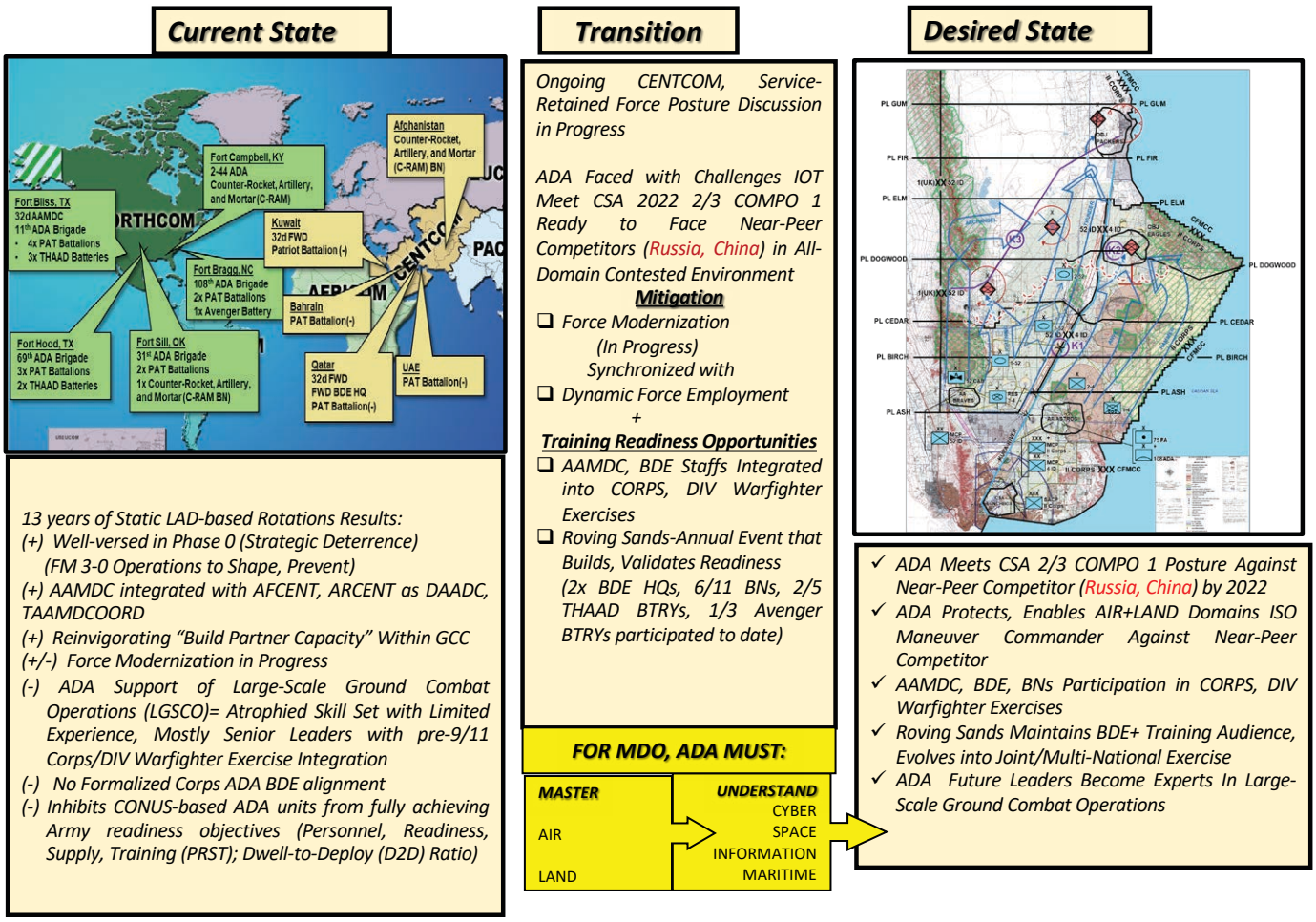

Figure 2. Air Defense Artillery ISO large-scale combat operations. (Courtesy illustration)

ditionally, one Patriot battalion, 3rd Battalion, 43rd Air Defense Artillery, out of 11th Air Defense Artillery Brigade, Fort Bliss, Texas, will support the multi-year Army Integrated Air and Missile Defense (AIAMD) testing effort at White Sands Missile Range, N.M. AIAMD is the largest modernization effort the Patriot force will undergo in over two decades. However, modernization is not to be viewed as a constraint or limiting factor. While installation and new equipment training/new equipment fielding may take several months to complete, leaders at all echelons can maximize training opportunities in digital and virtual environments.

Conclusion

Technological advancements only increase the complexity of combat operations. There is no substitute for self-imposed training rigor in preparation for war. Our present AMD force can implement the lessons learned from Roving Sands in support of our joint and coalition force in future operations. The challenge that present and future tactical battery and battalion commanders will face is two-fold: develop and maintain a rigorous training strategy that builds proficiency and expertise against a near-peer competitor, and effectively build leaders who are expertly familiar with engagement and force operations in support of a higher echelon. The balance of training management, rigor and the processes that sustain the force in combat are skills that will build the force of tomorrow.

Brig. Gen. Clement S. Coward, Jr. is the commanding general of 32nd Army Air and Missile Defense Command, he is the former deputy director for Force Protection on the Joint Staff J-8 as well as the former director, Joint Integrated Air and Missile Defense Organization, and the former director of the Joint Requirements Office for Chemical, Biological, Radiological and Nuclear Defense.

Air and Missile Defense in an Anti-Access/Area Denial environment

By Col. Gary Beard

With the rise of multiple competitors to U.S. influence across the globe, the likelihood of military operations within an anti-access/area denial (A2/AD) environment poses a significant challenge to U.S. security and U.S. military forces.[1] The most likely challengers to U.S. military capabilities are Russia and China, nations that possess powerful military forces that provide a formidable foe to U.S. joint forces. The U.S. and partner nations face an evolving and expanding array of air threats, in both capability and capacity. Given the likelihood that U.S. air superiority throughout an operation cannot be guaranteed, a holistic approach to air and missile defense is required to provide freedom of action to combat forces. The U.S. must train, equip, and organize air and missile defense (AMD) forces ready to operate effectively within the multi-domain operational framework to deploy, fight, and win against any adversary, at any time, in a complex, multi-domain environment.[2]

To defeat this threat, the U.S. military must maintain forces capable of acting against all enemies and the full range of threats these adversaries may use.[3] The ability to defend forces from air threats is a requirement for forces to "develop a lethal, agile, and resilient force posture and employment" as directed in the National Defense Strategy (NDS).[4] The National Security Strategy (NSS) advises that, "Allies and partners are a great strength of the United States. They add directly to U.S. political, economic, military, intelligence and other capabilities."[5] No matter where the U.S. goes, the joint force will fight alongside like-minded nations to strengthen U.S. interests and to deter or defeat adversaries. Both China and Russia are specifically noted in the NSS and NDS as nations that have increased military capabilities to marginalize U.S. influence within their respective regions.[6] U.S. ground maneuver forces must prepare to meet these threats, regardless of location or enemy.

The elimination of active duty Army maneuver AMD forces in 2006 provided the Soldiers needed to grow additional maneuver forces during operations in Afghanistan and Iraq. The lack of air threat meant this decision was an acceptable risk to an Army that needed to grow additional maneuver structure. However, the battlefield the joint force faces today and in the future has drastically changed. This change necessitates a review of how the Army defends the modern maneuver force against air and missile threats and the level of risk that maneuver units face. Full evaluation of the threat, and potential options to mitigate risk, are critical for the Army to achieve success as part of future joint forces operating in future conflict.

Lt. Gen. H. R. McMaster, while the director of the Army Capabilities Integration Command, said "There are basically two ways to fight the U.S.: asymmetrically and stupid."[7] While the U.S. assumes no enemy intends to fight "stupid," the continual adaptation of competitors means symmetric threats to the U.S. military and allies continue to grow. By evaluating how conflict could unfold, and the associated threats faced, it is easier to understand capabilities required to defend joint and international forces. It is unlikely maneuver forces can successful-

A Chengdu J-20 stealth fighter performs a flyby during the opening of Airshow China in Zhuhai, China, Nov. 1, 2016. (Alert5/Wikimedia)

1 *Stephen Biddle and Ivan Oelrich, "Future Warfare in the Western Pacific," International Security, Vol. 41, No. 1 (Summer 2016): 7, https://www.mitpressjournals.org/doi/full/10.1162/ISEC_a_00249 (Accessed 19 Jan 2018). A2/AD is a two-part strategy employed to deter or defeat an adversary. The enemy seeks to deny an opposing force the ability to enter a region to initiate operations and to further deny the enemy use of an area once in theater.*

2 *US Army Space and Missile Defense Command, Army Air and Missile Defense 2028 Fact Sheet (Huntsville, AL: USASMDC, 29 Mar 2019), https://www.smdc.army.mil/Portals/38/Documents/Publications/Fact_Sheets/Army_AMD_2028.pdf (Accessed 31 Mar 2019).*

3 *Donald J. Trump, National Security Strategy (Washington, DC: The White House, 18 Dec 2017), 29, https://www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf (Accessed 20 Jan 2018).*

4 *Jim Mattis, Summary of the 2018 National Defense Strategy of the United States of America, (Washington, DC: The Defense Department, 19 Jan 2018), 7, https://www.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf (Assessed 19 Jan 2018).*

5 *Trump, National Security Strategy, 37.*

6 *Trump, National Security Strategy, 2; 46-48 and Mattis, Summary of 2018 National Defense Strategy, 1.*

7 *Allison Schrager, "The Four Fallacies of Warfare, According to Donald Trump's new National Security Advisor," Quartz Media Online, https://qz.com/915438/the-four-fallacies-of-warfare-according-to-national-security-advisor-hr-mcmaster/ (Accessed 24 Jan 2018).*

Paratroopers of C Company, 2nd Battalion, 503rd Infantry Regiment, 173rd Airborne Brigade Combat Team (ABCT) provide security during the deployment of a Terminal High Altitude Area Defense (THAAD) to Naval Support Facility Deveselu, Romania, May 15, 2019. The 173rd ABCT Security Force is responsible for the security of the longest land convoy outside of the continental U.S. for the THAAD asset.

ly operate on the future battlefield without effectively managing threats from the air domain through effective force and technology management. As such, the Army must organize the force structure to employ AMD forces capable of operating in defense of the joint maneuver force.

Nations competing with U.S. capabilities and influence continue to evolve and adapt to the future battlefield. To close the military gap with the U.S., adversarial militaries engage in a continual cycle of improving strategy and technology. These military competitors use a variety of air threats, including fixed and rotary wing aircraft, unmanned aerial systems (UAS), rockets/artillery/mortars (RAM), and cruise missiles. These threats shape the future battlefield, threats the U.S. must effectively counter to ensure the future of U.S. military might and power projection capabilities.

How A2/AD impacts the fight

Adversaries to U.S. influence have increasingly developed capabilities and doctrine to offset U.S. military power. Both China and Russia employ A2/AD in disputed regions to show strength and limit U.S. options.[8] This method of warfighting makes use of military assets and capabilities to gain control of an area while ensuring the adversary is unable to do so. The primary mechanisms of doing so include preventing access and disrupting operations in a given area.[9] Russia and China have made significant investments in integrated air defense systems, guided missiles, anti-satellite weapons, electronic warfare systems and other capabilities such as cruise missiles and UAS that can be used at increasing ranges to interdict U.S. forces.[10]

As stated in the Joint Integrated Air and Missile Defense Vision 2020, "the future [Integrated Air and Missile Defense] environment will be characterized by a full spectrum of air and missile threats...with precision targeting."[11] The possibility of an adver-

8 *Zach Berger, "China's Anti-Access Area Denial," Missile Defense Advocacy Alliance, July 2016, http://missiledefenseadvocacy.org/missile-threat-and-proliferation/todays-missile-threat/china-anti-access-area-denial-coming-soon/ (Accessed 24 Jan 2018).*
9 *Nathan Freier, "The Emerging Anti-Access/Area-Denial Challenge," Center for Strategic and International Studies Online, May 27, 2012, https://www.csis.org/analysis/emerging-anti-access-area-denial-challenge (Accessed 19 Jan 2018).*
10 *Mark Gunzinger, et al, Force Planning for the Era of Great Power Competition, (Washington, DC: CSBA, 2017), 18.*
11 *Geoffrey Weiss, "Seeing 2020, America's New Vision for Integrated Air and Missile Defense" Joint Force Quarterly 76, (1st Quarter 2015): 109, http://ndupress.ndu.edu/Media/News/News-Article-View/Article/577599/jfq-76-seeing-2020-americas-new-vision-for-integrated-air-and-missile-defense/ (Accessed 19 Nov 2017).*

sary targeting U.S. forces from the air with weapon systems demonstrates why maneuver short range air defense (MSHORAD) is needed. When "ground and maritime forces can be held at risk by sheer numbers of cheap, long-range rockets" and other threats, the need to incorporate robust AMD capabilities becomes more apparent.

In order to defeat an enemy operating an A2/AD strategy, U.S. forces must operate faster than the enemy's decision cycle, taking action against a variety of threats before the enemy is able to influence our operations.[12] Threats from airborne platforms, which typically have speed, maneuverability, and weapons' range advantages over a ground-based force place U.S. forces at significant disadvantage, reducing the ability of commanders to operate within the enemy decision cycle.

Such threats form the key enabling capability of current U.S. competitors. Both China and Russia have improved their ability to use the full spectrum of air and missile threats to impact ground and naval forces. The ability to use UAS to provide reconnaissance and targeting data will enhance the enemy's situational understanding of the future battlefield, enabling better use of their attack aviation platforms, cruise missiles and artillery. Current U.S. and allied forces also risk being overwhelmed by the complexity and volume of air and missile attacks against our formations, further degrading our freedom of maneuver in an A2/AD environment.[13]

Multi-domain battle

The concept of multi-domain battle (MDB) forms the operational concept for how to defeat aggressors to U.S. influence and military might. Given that maneuver operations are the key to MDB operations, the joint force must be "capable of outmaneuvering adversaries physically and cognitively through the extension of combined arms across all domains."[14] It is no longer enough that U.S. military forces have the greatest land forces in conflict, those capabilities must be appropriately paired with the complimentary capability and capacity to operate within all domains, while simultaneously preventing the enemy from doing the same. As then-Chairman of the Joint Chiefs of Staff Gen. Martin Dempsey said in 2013, joint force commanders "will always rely on... [AMD] to survive air and missile attacks."[15]

Growing threats from the air domain make effective AMD critical to allowing the joint force of the future to operate within the MDB construct. Chief of Staff of the Army Mark Miley said, "On the future battlefield, if you stay in one place longer than two or three hours, you will be dead."[16] In order to operate at that speed, maneuver forces must bring AMD capabilities with them to the battlefield.[17]

The U.S. can no longer only emplace in relatively static locations and provide air and missile defense capabilities from behind our forces, as our current Patriot and THAAD systems primarily operate. Nor can we provide adequate protection in platforms such as the Avenger that are incapable of keeping pace with our maneuvering forces and without sufficient protection for the Soldiers that operate them.[18] Future AMD forces have to possess the mobility, firepower, protection and communications necessary to integrate and operate alongside maneuvering forces.

Conclusion

The complexities of the future operational environment and the need to overcome adversarial advances in technology, employment and capacity require materiel solutions and effective organization, training and doctrine for its employment. However, the U.S. Army currently has both a capability and a capacity shortage to counter the threats future competitors will certainly use. Developing and fielding forces to counter the threats of the future operating environment is critical to future success in combat operations.

Acquiring new detection and engagement systems designed to protect forces from a full array of air threats, including UAS, cruise missiles, rockets, artillery and mortars, and manned air platforms, is the only means to effectively protect maneuver forces on the future battlefield. These systems must be trained and task-organized to provide AMD for the joint maneuver force, the cornerstone of U.S. operational approaches in an A2/AD environment.

Col. Gary Beard is a 1997 graduate of the U.S. Naval Academy and a career air defense artillery officer. He has served in a variety of SHORAD and HIMAD formations, including command of a separate Bradley Stinger Fighting Vehicle battery and a Patriot battalion. He is a former OC at the National Training Center and was an Office of the Secretary of Defense Joint Chiefs of Staff Army staff intern. His additional staff assignments have spanned from battalion to the Joint Staff. He is also a graduate of Georgetown University and the U.S. Army War College. Beard assumed his current position as the TRADOC Capability Manager-ADA Brigade in July 2018.

12 *Tyler Rogoway, "America's Startling Short Range Air Defense Gap and How to Close it Fast," http://www.thedrive.com/the-war-zone/13284/americas-gaping-short-range-air-defense-gap-and-why-it-has-to-be-closed-immediately (Accessed 2 Nov 2017).*
13 *Thomas Karako and Wes Rumbaugh, Distributed Defense, (Lanham, MA: Rowman & Littlefield, 2018), 1.*
14 *Ibid., 1*
15 *U.S. Joint Chiefs of Staff, Joint Integrated Air and Missile Defense: Vision 2020, (Washington, DC: U.S. Joint Chiefs of Staff, 5 Dec 2013), 3, http://www.jcs.mil/Portals/36/Documents/Publications/JointIAMDVision2020.pdf (Accessed 19 Nov 2017).*
16 *Sydney J. Freedberg, Jr., "Army Races to Rebuild Short-Range Air Defense: New Lasers, Vehicles, Units," Breaking Defense Online, 21 Feb 2017, https://breakingdefense.com/2017/02/army-races-to-rebuild-short-range-air-defense-new-lasers-vehicles-units/ (Accessed 2 Feb 2018).*
17 *William Dries, "Some New, Some Old, All Necessary," War on the Rocks Online, 27 Mar 2017, https://warontherocks.com/2017/03/some-new-some-old-all-necessary-the-multi-domain-imperative/ (Accessed 2 Feb 2018).*
18 *Sebastien Roblin, "Is the U.S. Army Getting Ready to Bring Back the 'Linebacker?'" National Interest Online, 21 Jan 2018, http://nationalinterest.org/blog/the-buzz/the-us-army-getting-ready-bring-back-the-linebacker-24146 (Accessed 21 Jan 2018).*

TRAINING AREA WANTED

The need for a dedicated training venue for a field artillery brigade

By Lt. Col. Anthony Bianchi

My team of observer coach / trainers (OC/Ts) from First Army and I spent three weeks observing and assisting a field artillery brigade (FAB) headquarters (HQs) and its subordinate battalions during Northern Strike 2018 at Camp Grayling, Mich., (CGMI) in August 2018. Training centers such as CGMI provide unique opportunities for brigade and division-level units to train as they would fight. At this time there is not an established venue which facilitates quality training to a field artillery brigade similar to those which exist for brigade combat teams (BCTs) at the combined training centers (CTCs); such as the National Training Center (NTC) or the Joint Readiness Training Center (JRTC). NTC and JRTC do not have the necessary space in a field environment to accommodate a FAB along with a division-level HQs and a combat aviation brigade (CAB) HQs while maintaining a BCT with enablers. With four FABs in the active component and eight in the National Guard, not having a dedicated training center capable of supporting FABs highlights a major training opportunity deficiency. Northern Strike 2018 opened my eyes to this issue and through this article I hope to highlight the main reasons why the U.S. Army needs a training center more capable of supporting a FAB.

With a paradigm shift in training focus from the counter-insurgency (COIN) fight to large-scale combat operations (LSCO) against a peer or near-peer competitor, the need for a location to train FABs in their traditional, doctrinal role is imperative now more than ever. This requirement is necessary for a few reasons. First, war against a near-peer competitor will be a division-led fight versus a BCT-led fight with the U.S. not having air superiority from the onset, thus prompting division-level field artillery Fires reinforced with FAB Fires as a key to victory. Next, the ability of FABs to execute mission command in its traditional role as a corps asset reinforcing a division waned over the past 15 years. Finally, a knowledge gap exists within the FAB HQs regarding the FAB's role in the targeting process within a LSCO fight. Let's take a look at these reasons with more context.

War against a peer or near-peer competitor will have U.S. forces fighting as divisions rather than BCTs like the past 16 years. Further, the U.S. will fight without the benefit of air superiority. There is no doubt that FABs, a corps asset, will reinforce divisions with their rocket and cannon Fires in this inevitable conflict. This emphasizes the need to have well-trained FABs ready to reinforce divisions with counter fire, suppression of enemy air defense (SEAD) and shaping/deep Fires. This will become paramount to the success of the U.S. military strategy. Currently, the formidable enemies of the U.S. can "out-gun" and "out-range" the U.S. in terms of indirect fire capability. Division commanders must rely heavily on the rocket and cannon artillery

capability residing in the FABs at the corps level to provide timely and accurate counter-fire against enemy long-range systems in the early phases of battle against a capable adversary. Dominating the indirect fire fight during these early phases of war would allow the BCTs freedom of maneuver within their sectors by mitigating effects on their formations from enemy indirect Fires.

Additionally, the U.S. would likely regain air superiority through the FAB's ability to provide effective SEAD Fires in order to integrate fixed and rotary wing assets back into the fight. Eliminating the air defense threat to U.S. assets brings air dominance back into the U.S.'s favor and increases the U.S.'s lethality and ability to mass Fires in the right time and space on the battlefield to overwhelm the enemy. In order to become experts once more at executing critical fire support tasks, FABs must have a viable venue to perform its mission which is to plan, prepare, execute and assess combined arms operations to provide close support and precision strike for the corps employing joint and organic Fires and capabilities to achieve distribution effects in support of commanders operational and tactical objectives.

Repeated deployments to Iraq and Afghanistan in support of the Global War on Terror significantly degraded the ability of FABs to integrate subordinate field artillery battalions and execute the function of mission command in its traditional role of supporting the corps commander's operational and tactical objectives which usually means reinforcing a division-level headquarters in support of the corps fight. For more than a decade FABs deployed piecemeal to execute non-standard missions and as a result lost their ability to do their core mission as a FAB HQs. Understanding the military decision-making process (MDMP) and its outputs at the FAB-level is the starting point for successful mission command operations and integration of subordinate battalions. Ideally, the FAB staff creates an Annex D for the corps operations order through the MDMP that focuses on achieving corps-directed Fire Support Tasks (FSTs) by assigning responsibility of those FSTs to subordinate battalions. Those battalions now have a task and purpose to drive the MDMP process at their level. Associated products of the Annex D that help guide both the FAB HQs and subordinate battalions are the Field Artillery Support Plan, High Payoff Target List, Attack Guidance Matrix, Target Selection Standards and Field Artillery Synchronization Matrix. These products should revolve around the FSTs and drive the planning and executing at the brigade and battalion level, thus supporting the FAB's ability to conduct mission command. This process brings together all the warfighting functions to provide collective support in the successful completion of each FST. Having a training center that can accommodate a FAB HQs placed in the role to reinforce a division HQs

First Army OC/T, Master Sgt. Oscar Martinez Canada, from 3-314th FA, discusses improvements on a fighting position with two Army National Guard Soldiers during Northern Strike 2018 at Camp Grayling, Mich. (Courtesy photo)

in the same field environment as the subordinate battalions would increase readiness in this endeavor and would also set the conditions to exercise a multi-echelon targeting process with a focus on FAB integration.

My opinion is most, if not all, FAB HQs lack the understanding of their role in the targeting process to support a division-level HQs in a LSCO conflict against a near-peer enemy. I saw this firsthand when my team and I provided OC/T support to a FAB from the Army National Guard (ARNG) during Northern Strike 2018. This particular FAB had a very talented staff and recently came back from a deployment to Iraq where they served primarily as a deliberate targeting cell for a corps HQs. Early during the exercise we realized the FAB staff did not understand their role in the targeting process for a LSCO exercise. They remained focused on nominating high payoff targets (HPTs) not aligned with the division directed FSTs for which they were supporting during this exercise versus refining division targets associated with those FSTs. The FAB S2 and Fires cell had a learning curve in understanding the importance of nominating named areas of interest (NAIs) that support their FSTs and requesting intelligence, surveillance and reconnaissance (ISR) support to identify HPTs in order to transform those NAIs to target areas of interest and changes / additions to permissive fire support coordination measures (FSCMs) to better execute traditional FAB missions such as counter fire, SEAD and shaping Fires. My assumption is this mindset exists with most personnel in all FAB HQs. The need exists for some sort of training venue where FAB staff personnel can understand the difference between targeting in a COIN environment and targeting within a LSCO environment.

Using the concept of Northern Strike at CGMI or another similar training center, can provide every FAB the optimal joint/combined arms training environment necessary to hone the skills to fight a peer or near-peer enemy in a LSCO conflict. Incorporating a few lessons learned from Northern Strike 2018 would undoubtedly make this exercise the preferred method to train all FABs from the Active Component and the National Guard. At a minimum each exercise rotation would need to include a portion of a division HQs with Joint Air Ground Integration Cell capability to clear Fires, perform certain G2 functions and possess the ability to execute the targeting process with the Army in the lead and not the Air Force. The FAB would need to be placed in role of reinforcing a division area.

The exercise would also need the participation of a live CAB HQs to enable coordination between the FAB and CAB on massing Fires in the deep fight not attainable in a warfighter exercise environment. The exercise would also need a BCT to provide the necessary bottom-up, real-time feedback to the scenario and to the targeting process at division level. Having a live BCT and a CAB HQs would also significantly increase the training efficiency and shape everyone's understanding of their respective roles in the close and deep fights within a division battle space. Finally, the FAB would need to only bring its HQs to the exercise to get the training required which is coordinating with the division, CAB and BCT HQs. Over time the exercise can and should include the FAB's subordinate field artillery battalions for live coordination and associated effects.

The training mindset in the military changed with a focus of preparing to fight a peer enemy within a LSCO conflict where the U.S. will not have air superiority from the beginning. For the U.S. military to be successful, the U.S. Army Field Artillery, specifically the FABs, need to be more effective at supporting division level HQs as part of the corps commander's intent in this type of war. To do this, the U.S. Army needs a venue dedicated to training FABs on these skills for the following reasons. First, war against a near-peer competitor will be a division-led fight versus a BCT-led fight with the U.S. not having air superiority from the onset, thus prompting the FAB as the center of gravity for success. Next, the ability of FABs to integrate subordinate field artillery battalions and execute the function of mission command in its traditional role supporting a division-level headquarters diminished over the past 16 years.

Finally, there exists a lack of understanding of the FAB's role in the targeting process within a LSCO conflict environment. Once the FABs are proficient at being the lethal arm of a corps ready to support divisions, the U.S. Army will have a sharpened tool essential in defeating a peer or near-peer threat. BCTs have at least three dedicated, highly resourced, quality training centers. Knowing that the next war will pit division against division and rely heavily on indirect fire to regain air superiority, isn't now the time to resource a quality training center for FABs?

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US Artillery in World War I

By 1st Sgt. (ret.) Scott Cortese

Editor's note: This article is part three of three articles highlighting U.S. field artillery operations in World War I.

By autumn of 1918, four years of war had taken a toll not only upon the Allied armies but, more importantly, the German as well. With just a figment of what they were when the war first started, the tattered German divisions typically were down to 50 percent of their original strength. Units comprised of elderly and underage Soldiers were placed towards the front, deemed expendable, with the best troops in more fortified positions towards the rear. The morale of the Germans varied from division to division but at the core of each division were those who still held strong to the cause. With the addition of fresh Soldiers from the American Expeditionary Force (AEF), the time was never better for the Allies to mount a final offensive and deliver a crushing blow.

There was some infighting amongst the top Allied commanders leading up to the next offensive. Unwilling to bend to the French commander, Gen. Ferdinand Foch, American Gen. John Pershing was incensed that Foch demanded that the AEF be split apart and sent to various areas for this coming battle. Mediated by a third party, the two generals finally decided that the AEF would first support a French attack by eliminating the German defenses around St. Mihiel and then shift their focus to the Argonne Forest, located northwest of the town of Verdun. The AEF would become part of the main thrust in this bitter and bloody fight which would become known as the Meuse-Argonne Offensive.

The Germans had spent the last four years fortifying their defenses in this area named the Kriemhilde Stellung which was part of the infamous Hindenburg Line. Sixteen AEF infantry divisions along with 10 field artillery brigades, consisting of American and French units, would be hurled against this wall. The main objective of the AEF was to capture the German railroad hub at the town of Sedan, which supported the German army by transporting weapons, ammunition and supplies to the western front. But to get to Sedan meant that the AEF would first have to clear the Argonne. To provide the necessary artillery support for such an attack, the AEF artillery had grown considerably in the last few months to a total of approximately 2,775 guns. This equated to one artillery piece every 26 feet on the front line or 156 guns per mile.

Upon completing their objectives around St. Mihiel, the AEF marched about 50 miles to the edges of the Argonne Forest and prepared for their assault. Incessant rain over the previous days had turned the roads into a quagmire of mud making movement extremely slow and difficult. On the morning of Sept. 26, the rain was replaced by the sound of hundreds of firing artillery guns. The AEF infantry waited patiently for several hours with thoughts that, "...every one of the shells, big and little meant the less Germans on the advance." The barrage increased in ferocity in its final 20 minutes and at precisely 5:30 a.m. the call was made to move out. As the AEF advanced behind the rolling artillery barrage they encountered a shocked, and in some cases retreating, German enemy. This situation would not last long because in several areas the rolling barrage had outpaced the infantry as they advanced over terrain which was difficult for them to cross. No longer covered by their artillery, the Germans seized upon the opportunity as their machine-gunners and snipers emerged and fired into the flanks and the rear of the advancing infantry. By late in the day, Pershing sensed that the offensive was becoming bogged down and issued orders that "There should be no delay or hesitation in going forward... All officers will push their units forward with all possible energy." To further complicate the situation, a logistical nightmare developed as the artillery batteries attempted to relocate to new firing positions. Due to the massive traffic jams on the few roads at the front, some AEF units had to continue attacking while their artillery floundered in the road traffic.

After spending the night trying to catch a few moments of sleep in between shivering in the cold and the explosions of German

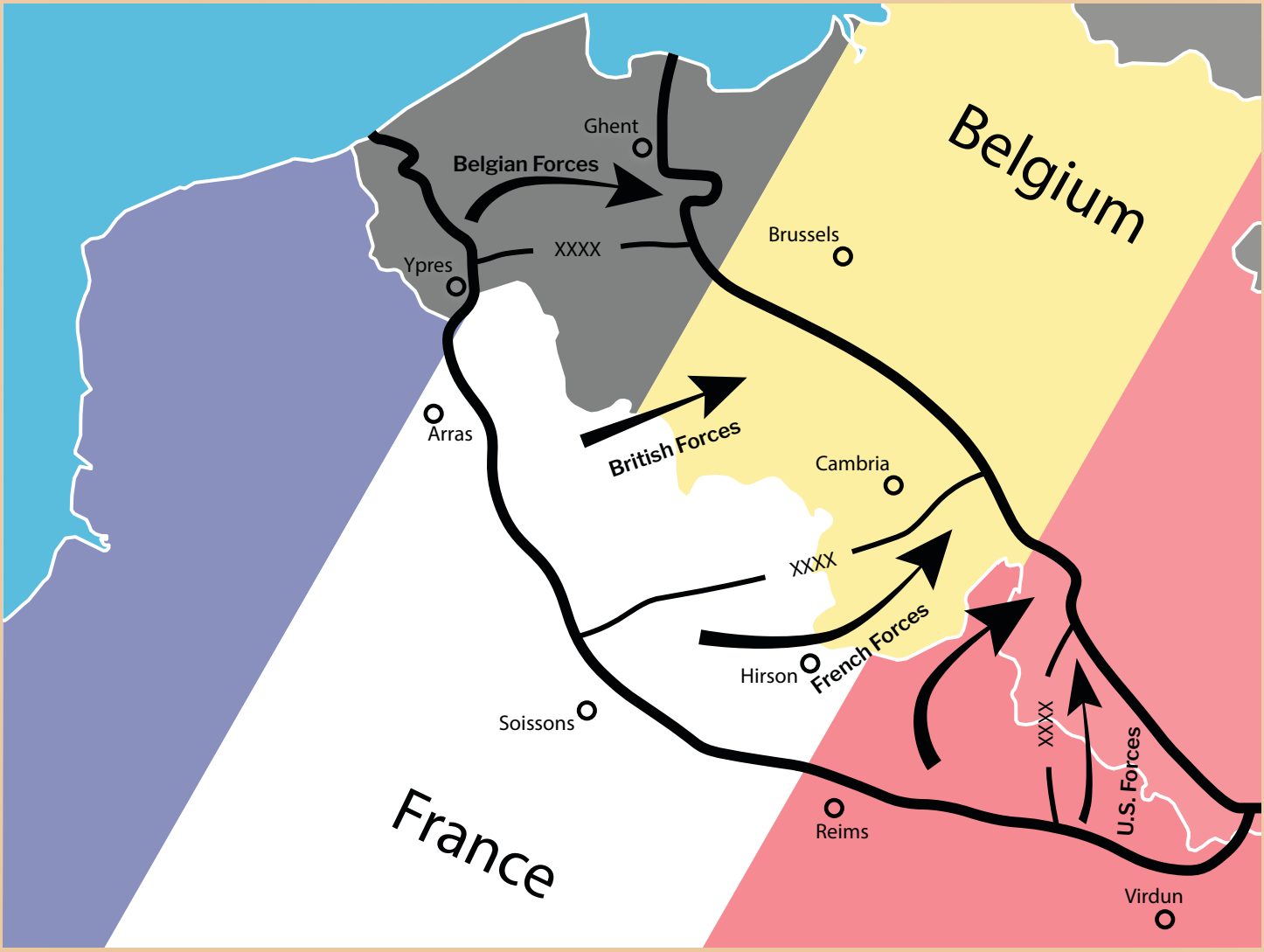


Figure 1. Allied and U.S. military forces advances from Sept. 26 to Nov. 11, 1918. (Rick Paape/ Courtesy information)

artillery, the AEF resumed the attack in a torrential downpour. Except for one infantry division, the AEF received no artillery support that day due to their guns being caught up on the congested roads. Flying over the front, American Brig. Gen. Billie Mitchell found the log jam to be, "worse...than I had ever seen on a battlefield." The sides of the road were littered with vehicles, bumper to bumper. This unintended lull in the battle allowed the Germans to bring their reserve forces forward and fortify their positions.

By the end of the third day the primary line of the German defenses remained intact and untouched despite Pershing's plan which called for it to be breached by that time. He felt that the inability of his divisions to secure their objectives lie with "inefficient officers" rather than the loss of essential artillery support. He immediately ordered three battered and torn divisions whom he regarded as being the problem to be replaced by three other experienced divisions."

The first phase ended poorly for the AEF on Sept. 30. After a gain of only a few miles, unofficial casualty estimates state the AEF losses at approximately 75,000. During this brief pause, the AEF assumed defensive positions and prepared for the second phase as Pershing came under increasing pressure from the French for the Americans to perform. He went to extreme measures to portray the AEF's situation in more positive manner, even as far as denying the existence of the traffic jam which hampered the ability to move its artillery and transport supplies. After witnessing the road congestion personally, French Premier Georges Clemenceau went back to Paris and sought the removal of Pershing as the AEF commander. His command would survive this episode but it was apparent that the Americans were indeed struggling.

Phase two was delayed a few days until Oct. 4 while all the original assault divisions in the first phase were replaced. The tasks of this phase were to clear the rest of the Argonne Forest of German resistance and to also secure the surrounding heights of Cunel and Romagne. The French impressed upon an indignant Pershing by insisting that the "...attacks start without delay and that, once be-

gun, they be continued without any interruptions such as those which have just arisen."

A pre-arranged artillery bombardment, once again, preceded the attack. As the Americans moved out at 5:35 a.m. on Oct. 4, some infantry units experienced another obstacle inhibiting their advance. Accurate German artillery fire forced the Americans to take cover, causing them to again lose pace with their rolling barrage. Only the AEF's 1st Infantry Division achieved any measure of success on that day moving around the east of the Argonne while the remainder of the AEF made no real progress in securing the Cunel and Romagne heights. Finally on Oct. 10, after an enormous physical toll, the AEF cleared the Argonne Forest all the way to the southern banks of the Aire River. Observing the remnants of one of these units leaving the front, one Soldier said, "I thought you were the worst bedraggled, worn out, broken up and disheveled bunch of men I ever saw at any place or at any time."

A dramatic turn of events happened on Oct. 16: Pershing divided the AEF into two armies, the 1st and 2nd Army, and relinquished his command. He appointed Lt. Gen. Hunter Liggett as commander of the 1st Army and Lt. Gen. Robert Bullard to command the 2nd Army. Another significant change in command was the promotion of Maj. Gen. Charles Summerall to command V Corps. Summerall, a career artillery officer, was one of the foremost advocates for the close integration of artillery in support of infantry advances. The AEF would soon benefit greatly from the combined leadership and battlefield ingenuity of these men.

Being one who understood the current physical state of the AEF Soldiers and wanting to preserve what morale was left, Liggett insisted that, "It was essential to gather up the army as a team." Liggett's pause for rest and resupply at the end of October helped the 1st Army penetrate the German defenses at Cunel and Romagne, crumbling the western part of the Kriemhilde Stellung. Now the AEF was finally in a position to shatter the remaining German line.

Summerall was given the task of being the focal point of this attack by rupturing the center of these defenses. To counteract previous setbacks that occurred during the first two phases, he developed an artillery fire plan which featured four distinct tactics: Rolling barrages tailored to the terrain, backwards rolling barrages, counter-battery fire and the use of artillery as the primary weapon system for attacking enemy strong points. This artillery fire plan was the most elaborate to date which also included, for the first time in AEF history, the heavy use of poison gas.

The morning of Nov. 1 broke with a tremendous artillery barrage of both high explosive and gas shells at 3:30 a.m. as all guns fired at their maximum rate for the next two hours. Moving out from behind a smoke screen at 5:30 a.m., the pace of the rolling barrage was designed to match the type of terrain that the infantry had to traverse. If the infantry lost contact with their barrage, a specific set of signals were designed to communicate back to the artillery batteries to slow the barrage's forward movement. To eliminate German machine gunners and snipers infiltrating the rear of the American advance, the barrage rolled over the German lines and then rolled back

Two U.S. Soldiers run past the remains of two German soldiers toward a bunker. (Library of Congress)

200 yards to kill those who had remained. To further protect the infantry's advance, the AEF's larger 155 mm guns focused their attention on German artillery by providing counter-battery fire so that "every enemy battery was taken under fire by two guns of the counter-battery firing at the maximum hourly rate." Finally, enemy strong points such as concrete-reinforced bunkers were taken under fire by the artillery which allowed the infantry to bypass them without suffering needless casualties.

The AEF still sustained high casualties but unlike the previous phases, they advanced at an astonishing rate. Taking stock of the carnage that they encountered, Maj. Jennings Wise exclaimed, "The Kriemhilde Stellung had been torn to shreds by the American guns. Upon the fields, along every approach, and in trenches, still lay the dead. The whole country had been drenched with gas." Pvt. Rush Young echoed the same scene, "As we advanced, the roads and fields were strewn with dead Germans…The whole earth had been gassed by shells from our artillery."

The defenses disintegrated as the Americans had gained 14 miles by Nov. 4. This time it was the Germans who were in retreat! Taking advantage of this opportunity, Bullard's 2nd Army gave chase while Liggett's 1st Army continued to push the Germans back toward the northern Meuse River as the spires of the town of Sedan could be seen in the distance. As a matter of national pride, the French were given the opportunity to be liberators of Sedan.

Not wanting to let up on the pressure, French general Foch issued orders that, "It is important to maintain and hasten our action. I appeal to the energy and initiative of commanders-in-chief and their armies to secure decisive results." The Allies didn't intend to simply beat the Germans; they wanted to annihilate them. Despite the pivotal role that the artillery had played during the final phase of this offensive, the overall American casualty count was immense at an estimated 122,000 and of those, over 26,000 were killed.

On Nov. 9, German delegates met with the French to negotiate terms of an armistice. The Kaiser had fled Germany for Holland on Nov. 10 and at 5:10 a.m. on Nov. 11 the German government directed its delegates to sign the armistice upon which all hostilities would cease at 11 a.m. The war was finally over!

Today, the U.S. Army field artillery fights as an integral part of a combined arms team. With the advances of technology in electronics, satellite and digital communications, laser range finders and designators, self-propelled howitzers and GPS-guided artillery shells, the artillery is more than prepared to provide the support required to assert itself as "The King of Battle."

Scott Cortese resides in Harrison Township, Mich., and retired at the rank of First Sergeant from the Michigan Army National Guard in 2015 after 23 years of service. His MOS was 13F and he served with the active duty Army, the Army Reserve and the Army National Guard. He is also a veteran of Operations Iraqi Freedom and Enduring Freedom. Cortese earned a Bachelor's in History from Wayne State University in Detroit.

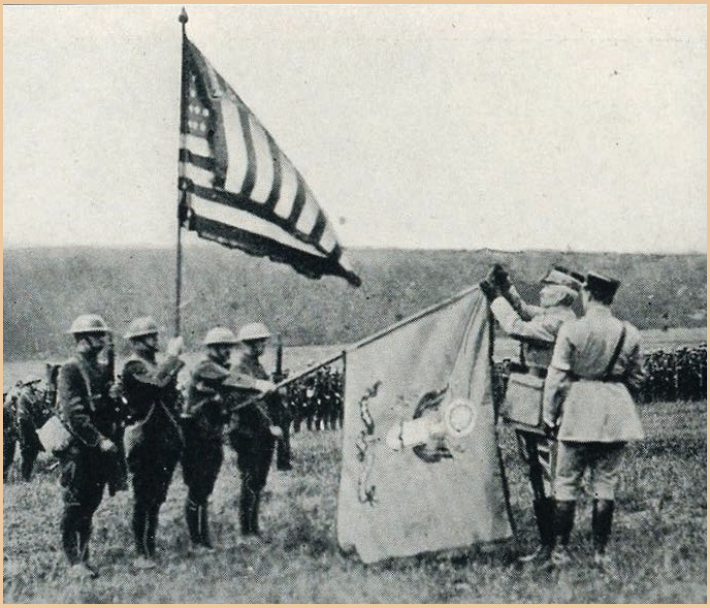
References

Aultman, Brig. Gen. Dwight E. "Counter-Battery Work," The Field Artillery Journal Volume IX, Number 3 (1919): 245-254. This article gave insight as to the tactics and methods the AEF artillery used to locate the German artillery in order to neutralize or destroy it.

Groteluеschen, Mark E. Doctrine under Trial: American Artillery Employment in World War I. London: Greenwood Press, 2001. This book dealt primarily with the tactics that the AEF had employed during the war and also the training that the AEF artillery had received.

Lengel, Edward G. To Conquer Hell: The Meuse-Argonne 1918. New York: Henry Holt & Company, 2008. The author told an excellent story of the battle in a very organized fashion.

The 1st Americans are presented with a streamer for bravery under fire during World War I. (Library of Congress)



A U.S. Soldier surveys the battlefield during World War I. (Library of Congress)

Joint Air Ground Integration

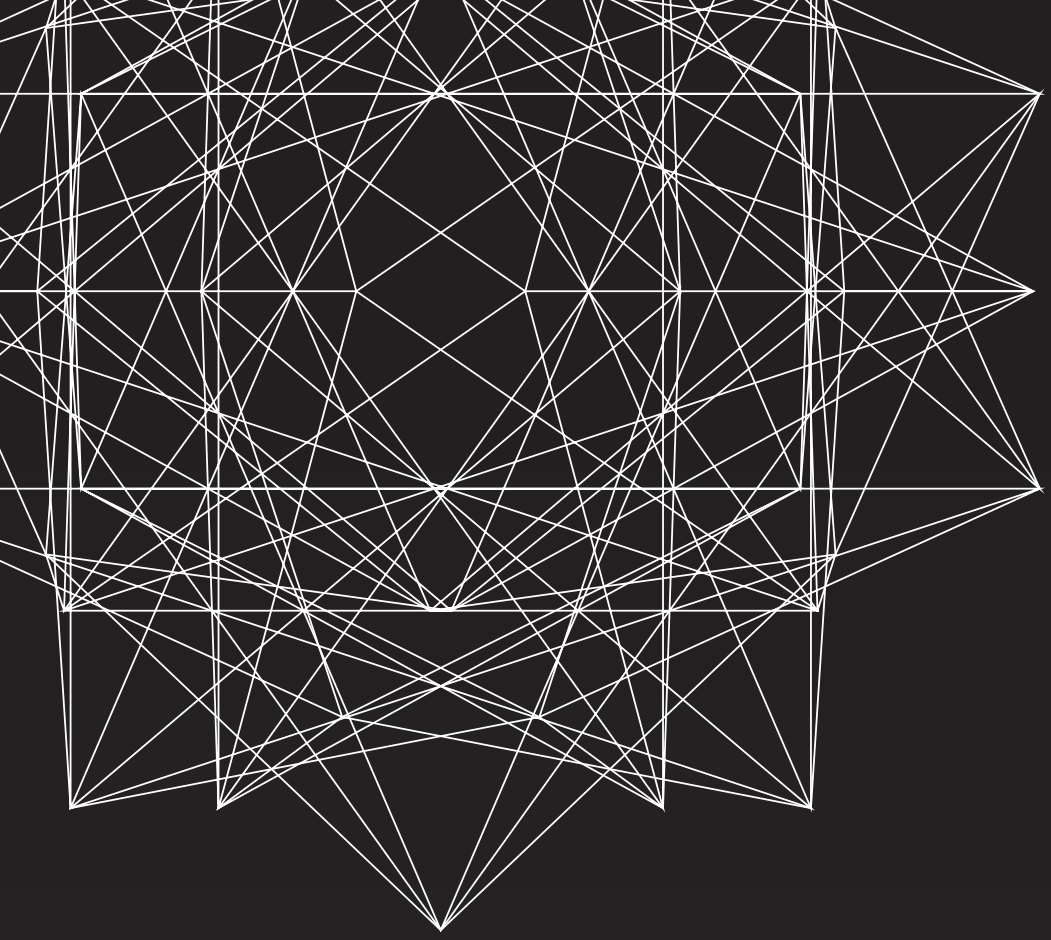
How to describe prudent risk

By Capt. Thomas Evensen

Risk estimated distances (RED) are used by maneuver commanders to determine how close to position their forces to their own indirect fires. Commanders must choose to balance the conditions of the battlefield, the recommended conditions of the REDs, and the requirement to mass Fires against the enemy when creating their plan. This is common practice for Army operations. No such risk estimate exists for airspace clearance. Joint force commanders (JFC) are not provided risk estimates when it comes to the shared airspace for surface-to-surface Fires and aircraft. If a JFC was offered a number, such as a 1 in 10,000 chance that an artillery round would collide with an aircraft based on repeatable scientific modeling, the JFC may make a determination that certain missions could be fired without clearance. Such a modeled estimate would further enable JFCs to balance risk to force with risk to mission.

Airspace clearance is difficult and time consuming. In order to conceptualize airspace, an entire MOS is dedicated to developing graphics and controls in three dimensions, and further tracking these measures by time. Indirect Fires use airspace, and quite often will travel through portions of airspace already dedicated to other users. The risk of a mid-air collision is conceivable, though not defined, and is a topic of much debate between the United States Army and United States Air Force. An agreement between the Army and Air Force was made to create centers at the Army division echelon to address the conceivable risks of artillery rounds colliding with aircraft midflight. The goal of these centers is to ensure the risk is brought to zero, since there is no understanding of the likelihood of mid-air collisions.

Joint air ground integration centers (JAGIC), comprised of both Air Force and Army personnel, work a process that involves receiving a ballistic solution from the firing unit; determining what



aircraft are effected; contacting those aircraft and providing a new route; confirming they no longer occupy their original route; then informing the firing unit it is clear to fire. This process can take as little as thirty seconds, or as long as ten minutes. During the Army's Warfighter Exercise 19.2, the 1st Armored Division JAGIC added an average of four minutes and twenty-five seconds processing time to every rocket artillery mission. Though the JAGIC accomplished its purpose in ensuring other airspace users were protected from friendly fire, the additional four minutes increased risk to mission as the enemy continuously moved out of target areas and attacked the division at large.

Work to decrease processing time is ongoing. Though an average of nearly four and a half minutes may be quick for JAGICs at large, that additional time may feel like a lifetime to forces under fire. There is benefit to modeling the likelihood of a mid-air collision of artillery and another airspace user. The model would be used to inform joint force commanders the risk to force, specifically airspace users, if a division needs to place surface-to-surface Fires on a target under strict conditions. Historical models and some simulated models have been used previously, but neither have addressed every condition that could be imposed to eliminate those four extra minutes to destroy the enemy as rapidly as possible.

A repeatable "clearance risk estimate" model would require multiple conditions in order to be used. The number of firing unit locations, volume of fire over time, number and types of aircraft in the sky, and the altitudes of each aircraft are only a few of the variables that must be considered. If any of the variables deviate from the clearance risk estimate model, the risk percentage may need recalculating.

If the model determines that four battalions of rocket artillery will fire 100 rounds per launcher in a day, and 50 aircraft will be in the battlespace in that day, two percent of the time an aircraft will be downed by surface-to-surface Fires, the commanders now have a number to base a decision. The commander may ask the planners to change the variables. If the model is then reworked to account for only 20 aircraft, ignoring 30 of them because they are unmanned, the probability might inform them that an aircraft is shot down only 0.2 percent of the time. The Airspace Control Authority at that point could require that the fastest aircraft are cleared, since those aircraft would be at the highest risk of occupying the same location as a ballistic round if the round violated its airspace. The model then could be worked again considering only the slowest aircraft, which the model could then show that if no clearance is conducted for the slowest moving aircraft, only 0.0005 percent of them will be shot down. This risk, determined on a mission by mission basis, could be considered prudent by the joint force commander.

Large Scale Combat Operations require a combination of both art and science. Airspace clearance as it is right now is procedurally a science, but planned as an art. If the enemy does not present itself in the exact way the intelligence community estimates, 24-72 hours from the time airspace is planned, processing times increase and the responsiveness of Fires decrease. The goal of estimating the risk to force using a scientific approach is not to replace procedural and positive control during the integration of surface-to-surface Fires, but rather to inform all commanders of the probable risk when prior integration fails to account for an enemy who refuses to conform to planned target areas.

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Soldiers from 1st Battalion, 148th Field Artillery Regiment, conduct a live-fire calibration, National Training Center, Calif. (Sgt. Mason Cutrer/U.S. Army)

Managing talent

FA majors to combat training centers post KD

By Maj. Benjamin Culver, Maj. Robin VanDeusen and Maj. Kurt Knoedler

As highly competitive field grade officers complete key and developmental (KD) jobs, we are faced with a decision of going to a Combat Training Center (CTC) or a myriad of other possibilities. The fact that this next assignment fills the important block of time between KD time and the possibilities of a tactical battalion command highlights the importance of this decision. Factors that weigh into an officer's decision for assignment post KD include, but are not limited to; career progression, available time with family members and posting location. The U.S. Army's three ground combat training centers, located in California, Louisiana and Germany, offer opportunities to fulfill all of the aforementioned factors. Additionally, CTCs offer a tremendous experience and learning environment for majors as they make the transition from running a battalion to commanding a Field Artillery (FA) battalion.

To start the decision of whether to request a CTC position (nominative), we should examine all aspects of what an observer, coach, trainer (OC/T) does, and how it will affect themselves as well as their family. There are several clear advantages to being an OC/T. First, each year you have the opportunity to see nine to 11 brigade combat teams (BCTs) and multinational units rotate through to execute the highest level of collective training. Secondly, as an FA OC/T, you have a first-row seat to observe a current battalion commander and fire support coordinator (FSCOORD), operate in a decisive action training environment (DATE). Third, as an OC/T at a CTC, one has the opportunity to work closely with a post-command battalion commander (FA battalion senior trainer) and a post-command brigade commander operations group (COG). This type of close mentorship is invaluable for a future battalion commander and, more importantly, FSCOORD. The OC/Ts not only receive the experience of observing rotational unit commanders and FSCOORDs, but more importantly can have the mentorship and discussions with the team senior trainer and COG focused on their rich experience, lessons learned and best practices. I cannot think of any other position that provides the level of experience and environment to learn and grow as being a field-grade OC/T.

Involvement in multiple DATE rotations as an OC/T enables the future FSCOORD to draw upon those experiences as they provide purpose, direction and motivation for their unit's training glide path and leader development program. Commanders must "develop and communicate a clear vision" for training guidance,[1] and a key aspect of this is determining "what to train." A former OC/T gains two to three years' worth of real-world examples to inform them on what their unit needs to emphasize during a training cycle to overcome the common challenges associated with the DATE fight. They see units successfully negotiate these challenges and units unable to overcome the friction associated with these challenges. Likewise, the future FSCOORD becomes very familiar as an OC/T with the development required by leaders at echelon to succeed in the DATE fight. They can in turn utilize this knowledge to inform junior leader development strategy and integrate it into the overall unit training plan. Moreover, the OC/T conducts after-action reviews (AARs) on a regular basis and gains experience assessing training that directly benefits a future commander as they ensure proper execution of AARs during battalion command.

As stated above, being an OC/T gives you a view of how lieutenant colonels balance the challenging roles as both a battalion commander and FSCOORD. Coming out of KD time, you have no doubt identified gaps in your own military experience and tactical knowledge required to be a successful battalion commander. As OC/Ts observe the rotational units' field-grade officers execute their duties they have the opportunity to evaluate and take notes addressing these natural knowledge gaps in their military

1 FM 7-0, 1-5

knowledge. Additionally, being an OC/T provides the opportunity to coach and train leaders across the FA battalion, increasing your knowledge in systems you did not master during time in KD positions. When executing training as a participant, the stresses of combat affect leaders and their ability to step back and see the bigger picture. As an OC/T, the CTC provides the unique opportunity to be a part of that training but from a more informed perspective. This perspective is one in which you have more situational awareness than the rest of those conducting the training.

Another question that field-grade officers need to ask themselves is whether being an OC/T is personally rewarding. For the majority of OC/Ts, a large part of the job satisfaction comes from coaching rotational units and their leaders. From the time a unit arrives at Leader Training Program, during execution, and after the rotation, OC/Ts provide the coaching and training required to help units see themselves and improve their organizations. Being an OC/T requires leaders to know and understand the most current joint and Army doctrine. There is a constant dialog with the Fires Center of Excellence (FCoE) for both current rotational trends as well as any adjustments required to doctrine. An OC/T has the ability to observe trends and then articulate necessary training adjustments to leaders across the force, from the centers of excellence to Army senior leaders. This fact is both humbling and rewarding. Often, Army senior leaders visit the CTCs allowing the OC/T to express this feedback first hand through face-to-face exchanges driving timely changes at the FCoE on important doctrinal, equipment, and training strategy issues.

An often-misunderstood aspect to being an OC/T is the impact on your family. After completing KD time, most officers desire to take their foot off the proverbial gas pedal and give time back to their family. During the rotation OC/Ts have the flexibility to adjust coverage to allow time to return to main post for special occasions, such as anniversaries, birthdays, sports games, etc. During a 14-day rotation, OC/Ts work in a few overnight "refits" to take a shower, do laundry and conduct physical fitness. When not on rotation, weekends are turned into four days to give back the time to families, helping to build that time "savings account" up prior to the possibility of being a battalion commander. As we have all seen, being a battalion commander is both rewarding and challenging for the leader and their respective family.

What you do with family time while assigned to a CTC is of course your decision. The closest town to the Joint Readiness Training Center (JRTC) is Leesville, La. True, Leesville is not a large town, but it is filled with a community that loves its military and for just a tank of gas, you have access to Houston, Baton Rouge, New Orleans and Lake Charles. Most OC/Ts at JRTC spend time hunting, fishing or camping in the year-round moderate climate. The advantages of assignment to the Joint Multination Readiness Center in Hohenfels, Germany, are obvious as the CTC is centrally located in Europe with access to many countries within a few hours' car, plane or train ride. In addition to the travel options, the immediate area and communities surrounding Hohenfels are filled with events and fests throughout the year.

The National Training Center is only hours away from the beaches, theme parks and historical attractions of Southern California. It also is about a three-hour drive from Las Vegas, and only six hours away from Phoenix, Ariz. There is a lot more to CTCs than the box, which is what most people think of when they see the OC/T job on the list of possibilities from FA branch. As Army senior leaders at echelon start to vote on the future groups of battalion commanders, it is our recommendation to guide their talented officers to serve as OC/Ts at one of the CTCs. As leaders mentoring captains and majors, we must help them to see the complete picture of how a tour at a CTC a can help them be proficient tactical battalion commanders. Additionally, the Field Artillery Branch must continue to have honest dialogue with talented officers across the force and fill the CTCs with the requisite talent. BCT and DIVARTY commanders are the first line of communication counsel with their field-grade officers – they need to encourage them toward the tremendous opportunity available to maintain the edge at the tactical level prior to selection to battalion command.

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Maj. Kurt Knoedler is currently the field artillery battalion operations trainer (OC/T) at the Joint Multinational Readiness Center. A field artillery officer, he has served in FA brigades, DIVARTYs, infantry, and armor brigade combat teams with operational experience in OIF, OND and OIR. He completed his KD time in the 101st DIVARTY and 2/101st Airborne Division (IBCT) and recently served as deputy commander for the 101st DIVARTY.

Soldiers, assigned to 82nd Airborne Division Artillery, 82nd Airborne Division, attach a M119A3 howitzer to a CH-47 Chinook helicopter from 82nd Combat Aviation Brigade during sling-load operations, part of a division artillery readiness test at Fort Bragg, N.C., Jan. 20, 2016. (Staff Sgt. Christopher Freeman/U.S. Army)

A BATTLE FOR TIME

An adaptive method to enable division targeting while synchronizing the DIVARTY in multi-domain operations

By Maj. Benjamin Maher

A fundamental gap exists in current doctrine on how to integrate and synchronize Fires with maneuver in multi-domain operations. Maj. Gen. Wilson A. Shoffner, commanding general, the Fires Center of Excellence and Fort Sill, argued that the integration of fire and maneuver is essential to the success in future large-scale combat and that we will not dominate our adversaries if we can only do one and not the other. He argued that the "role of Fires is to enable freedom of maneuver, while maneuver forces compel the enemy to concentrate when they place something of value at risk."[1] Fires creates this window of opportunity for maneuver. Surface Fires is the most critical requirement to achieve this effect because it directly counters the enemy's strength, integrated air defense (IADS) and long-range Fires.[2] Without effective surface Fires, joint Fires and attack aviation cannot be employed and maneuver risks unacceptable losses to massed enemy artillery. The need for synchronized ground-based Fires is

1 *Col. Kimo Gallahue, "Mission Command Training in Unified Land Operations Fy17 Key Observations," Center of Army Lessons Learned Bulletin 18, no. 15 (March 2018), 29.*
2 *Maj. Gen. Wilson Schoffner, "The Future of Fires: Dominating in Large-Scale Combat," in Lethal and Non-Lethal Fires: Historical Case Studies of Converging Cross-Domain Fires in Large-Scale Combat Operations, ed. Thomas G. Bradbeer (Fort Leavenworth, KS: Army University, 2018), 206.*

intensified due to the qualitative and quantitative advantage of peer competitors' surface Fires. Therefore, success in this effort is centered on a contest for time. The challenge is to make the right decisions, arrange tactical actions and resources to achieve a decisive effect before the enemy can do the same. Material developers strive to close this gap by developing weapons that can move faster and fire further to create additional time.[3] However, the joint force cannot wait for modernization efforts to implement multi-domain operations, it must rely on current capabilities that already exist within the Army. Therefore, in the absence of a technological overmatch, the current force must develop a process to synchronize and integrate Fires with maneuver across domains to dominate our adversaries in large-scale combat operations (LSCO).

Within the Army division, the processes that synchronize Fires center on the division fire support coordinator (FSCOORD) and the DIVARTY staff. In particular, the role of commanding surface Fires functions as the foundation for the entire Fires enterprise because it creates opportunities to employ joint Fires and attack aviation. The DIVARTY, as the force field artillery headquarters (HQ), optimizes Fires beyond the range of brigade combat teams' (BCTs) cannons in order to destroy, defeat or disrupt enemy IADs and long-range artillery in depth.[4] In order to shape these enemy capabilities, it requires a seamless integration and synchronization of cross-domain Fires. The cross-domain capabilities exist within a division now, but most HQs lack a unifying process with the requisite authorities to achieve synchronization.[5] The DIVARTY commander brings together surface and joint Fires, collection, airspace management and cyber and electronic warfare into one coherent effort through the targeting process. As the foundation for this collaboration, surface Fires enabled division targeting through its understanding of enemy artillery locations and organic delivery capability.[6] In addition, the DIVARTY staff must understand how the DIVARTY supports the division across all warfighting functions (WfF). This interconnected effort moves at the cadence of the air tasking order (ATO) cycle. Therefore, the division Fires enterprise needs an integrated process aligned to an ATO cycle to coordinate and synchronize Fires across multiple domains.

The current methods for integrating and synchronizing Fires are insufficient for the intensity and complicated character of large-scale operations against peer threats.[7] Success in modern warfare consists of two requirements: the ability to mass high volumes of lethal attacks in a short period of time and ability to sustain those attacks over time.[8] The DIVARTY commander, division and the DIVARTY staffs have two principle mechanisms to solve these divergent aims: the military decision-making process (MDMP) and targeting. The operational tempo during recent Army Warfighters moves at such a rapid pace that deliberate MDMP becomes too inflexible and not an economical use of time. This process does not allow the division Fires enterprise to manage the competing interests for resources and priorities.[9] The combination of a full battle rhythm and constantly changing conditions leads to divisions relying on targeting rather than MDMP to synchronize Fires. The DIVARTY's principle doctrine ATP 3-09.90, Division Artillery Operations and Fire Support for the Division adequately describes how to conduct division-level targeting through the dedication of an entire chapter. However, only two sentences within this manual reference the requirement to conduct the DIVARTY targeting working group (TWG) and it does not detail any roles, responsibilities, or inputs/outputs.[10] ATP 3-60 Targeting describes a TWG, but it is written for a brigade combat team. In addition, this manual does not adequately list DIVARTY inputs to division targeting and omits the key warfighting functions. Specifically, the logistical requirements needed to synchronize the DIVARTY and expedite Fires through the use of airspace control measures are noticeably absent. As a result of this doctrinal gap and operational tempo in LSCO, a new method to enable division targeting and synchronize surface Fires was needed. The 1st Armored Division Artillery synthesized a method to facilitate division targeting and synchronize surface Fires through a daily execution of the rapid decision making and synchronization process (RDSP) aligned to the ATO cycle.

The DIVARTY daily synchronization meeting

In order to describe 1st AD's method, this article will detail the function, process, and shortfalls (see Figure 1).

Function

In order to continuously execute Fires in support of the division with surface Fires and enable division targeting, 1st AD DIVARTY conducted a daily synchronization meeting. This meeting termed the 'Daily Sync' had two distinct goals: facilitate division targeting through informing the FSCOORD's and targeting team's estimate and synchronization of the DIVARTY staff. The meeting informed division targeting through providing an accurate estimate on the enemy

3 *Robert R. Leonhard, Fighting by Minutes: Time and the Art of War (Westport, CT: Praeger, 2017), 7.*
4 *Maj. Gen. Wilson Schoffner, The Future of Fires: Dominating in Large-Scale Combat," in Lethal and Non-Lethal Fires: Historical Case Studies of Converging Cross-Domain Fires in Large-Scale Combat Operations, 207.*
5 *Col. Kimo Gallahue, "Mission Command Training in Unified Land Operations Fy17 Key Observations", 28.*
6 *Department of the Army, ATP 3-09.90 Division Artillery Operations and Fire Support for the Division (Washington, DC: Department of the Army, 2017), 3-1.*
7 *Col. Gallahue, "Mission Command Training in Unified Land Operations FY17 Key Observations," 7.*
8 *Leonhard, Fighting by Minutes: Time and the Art of War (Westport, CT: Praeger, 2017), 10.*
9 *Center of Army Lessons Learned, Deep Operations Handbook (Fort Leavenworth, Kan.: Center of Army Lessons Learned, 2018), 1.*
10 *ATP 3-09.90 Division Artillery Operations and Fire Support for the Division, 3-2.*

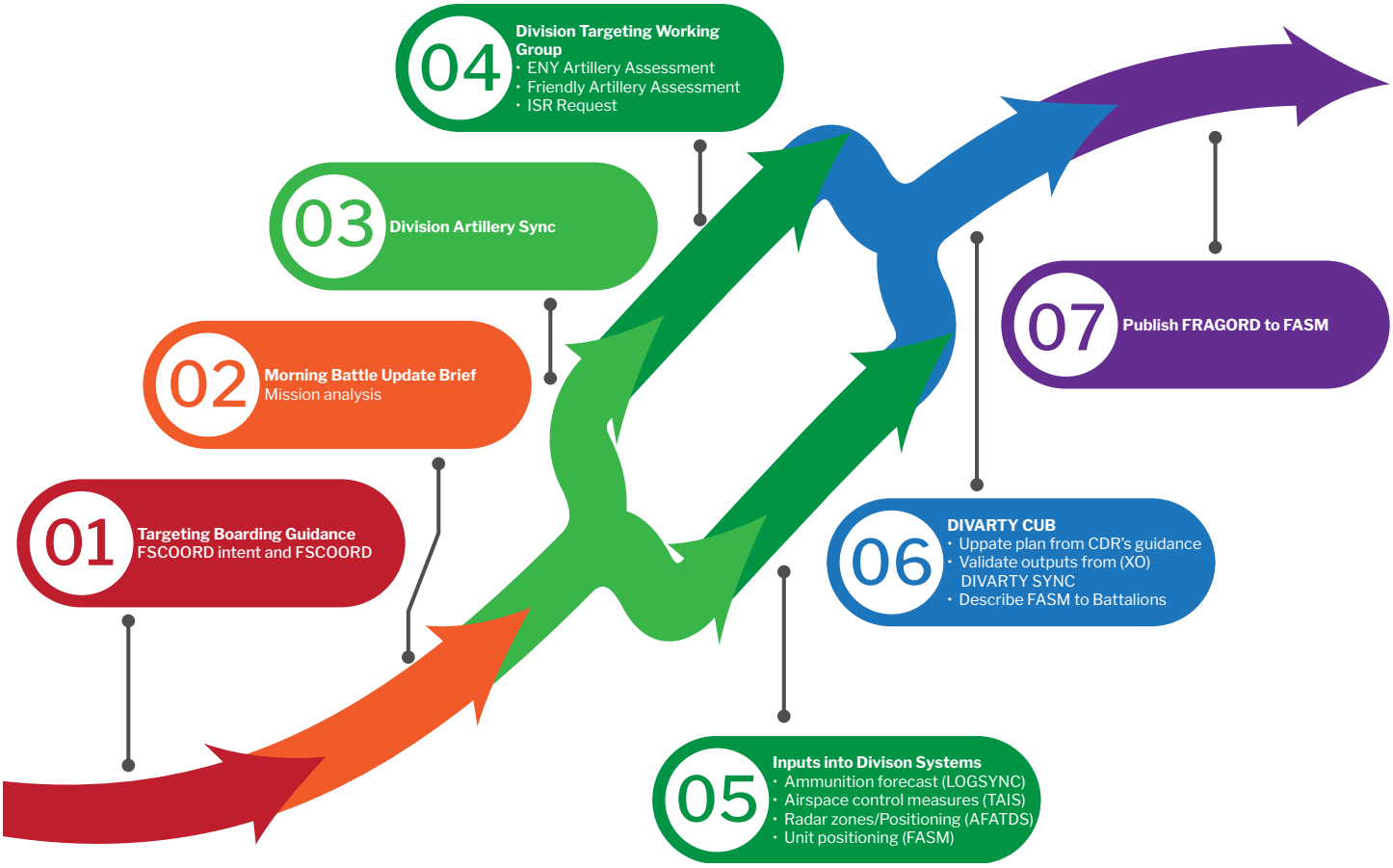


Figure 1. The sync flow process detailed in the 1st Armored Division Artillery plans standard operating procedures. (Rick Paape/Courtesy information)

surface fire picture and friendly surface Fires capability (positioning and ammunition). Simultaneously, the DIVARTY staff would be able to forecast requirements such as logistics and airspace control measures. As a rule, this meeting forecasted resources at 72 hours, coordinated the movement of resources at 48 hours and synchronized assets at 24 hours. This meeting occurred after the morning update brief to the commanding general and prior to the division (TWG). This timing is critical to the function because it started the meeting with an accurate estimate, drove the division targeting with recommendations based on facts, and provided outputs to the staff to execute in concert with the targeting process. In particular, the staff placed a heavy emphasis of utilizing this meeting to publish airspace control measures to the airspace control order (ACO) in order to allow more responsive Fires. These outputs are codified in a daily field artillery support plan (FASP) and validated in the evening DIVARTY commander update brief. An illustration of the 'how' will describe by what method this meeting closed the doctrinal gap needed to be successful in large-scale combat operations.

A concise description of the meeting, attendees and agenda will clarify why a daily RDSP event was vital to provide inputs to targeting and drive DIVARTY operations. The sync was conducted in four steps: the current assessment, next 24 hours (ATO), next 48 hours (ATO), and review of the due outs for the upcoming daily fragmentary order for the FASP. This meeting was chaired by either the executive officer (XO) or S3 dependent on current operational tempo.

The setup for this event is critical and requires each staff member to come prepared with their running estimate. Before the meeting the targeting officer collated an analog map with the enemy (from the S2) and friendly (from the plans officer) situation for the current state, next 24 and 48 hours. In addition, the targeting officer created a sketch (see Figure 2) that outlines the targeting focus. This sketch contains the current enemy assessment by named unit that outlines type and number of tubes. This sketch is copied and handed out prior to the meeting and is used by the participants to record requirements aligned to enemy formations. For example, the enemy named area of interest (NAI) that is identified as a battalion of multiple rocket launchers will have a battalion 3 of Dual Purpose Improved Conventional Munition, call-for-fire zone, and air space control measure allocated against it. This allows the staff to stay enemy focused, streamlines the meeting and simplifies the transition to FASP production.

The first action for the meeting

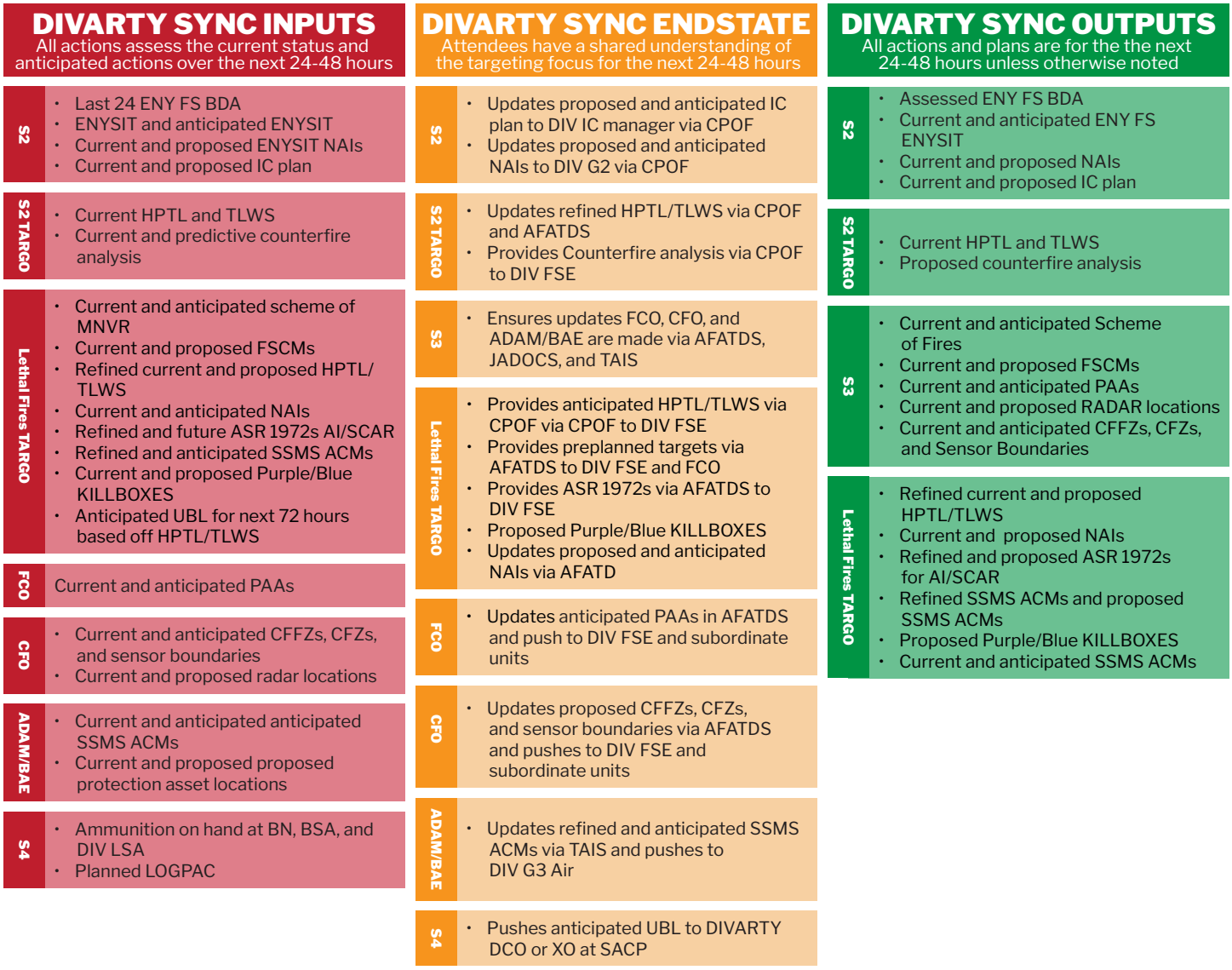


Figure 2. The division artillery (DIVARTY) sync agenda. (Rick Paape/Courtesy information)

is the S2 assessment of the enemy artillery and IADs composition and disposition, which included pertinent details of terrain and weather. This is an abbreviation of MDMP, therefore it is critical that the S2 distilled the essential facts through continuous mission analysis. The sketch in Figure 3 captured these essential facts in a manner that brought the clarity and focus needed for a short and efficient analysis. A special emphasis must be placed on the division's area of influence because enemy long-range artillery will exploit adjacent boundaries to make friendly Fires less responsive.[11] After the S2's assessment, the S3 or XO outlined the scheme of maneuver for the division. The scheme of maneuver covered both the corps and division to create a baseline understanding needed to transition to COA development.

Second, the targeting officer outlines the current fire support tasks requirements from the previous division targeting board in order to account for resources that are allocated against enemy artillery or IADs such as strike coordination and reconnaissance, air interdiction, close air support, corps artillery, or attack aviation. With this starting point established, the S3 or XO leads the staff through each enemy formation and determines a course of action. This includes movement to new position areas for artillery (PAAs), changes to radar positioning, and the fire control officer (FCO) recommended a fire order based on current and projected ammunition. This must be a succinct collaboration based on a shared understanding. This deliberation is an artillery-centric method that analyzed relative combat power, generated options, arrayed initial forces, developed a scheme of maneuver and assigned the HQs to fire support tasks.[12] Within the approved course of action, the S3 directed the inputs to the FASP that focused on the positioning of the artillery battalions. This method also expedited Fires by hav-

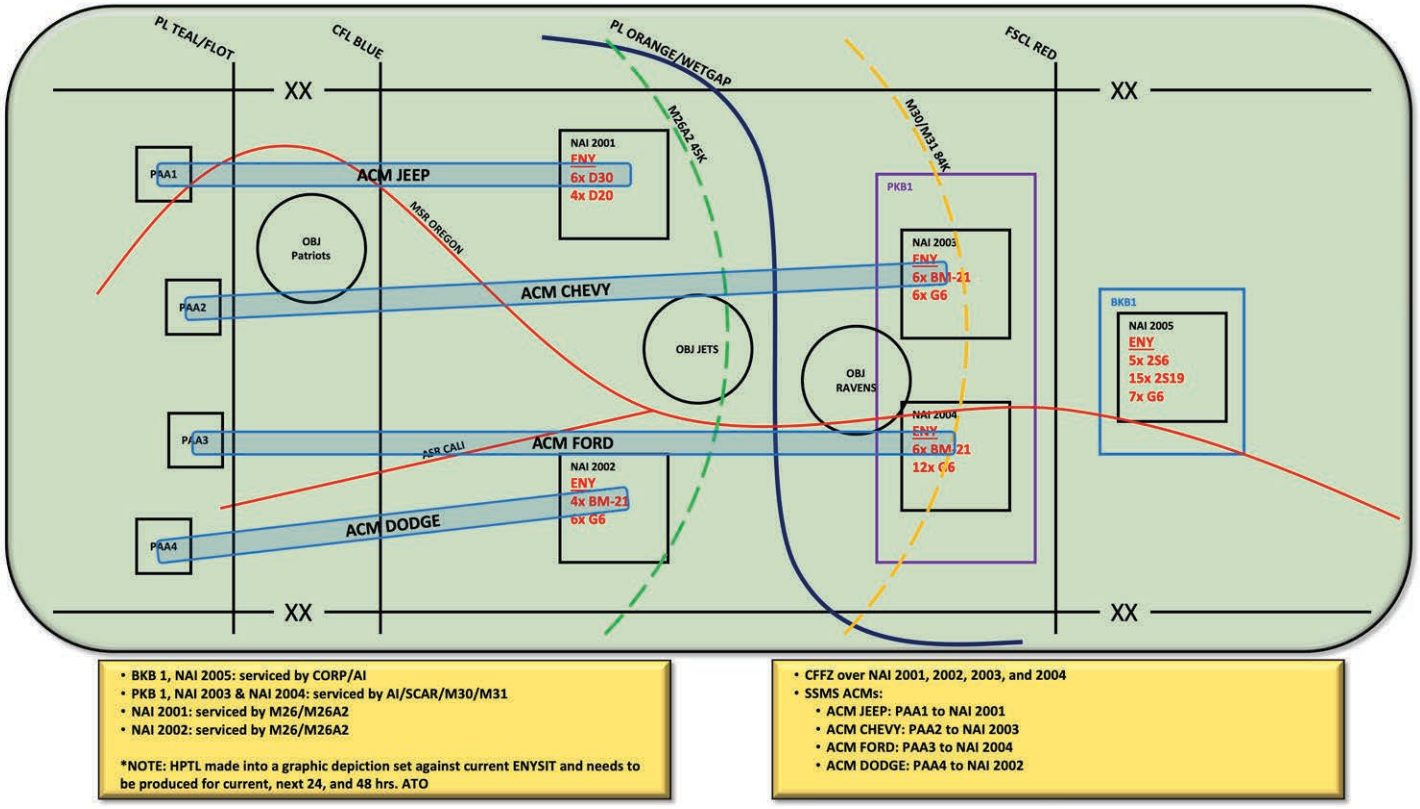
11 COL Gallahue, "Mission Command Training in Unified Land Operations FY17 Key Observations," 29.
12 Center of Army Lessons Learned, MDMP and Field Artillery Support Plan (Leavenworth, KS: Center for Army Lessons Learned, 2013), 33.

ing the air defense and airspace management cell create airspace coordination areas (ACAs) from the PAAs to the enemy locations (NAIs) for more permissive geometries. These ACAs are submitted through Advanced Field Artillery Tactical Data System (AFATDS) to division in order to be placed on the ACO. The counter-fire officer records critical friendly zones or call-for-fire zones based off the COA. The S4 records the predicted ammunition consumption to request ammunition 72 hours out. The collaboration with the S3 and FCO enabled the S4 to recommend the coordination of ammunition into the division area or recommended movement of a supporting brigade support area. At 24 hours, the S4 provides locations and timings for class V resupply. In essence, this method provided the staff an understanding of time and space needed to conduct battlefield calculus. These requirements are annotated on the sync sketch by each staff officer for review at the completion, which allowed an efficient transition to orders production.

Lastly and most important, the plans officer identified all due outs and updates to the DIVARTY Field Artillery Support Matrix (FASM). The DIVARTY sync sketch contained the critical tasks, facts and assumptions needed to inform the DIVARTY S3 at the division targeting meeting and enable the production of a FASM by ATO cycle. The sketch contained the predictive ammunition consumption, movement of PAAs, fire support coordination measures, logistical requirements or critical shortfalls to request from division. These sketches provided a concise reality of the DIVARTY for the next three days. This allowed the DIVARTY XO and S3 to make decisions and provide recommendations to the DIVARTY commander prior to the division TWG. Upon completion of the sync, the DIVARTY S3 attends the division TWG and provided the surface Fires recommendation to the commander. Simultaneously, the DIVARTY XO oversaw the inputs of the staff into the digital mission command systems (CPOF, AFATDs, Tactical Airspace Integration System, Distributed Common Ground System – Army (DCGS-A) and division processes (logistics synchronization and operations synchronization). At the DIVARTY commanders update that afternoon, the XO validated the status of the staff inputs and the S3 incorporated the commander's guidance from the TWG through two minute drills, operations and intelligence (O&I) and updates to the FASM.

The DIVARTY sync achieved the intent to enable division targeting and DIVARTY operations, but the tempo of LSCO presented a serious challenge that must be discussed. The speed of combat relative to the enemy provided a remarkable challenge to keep pace with the battle. The outputs of the DIVARTY sync stayed current for an average of six to eight hours. Enemy forces moved to unexpected locations, friendly units sustained significant losses, ammunition resupplies are de-

Figure 3. An example of a division artillery (DIVARTY) sync. (Courtesy illustraton)



Soldiers with the 1st Cavalry Division report the opposing forces movement from an observation point during exercise Combined Resolve XI, Dec. 4 at Hohenfels Training Area, Germany. CBRXI exercise gives the U.S. Army's regionally allocated combat forces in Europe the opportunity to execute a combat training center rotation with a joint, multinational environment demonstrating their integration into U.S. Army Europe operations. (Sgt. John Onuoha/U.S. Army)

layed and a whole litany of friction overturned the outputs of the sync. The 1st AD DIVARTY staff struggled with incorporating changes in conditions within real time into the FASM with simultaneous understanding at battalions, BCT's, FA and division. Command Post of the Future (CPOF) was the primary mechanism to share the estimate and FASM, but other brigades and division often did not fight off the DIVARTY estimate and common operational picture. The process still allowed for effective DIVARTY operations and targeting. The incorporation of regular two-minute drills and O&Is utilizing the syncs method would allow the staff to keep with the pace of the battle. The XO or S3 must regularly bring the staff in to update the FASM if the fundamental conditions have changed. In addition, the DIVARTY staff must strive to keep the FASM simple in order to ensure ease of change. Despite this friction, the process did allow the field-grade officers to manage critical transitions with resources already forecasted or coordinated for. Without the staff sync or a similar process, the DIVARTY would be reactive to the enemy or conditions on the battlefield. Gen. Dwight D. Eisenhower's dictum could not have been truer, "The plan is nothing, but planning is everything."[13] The overreaching aim must always be to anticipate enemy actions and place overwhelming combat power against enemy artillery and the integrated air defense network.

It is important to understand that the combination RDSP aligned with the ATO cycle enabled division targeting and synchronized the DIVARTY's focus on Fires across all WfF. This method served as only "a way" to bridge the gap of capabilities and doctrine. Each division is unique, but this process can be applied across the force as an effective means of integrating Fires with maneuver. Large-scale operations are inherently complicated and require training and repetition to be successful. With processes such as the DIVARTY sync, the Army and joint force will bring multi-domain operations to life. With current threats there is no time to wait for a new 'whiz-bang' technology that will bring about victory. The most powerful changes of warfare come from organizational ideas or methods rather than technological innovations.[14] In order to deter adversaries and prevent conflict, we must hone our ability to synchronize and integrate Fires and maneuver or be prepared to spend needless blood and treasure to learn these lessons at war.

Maj. Ben Maher is currently the 1st Armored Division Artillery executive officer. He has experience as S3 and XO of 4th Battalion, 27th Field Artillery, 2ABCT, 1st AD in support of CJFLCC and Operation Spartan Shield in Iraq and Kuwait. In addition, he was G5 planner in CJFLCC-OIR under 1st Infantry Division and 1st Armored Division and the lead G35 planner for 1st AD during WFX 17-3. He is a graduate of Command General Staff College and School of Advanced Military Studies.

References

Center for Army Lessons Learned Newsletter No. 99-11, An Artillerization of the Military Decision-making Process (MDMP). Fort Leavenworth, KS, 1999.

Center of Army Lessons Learned. Deep Operations Handbook. Fort Leavenworth, KS: Center of Army Lessons Learned, 2018.

Center of Army Lessons Learned. MDMP and Field Artillery Support Plan. Leavenworth, KS: Center for Army Lessons Learned, 2013.

Department of the Army. ATP 3-09.90 Division Artillery Operations and Fire Support for the Division. Washington, DC: Department of the Army, 2017.

Department of the Army. FM 3-0 Operations. Washington, DC: Department of the Army, 2017.

Knox, MacGregor, and Williamson Murray. The Dynamics of Military Revolution, 1300-2050. Cambridge, UK: Cambridge University Press, 2001.

Leonhard, Robert R. Fighting by Minutes: Time and the Art of War. Westport, CT: Praeger, 2017.

Maj. Gen. Wilson A. Shoffner. "The Future of Fires: Dominating in Large-Scale Combat." In Lethal and Non-Lethal Fires: Historical Case Studies of Converging Cross-Domain Fires in Large-Scale Combat Operations, edited by Thomas G. Bradbeer, 1. Fort Leavenworth, KS: Army University, 2018.

Col. Gallahue, Kimo. "Mission Command Training in Unified Land Operations FY17 Key Observations." Center of Army Lessons Learned Bulletin 18, no. 15 (March 2018).

13 From a speech to the National Defense Executive Reserve Conference in Washington, D.C. (November 14, 1957) ; in Public Papers of the Presidents of the United States, Dwight D. Eisenhower, 1957, National Archives and Records Service, Government Printing Office, 818.

14 MacGregor Knox, and Williamson Murray, the Dynamics of Military Revolution, 1300-2050. (Cambridge, UK: Cambridge University Press, 2001), 192.

MLRS

A possible Norwegian countermove against the Bastion Defense

By Ragnhild Tau Strand Oanes

In the current security political situation, the Russian Bastion Defense has gained renewed actuality, and is increasingly being highlighted as a potential threat towards Norwegian sovereignty in the ongoing debate. It is therefore interesting to note that this concept at its core is to be seen as a defensive concept thought to be used in a major conflict against a more or less equal opponent. As such, it is not likely to be seen as a major threat in the case of an isolated Norwegian-Russian conflict of interest, but may in return affect Norwegian interests if a conflict elsewhere on the globe escalates above a certain level.

The majority of Russia's strategic submarines are stationed at the Kola Peninsula, and these capacities are of crucial importance to Russia's defense. Their main function is to act as a deterrent from attacking Russia with nuclear weapons. A robust second-strike capability is the very core of Russian defense planning. The Bastion Defense is therefore aimed at protecting these submarines by creating an extensive anti-access/ area denial (A2/ AD) ”bubble,” in order to preserve Russia's second-strike capabilities. Most of the elements in this concept will be found within the sea domain, but one must assume that it also will include, at least in part, essential elements within the land and air domains.

The first line of the Bastion Defense will most likely consist of nuclear-powered "hunter-killer" submarines with torpedoes and long-range missiles, supported by long-range air capabilities. This line will go from Greenland, via Iceland to the British Isles (the GIUK gap). Behind this line, there will be several defense lines consisting of a variety of capabilities within the sea, air and land domains. In such a context it may, inter alia, become necessary for Russia to occupy parts of Norwegian territory, in order to deploy long-range land-based air defense here. The creation of A2/AD bubbles will first and foremost become a necessity due to NATO's expected air supremacy. Especially "hunter-killer" submarines will be vulnerable to long-range patrol aircraft, such as the P-8 Poseidon or P-3 Orion. It is also worth noting that Russian maritime capabilities from the Northern Fleet have very limited abilities to perform a long-range anti-air defense of their own. The vessels that currently possess such capacities are also largely in the final stage of their lifespan. These shortcomings must probably be compensated by initially extending the physical distance between NATO territory and the vital installations on the Kola Peninsula. This can be done by, as an example, occupying Norwegian territory from Grense-Jakobselv to Porsangen or Lyngen. A full-scale invasion is therefore unlikely; it would rather be a matter of taking and holding a limited part of Norwegian territory. This may be accomplished by amphibious operations, land operations, air operations and hybrid operations, or through a combination of these.

The starting point of a possible conflict in which the Bastion Defense is activated is unlikely to take place within the context of a bilateral Norwegian-Russian conflict. A more relevant example would be a conflict of interests in the Baltics, where former Soviet states end up being occupied. The occupation could then be followed up by threats of defending the occupied areas with nuclear weapons if necessary. In this situation, it will be imperative to activate the Bastion Defense in order to maintain Russian second-strike capabilities.

At an early stage of the conflict, it will therefore be a possibility that parts of Norwegian land territory become occupied. This can

be expected to happen as part of a chain of events, where the Russians establish a forward line of operations between Greenland and the British Isles as described earlier. In such a scenario, the opponent will seek to create a comprehensive A2/AD bubble around his most vital and vulnerable installations on the Kola Peninsula. These installations are crucial in order to maintain Russian nuclear capacities. Simultaneously, this will create a situation where Russian units completely or partially block the supply lines across the northern Atlantic. In other words, two goals can be achieved over a relatively short time: Both maintaining second-strike capabilities, while at the same time weakening NATO's ability to hold its own territory over a short and medium time span, as an example in the former Soviet states in the Baltics.

Russian land-based A2/ AD "bubbles" can be assumed to have a full range of around 300 kilometers, primarily being based on long-range missiles within the air and sea domains. As an example, SS-N-26 or SS-C-5 anti-ship missiles in conjunction with S-300 or S-400 air defense missiles. These will then be protected and supported by land capacities, including missiles and rocket launchers such as Iskander and 9A52-4 Tornado.

In relation to Norwegian territory, it will most likely be the case of a relatively limited action, at least initially. This implies that the operation may have to be carried out with fairly limited resources, as political and strategic interests will indicate that the center of gravity of the conflict will be outside Norwegian territory. Some analysts believe that the Bastion Defense may be expanded, and that areas as far south as Møre or Jæren can come under occupation. If this were to be the case, such operations would require a considerable amount of resources, and would therefore hardly take place in the initial stages of a conflict.

If Russian forces successfully establish a forward Bastion Defense in the manner described, one of the consequences will be that NATO comes to face noticeable difficulties in order to reinforce the European theater. This will especially apply to the Scandinavian and Baltic areas of operations. Since the Baltic States may be expected to become a possible gravitational center in a future conflict, this may early on imply serious consequences for the alliance's ability to defend its own territory.

As mentioned, the installations on the Kola Peninsula are vital, both in order to maintain Russian second-strike capabilities and in the extension of this, in order to implement the Bastion Defense. In order to ensure these, it must be assumed that Russian forces will aim to occupy parts of Norwegian territory so to increase the physical distance between NATO-controlled territory and the Kola installations. This assumption is based, among other things, on declassified documents from both sides during the Cold War. A comprehensive A2/AD "bubble" around the area in question will discourage attacks on these installations through traditional capacities from the air or sea domain, while leaving them out of reach for current land forces. However, development is taking place, especially within the area of ammunition technology, which in the foreseeable future will allow us to attack the very core of the Bastion Defense by relatively simple means. This could again contribute to deterrence from triggering this concept.

As of today, conventional tube artillery can achieve a maximum range of roughly 40 kilometers, but within the next few years this range will presumably be extended up towards 100 kilometers. Such a capacity will expand the battlefield significantly, and to some degree constitute a multi-domain capacity with the ability to combat targets within the land and sea domains with a high degree of precision, provided adequate target data. These capacities will nevertheless have some limitations, essentially being a delaying element towards a potential invader, thus with a significant potential as a casualty and loss provider. In order to hamper the activation of the Bastion Defense and, in its most extreme consequence help raise the threshold for actions that could trigger these scenarios, one will still need the ability to deliver precise fire over significantly longer distances. In this context, it is interesting to note that several parties, including the U.S. Army, are pursuing the development of rocket ammunition with greatly improved range. Today, the MLRS system can deliver fire up to 120 kilometers, and up to 300 kilometers using Army Tactical Missile System (ATACMS) semi-ballistic missiles. The latter has its range restricted by the Missile Technology Control Regime (MTCR), where land-based missiles with a payload exceeding 500 kilos may have a maximum range of 300 kilometers.

It is known from open sources that the U.S. Army currently has under development a new range of ammunition for the MLRS system, using conventional rockets that do not fall under the definitions of MTCR. The project specifications list a maximum range up to 499 kilometers. Lockheed Martin and Raytheon are currently competing over this contract, which will be awarded in 2019, and initial deliveries taking place in 2023. This weapons system will constitute a far more cost-effective capacity compared to long-range missiles such as the before mentioned ATACMS, and at the same time possess a satisfactory degree of precision and considerably longer range. Norway purchased a number of MLRS platforms in the late 1990s, but the system was "mothballed" as early as in 2005. Norway does, in other words, already possess this capacity, which could be re-established without costly material investments. The core investment

for future use of this system will then be limited to upgrades of existing materiel, e.g., to Mittleres Artillerie Raketen System/ Lance Roquette Unitaire (MARS2/ LRU) through incorporating the European fire control system. An upgrade of this type will also ensure that the system will be used in accordance with the "Convention on Cluster Munitions," a convention that Norway ratified in November of 2006. Furthermore, an upgrade will lead to greatly reduced sensor-to-fire times, a factor that is critical for successful fast paced artillery offense.

A long-range weapons system based on the MLRS will therefore be simple to convert into a multi-domain capacity, able to combat targets within the sea and air domains using land based artillery. In this context, it might also be seen as a relatively cost-effective threat to the very core of the Bastion Defense, the fixed installations on the Kola Peninsula. In order for the Bastion Defense to continue to work effectively under such a threat, the physical distance between NATO territory and the installations at Kola would have to be significantly extended, with the operational and logistical challenges that this entails.

In a future operational environment, it can be expected that a possible opponent possesses significant sensor capacities in combination with the ability to combat targets with a high degree of strength and precision. This means that the opposing forces will be able to limit our freedom of action and movement, and thereby limiting our access to the different domains within a limited geographical area. This is done through establishing A2/ AD "bubbles." One possible solution to this problem is through applying a land-centric multi-domain approach. This way, one will be able to secure terrain, restrict the opponent's freedom of action and thus counteract the creation of said "bubbles." This will presumably create a need to use Special Forces (SF) and intelligence, surveillance, target acquisition and reconnaissance (ISTAR) units capable of directing fire, which, in cooperation with long-range tube and rocket artillery, can act as "door openers" for friendly joint forces, including those from air and sea domains, which so far have been denied access to the area in question. The neutralization of these "bubbles" will of course have to be performed at maximum strength, speed and effect, through carefully coordinated operations linked and synchronized through digital networks.

A combination of tube and rocket artillery, with access to a wide range of ammunition types with corresponding ranges and precision, will form a versatile toolbox also within more traditional scenarios. Assuming that the future will give access to an increased sensor surface, including through sensor information from submarines and F-35 airplanes, as well as timely and accurate target data from SF and ISTAR units, this will give us a highly increased accessibility towards enemy troop concentrations and high-value targets.

Target data collected by NATO allies can be included in the target imagery by coordinating them in Artillery Systems Cooperation Activities (ASCA). Standoff from the ground in, for example, Troms will also offer a greater degree of speed and mobility, as well as provide a significantly lower signature than from said submarines or F-35s, which in turn will give opposing forces less room for countermeasures.

Over time, one must also expect that new technology will provide increased opportunities as to direct fire toward moving targets. This will, in turn, imply that these type of artillery capacities will have a further enhanced effect, both in relation to the neutralization of A2/ AD "bubbles," executing our own area denial operations, as well as enabling the achievement of a highly improved effect of counter-fire.

This toolbox will also offer cost-effective solutions in most scenarios, offering access to a wide range of munitions where costs vary greatly based on properties and applications. This will in turn enable the optimization of the capacities at hand, from a cost-benefit analysis related to the target imagery in question.

In order to achieve the objectives described in this article, it will of course be necessary to enable a determination and ability of thinking in new directions. There is also a requirement to develop new doctrines and operational concepts that safeguard key objectives against current predominant threats. This will in turn involve extensive adaptation, both intellectually and culturally, where one must develop the ability to make holistic approaches within operational planning in which all domains will be assessed. In this context, it may be an idea to create a specialized multi-domain unit, possibly within the structure of Norwegian Brigade N, with the ability to integrate sensors into digital networks linked up to NATO network enabled capability.

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References

Army Will Field 100 Km Cannon, 500 Km Missiles: LRPF CFT
(Sydney J. Freeberg Jr., article in Breaking Defense, 2018)
Extending the Battlefield
(Donn A. Starry, Military Review, 1981)
Fires in Multi-Domain Battle
(US Army, 2016)
HR McMaster: Army Shifts Focus to Multi-Domain Battle Concept
(J. Clemens, Executive Gov, 2016)
Hybridkrig, bastionforsvar og landmakt: Hvilket Forsvar trenger vi?
(Karsten Friis, Norges Forsvar, 2016)
Multi-domain Battle: A New Concept for Land Forces
(A. Palazzo and D. P. Mclain III, 2016)
TRADOC Pamphlet 525-3-4: The US Army Functional Concept for Fires 2020 – 2040
(US Army Training and Doctrine Command, 2017)
Västlig militär förmåga - En analys av Nordeuropa 2017
(Krister Pallin (ed.), Totalförsvarets forskningsinstitut, 2018)
What Role Can Land-Based, Multi-Domain, Anti-Access/ Area Denial Forces Play in Deterring or Defeating Aggression?
(Timothy M. Bonds et al, Rand Corporation, 2017)

Forging the future battlefield

Combining past and modern training methods

By 1st Lt. Kristofer Thompson

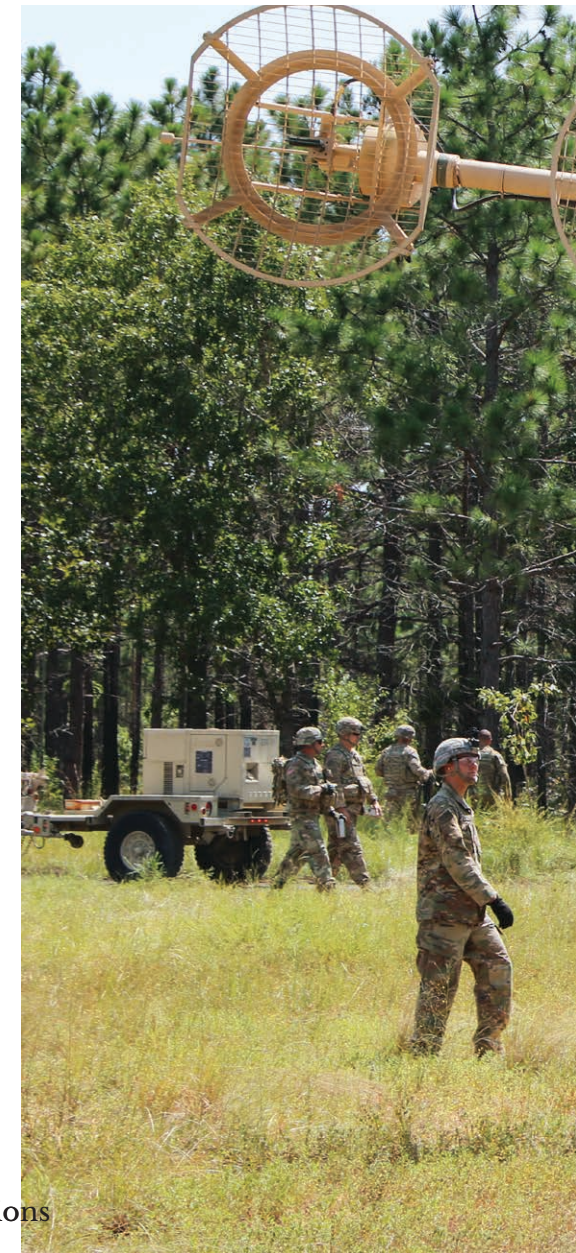
The future character of warfare is rapidly increasing in complexity due to emerging trends in technology. Current world affairs affect how we look at preparing our Soldiers and the Army. Air defense artillery equipment continues to evolve with the times and has become more digitally-centric. The intricacies of training Air Defenders using digital and analog methods is imperative so they are able to rapidly emplace and operate their systems. As international relations become more complex, there is a rising precedence for a more dynamic training style, one that blends digital and analog training that prepares the U.S. for uncertain and likely contested operational environments.

Numerous professional military journals have concluded that a significant threat to the United States military lies within the electronic warfare (EW) realm. An article from the Journal of Asymmetric Warfare found that near-peer competitors far outmatch the United States in tactical EW.[1] U.S. Army Gen. Raymond Thomas III, U.S. Special Operations Command commander, stated that Syria has become, "The most aggressive electronic warfare environment on the planet, with Russian and Syrian electronic warfare systems working to disable or spoof American Aircraft."[2] In response to this burgeoning threat, there are rapid and concentrated efforts to update the Air Defense Artillery Branch to contend with these pressing issues. However, the Army must be wary of becoming over-reliant on technology that could be degraded or destroyed in future congested and contended environments. These issues can be seen in Air Defense Artillery as Defense Advanced GPS Receivers (DAGRs) are used for nearly the entire emplacement of a Patriot fire unit. Soldiers use DAGRs to relay the exact position of launching stations, radar location and direction to the Engagement Control Station (ECS). Air defenders should train for contingencies during future operations ranging from reacting to EW attacks, operations after GPS degradation, and spoofing to prepare Soldiers for the uncertainty of the next battle.

A way the Army is incorporating modern technology in the Air Defense Artillery Branch is through the use of synthetic training environments. These simulations allow air defense Soldiers to practice and become more proficient during emplacements as well as air and ground battles. During virtual exercises, cross-functional teams can simulate weather and terrain that mimic real life areas and scenarios. One scenario commonly practiced in air defense is communications loss from the ECS to higher echelon units. During the scenario operators are required to talk via voice with communications equipment using ultra and very high frequencies. This equipment is not vulnerable to jamming, allowing the operator to validate and engage enemy aircraft and missiles even in the event of GPS loss. Due to the ECS's internal operating system, it remains unaffected by GPS degradation. Operators can continue to make manual engagements primarily because the system is self-contained. This method of communication also requires minimal maintenance from the operator. These realistic training aids help increase lethality in with high technology to degraded technology capabilities, and allow Soldiers to practice their skills with the benefit of making and learning from mistakes without repercussion. However, a downside with the use of these synthetic trainers is the physical hands-on training Soldiers receive when practicing with their equipment.

Teaching Soldiers how to manually use and emplace equipment presents its own set of challenges. One challenge is retaining senior enlisted Soldiers that were taught these methods.

Institutional knowledge has been lost due to dependence on



1 *Journal of Asymmetric Warfare, 'Tactical EW and Cyber: Russian versus U.S. Capability', Vol. 1, Issue 2, August 2016*
2 *Courtney Kube, "Russia Has Figured Out How to Jam U.S. Drones in Syria, Officials Say," NBC, 4/10/2018*

digital systems in non-contested operational scenarios for the last 15 years. Air defenders have not been forced to operate in a full spectrum operation where the U.S. military hasn't been the dominating force across all war fighting functions. Another problem that presents itself with manual emplacement is maintaining the necessary proficiency to use equipment such as aiming circles, tripods, and gunners quadrants. This equipment operates similar to a compass allowing a launcher operator to find their primary target line and azimuth in degrees. Once the operator properly orientates the equipment, the location is recorded in a military reference grid system format that is given to the ECS to be manually entered into the system. In the event that GPS communications is restored after manual emplacement, the ECS will receive the location data from the DAGRs located on the equipment and automatically update them in the system. The operator will be notified via an on-screen message. Though the process of manual emplacement is a lost art among the force today, it is still a requirement for battery gunnery tables that certify the crews and operators on their assigned equipment.

Even with the advancements of air defense artillery equipment, it is crucial for air defenders to maintain analog knowledge due to the uncertainty and unpredictability of future operational environments. Through continued advancements and implementation of realistic training, these Soldiers will increase mission lethality as an air and missile defense cross-functional team. Training such as this allows the United States military to remain fully mission capable for any scenario that is presented in the next first battle.

Thompson is an air defense officer (14A) with D/1-7th ADA. He serves as a platoon leader and tactical control officer for the Patriot Air Defense system. The Panther Battalion recently returned from operations on the Arabian Peninsula, where they successfully provided air defense for critical geopolitical assets.

Soldiers from 108th Air Defense Artillery emplace a OE-349 Antenna Mast Group. (Staff Sgt. John Healy/U.S. Army)

"Message to Garcia"

Still relevant read for leaders

By Lt. Col. Seth G. Hall and Sgt. 1st Class Carl W. Lanier

Written in 1899, Elbert Hubbard's "Message to Garcia" has become a staple on commandants' reading lists and used in countless leader professional development exercises across the Army. If you have not read it or have not read it lately, it is worth your time. Briefly, before the Spanish-American War, President William McKinley needed a message delivered to the Cuban insurgent leader, Gen. García, who was operating somewhere in the Cuban mountains. 1st Lt. Andrew Summers Rowan was recommended for the arduous task, which he accomplished, forthwith. Throughout the essay, Hubbard champions the fact that when called upon Rowan accepted and executed the daunting task without asking for details such as 'where is García' or 'how should I get there.' Hubbard highlights that when given a somewhat ambiguous task, nine out of 10 others will not set themselves to accomplishing the task without asking a multitude of follow-up questions.

Invariably, during a well-intentioned leaders' professional development session, a facilitator asks, 'how do we create Soldiers who will carry the "Message to Garcia," and the group brainstorms this topic. There is nothing inherently wrong with the question; our Army needs Soldiers of every rank who accomplish difficult missions given minimal guidance. Army leadership thought this concept was so important that Training and Doctrine Command dedicated an entire manual, ADP 6.0 Mission Command, to outlining and defining these principles. Rowan's actions should be lauded and emulated. Of course, when given a task, all of us should

'promptly concentrate [our] energies; do the thing.' However, Rowan is not the only one whose actions, or lack of action, played a part in this important mission succeeding. Although at first read he seems like a minor footnote to the story, consider two critical actions taken by President McKinley and how each directly contributed to Rowan's successful mission.

First, McKinley trusted the recommendation of his staff. "There's a fellow by the name of Rowan who will find Garcia for you, if anybody can." This point is not insignificant. That recommendation means McKinley had created a culture where people felt comfortable enough to speak up and offer solutions to complex problems. Furthermore, the culture was such that people felt invested in the organization's success. The size of the organization and the importance of its mission are irrelevant. If people are not confident that their opinions are trusted and valued, they will not be emotionally invested in the organization's success and will not contribute to potential solutions. A characteristic of the 'leads' competency is building trust. One of the ways McKinley led his organization was by establishing trusting relationships with his team members. All six principals of Mission Command are essential; however, the first principle, build cohesive teams through mutual trust, is the most critical. A leader must trust his or her subordinates. Likewise, subordinates must trust their leader. This mutual trust is earned through actions, well-researched recommendations and sound decisions, are key elements. Leaders constantly and consistently cultivate trust with subordinates; with each good decision trust grows and with each false decision trust diminishes. It is important to note that a leader's genuine decisions can be incorrect and, if handled correctly, the trust may still grow, provided the error is not immoral, illegal or unethical and the leader immediately takes responsibility and remediates the incorrect decision. However, the best condition for growing trust between leader and led is for correct decisions to be made. This is as true today as it was in McKinley's and Rowan's time.

In 2019, an article titled "Mission Command Critical for a Winning Army," Gen. Stephen J. Townsend, commander, U.S. Army Training and Doctrine, said that "[exercising Mission Command] is the only way to lead a winning Army." Townsend goes on to speak about the importance of trust between the leader and the led. This trust is not free; it is not instantly presumed by the rank on an individual's chest. Instead, trust must be grown; growth through countless human interactions between Soldiers.

Second, McKinley gave Rowan the task and allowed his subordinates' resourcefulness to meet his intent without the burden of micromanagement. The last mention of McKinley states, 'McKinley gave Rowan a letter to be delivered to Garcia…' Again, McKinley demonstrated trust in a subordinate, but this trust went beyond that of accepting a recommendation. This time, he trusted Rowan to accomplish a task critical to the war effort; McKinley deserves a great deal of credit for this decision. Cynics may claim that McKinley's actions did not display trust in Rowan. Rather, he simply lacked the technology necessary to check in on Rowan's progress once the mission began. We find this unlikely. Nothing in the text suggests that McKinley desired to monitor Rowan's progress minute by minute that was only bridled by his inability to do so and blaming technology's ability to micromanage excuses the micromanaging leader's toxic actions.

On the contrary, McKinley was exercising Mission Command to the fullest when the stakes were highest. He "provided his subordinate with his intent, the purpose of the operation, the key tasks, the desired end state and resources. Subordinates [Rowan] then exercise disciplined initiative to respond to unanticipated problems."

Mission Command is doctrinal, and leaders at all levels agree our Army should operate this way, why then don't Soldiers "believe that we, as an Army, are consistently practicing the principles of Mission Command?" That question goes beyond the scope of the article, but we challenge others to explore and answer it. Perhaps, and this is purely speculative, Soldiers do not believe our Army consistently practices Mission Command because leaders prefer to operate with more autonomy from superiors then they are comfortable giving to subordinates.

In conclusion, when evaluated with a fresh perspective, Message to Garcia continues to inform leaders, extolling time-honored, leadership values with 'new' names, like Mission Command. Commanders advantage their units and themselves when they choose to follow McKinley's example to cultivate a culture of trust and to resist the urge to micromanage. Leaders must capitalize on their most valuable assets, other leaders. If leaders commit to this, they will create a culture that effectively frames problems, understands commander's intent and takes action to achieve desired end states.

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Sgt. 1st Class Carl W. Lanier is a fire support NCO currently serving as a fire support OC/T. He is completing his Emergency Management and Homeland Security Degree from Post University, and is a veteran of Iraq and Afghanistan. In 2005 Lanier served as an assistant squadron fire support NCO working with Lt. Col. Seth Hall, which was the most memorable deployment of his career.

Radar survivability and synchronization for the 82nd Airborne Division WFX 19-03

By Warrant Officer Donald "Trey" Nicholson

This article discusses radar force protection in the 82nd Airborne Division's Warfighter (WFX) 19-03. Specifically, I recount our radar protection plan and tactics, techniques and procedures (TTP) that resulted. This information is valuable to all who execute the counterfire fight and appreciate the critical role counterbattery radars play on the modern battlefield.

The 82nd Division Artillery (DIVARTY), in its role as counterfire headquarters, was reinforced by the 45th FA Brigade throughout the operation. To centralize facilitation of counterfire operations, all 12 AN/TPQ-53 radars belonging to both the division and the reinforcing FA brigade were controlled within the DIVARTY work cell, located at the Fort Bragg Mission Training Complex (MTC). Proper training, practice and rehearsal in operating the MTC's Battle Simulation Work Station (BSWS) to accurately portray execution of operations should not be an afterthought. In fact, it is central to the successful execution of simulated operations in the field.

Capitalizing on the lessons learned from our and other Warfighters exercises, the DIVARTY counterfire team devised a force protection package to enhance survivability and refined TTPs for fighting the enemy.

Survivability

Survivability starts with dedication of supporting assets. Due to their vulnerability and critical importance for mission success, Q-53 radars require a dedicated force protection element. To accomplish 24-hour, continuous operations, each radar was task organized an infantry team, equipped with a High Mobility Multi-Purpose Wheeled Vehicle (HMMWV), four infantryman with M-4s small arms, and one mounted M240B or M2 .50 caliber weapon. Each force protection element was under tactical control (TACON) command authority of each Q-53 and was physically controlled by the same BSWS operators that controlled the radars, for unity of command.

Engineer support is also a critical element for radar survivability. Each radar was provided one engineer team, with D7R Dozer, also TACON. This support relationship enabled expedited survivability moves and virtually guaranteed prepared defensive positions (PDP) at all radar sites.

Radar survivability moves were conducted continuously, throughout the WFX. Whenever indirect fire was received within a position area for artillery (PAA), or enemy unmanned aerial systems (UAS) were observed, or eight minutes of accumulated radiation time had elapsed, a survivability move was initiated. Movement distances ranged from 500m to 2K. Though three Q-53s were requested to cover the division's area of operation at all times, we determined that two radars could effectively provide frontal coverage, which provided the remainder of the division's radars greater time and opportunity to conduct movements in support of future operations.

Within the MTC DIVARTY work cell, all 12 Q-53s with supporting TACON elements were consolidated onto two BSWSs. The stations were configured side-by-side with an MOS 13R Soldier manning each station, an MOS 13R NCO on each of two shifts and the target acquisition platoon leader warrant officer as officer-in-charge. This essentially split the responsibility of movement and survivability in half and became much more manageable. This consolidation also allowed for radar deployment orders to be pushed to all radars through two systems instead of 12; which in turn, expedited movement orders, cueing schedules and zone management.

Fighting the enemy

Ultimately, the point of survivability is to live to fight another day. To that end, we developed the following checklist, to help us and you better prosecute the counterfire and counterbattery fight, both in the field and in a mission command training facility:

1. Consolidate all radars being controlled during the battle under two stations within the same cell. Make the officer in charge a field artillery warrant officer and the executors MOS 13R Soldiers, with a high-speed NCOIC. Controlling 12 x Q-53s, with 12 x decoys and supporting security and engineer elements can become overwhelming for one station. For WFX 19-03, we employed two stations in the mission training center, side-by-side, with an MOS 13R Soldier at each station and an NCO supervising each shift.
2. Ensure Q-53 radars always occupy a PDP. With an engineer asset supporting each radar, occupying PDPs became a simple task. Prior to every movement, the supporting engineer asset was sent to the next planned position, with the task of building two PDPs (one for the Q-53 and one for a decoy constructed to mirror a decoy system in the field).
3. Avoid merging the radar, decoy, security and engineers into one unit, within BSWS – a les-

son we learned the hard way. Within BSWS, if the enemy engages a merged team, only the four-man crew of 13Rs operating the Q-53 would engage the enemy, using only organic M4s. This is a system flaw. On the other hand, if radar, decoy, security and engineer elements are separated, the infantry security is free to also engage the enemy, using M240s and M2 .50cal weapons. This TTP more realistically replicates the training audiences' fight.

4. Once located in a PDP within a PAA, the infantry security should be tasked with conducting reconnaissance or providing security within the PAA. Without giving the security element a task, that infantry team will simply default to "occupy assembly area" mode and do nothing.
5. The engineers complement should always be digging PDPs, in accordance with the primary, alternate, contingency, emergency plan. Once a Q-53 and decoy occupy a PDP, engineers should be immediately tasked with digging an alternate PDP, then a PDP in the next planned PAA.
6. Team rehearsals in the mission command training center are as important as those in the field (and should be synchronized). Our 13R Soldiers, NCOs and warrant officer were identified a month in advance and began training on the BSWS two weeks prior to exercise execution. This enabled the controllers to familiarize themselves with the system and learn how to properly operate all the elements associated with and supporting the radars. This also built the leader confidence necessary to enable the OIC to handle the logistics and communicate effectively with higher headquarters, both in the mission command training center and in the field.
7. Whichever Fires headquarters serves as the counterfire headquarters (for us, it was the DIVARTY; for you, it may be an FA brigade), the logistics are handled through the S4. The S4 must track and satisfy the logistical requirements of the security and mobility elements, as well as those of the radars. Infantry security elements require periodic Class V resupply and infantry and engineer elements require constant Class III resupply.
8. The best defense is an aggressive offense. When enemy were identified, infantry security teams were immediately directed to attack the enemy, if the force ratio was appropriate. If a radar was destroyed, its surviving attachments (infantry, engineer and decoy) were reassigned to other surviving radars, until a replacement radar could be reconstituted.
9. Maneuver brigade combat team (BCT) control cells are typically located elsewhere in the mission command training center, but movement of FA elements, including supporting radars, requires detailed communication. Maneuver BCTs can share their "route overlay" with the radar control cell, through BSWS. This eliminates guess work associated with movement. When moving radars and associated elements, consult the order of movement table in the operations order, which will facilitate maximum security and survivability throughout the operation.

A CH-47 helicopter flies over a Q-53 radar. (Courtesy photo)

When supporting the Warfighter training audience, the BSWS should be considered the operational environment (OE) for Soldiers in the mission command training center. As with all fights, the OE is continuously evolving. It is not "gameism" mentality to prepare to support the training audience through home station mission command training centers; it is embracing the OE. Proper train-up, rehearsal and an emphasis on force protection will lead to success in your next Warfighter exercise.

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Expeditionary Fires
Air defense on the move

By 1st Lt. Nicholas Culbert

This past November, we celebrated the 100th anniversary of the end of the First World War, a war which is infamous for its horrendous death tolls as well as static trench warfare tactics. As the Army reflects on warfare of the present day, we can see many parallels to warfare 100 years ago.

The past 15 years have been characterized by counter insurgency operations centered around fortified bases of operations across the Middle East. Now as the Department of Defense shifts its focus to near-peer threats from Russia and China, air defense units must be prepared to once again provide protective Fires to maneuver units and critical assets in a mobile war with fluid battle lines.

The activation of the 5th Battalion, 4th Air Defense Artillery Regiment in Ansbach, Germany, on Nov. 28, 2018, was a momentous occasion for United States European Command as well as the Air Defense Artillery branch. It marks a resurgence of the Maneuver Short-Range Air Defense (M-SHORAD) mission in support of U.S. Army maneuver forces. Symbolically, 5-4th ADA's re-activation represents the heart and soul of the Air Defense Artillery mission, which as defined by the Army, is "to protect the force and selected geopolitical assets from aerial attack, missile attack and surveillance."[1] This is further defined by maximum protection of U.S. forces, something which in a mobile war, cannot be done by remaining comfortably behind the lines in a fixed location.

The Army's M-SHORAD plat-

Top: An artist's conception of a Mobile Short-Range Air Defense System. (Courtesy illustration)
Bottom: A set of three Army Patriot missile launchers stand ready to defend the 380th Air Expeditionary Wing against airborne threats at an undisclosed location in Southwest Asia. The Patriot Air and Missile Defense System is just one component planned for the future Qatar Air and Missile Defense Operations Center. (Senior Master Sgt. Eric Peterson/U.S. Air Force)

1 *United States. United States Army. Army Publishing Directorate. Army Publishing Directorate. Nov. 2, 2015. Accessed Dec. 8, 2018. https://armypubs.army.mil/epubs/DR_pubs/DR_c/pdf/web/fm3_01.pdf.*

Spc. Matthew Williams, a cavalry scout assigned to 2nd Cavalry Regiment, fires a Stinger missile using Man-Portable Air Defense Systems during Artemis Strike, a live fire-exercise at the NATO Missile Firing Installation at Crete, Greece, Nov. 6, 2017. (Sgt. 1st Class Jason Epperson/U.S. Army)

form hosts a robust variety of combat capabilities from the latest generation of infrared homing and radar guided missiles, to onboard radars and a 30 mm cannon.

This newly designed Stryker's tools are designed to provide close fire support and air defense protection for infantry and armor troops in close combat with the enemy. In the same formation as these new vehicles will be man-portable air-defense systems (MANPADS) batteries. These units will be comprised of dismounted Soldiers with shoulder-mounted anti-aircraft weapons embedded with infantry and ground forces to help better seize and hold terrain.

In the coming years, all across the globe, we can expect numerous more battalions like 5-4th ADA to be stood up.[2] This renewed capability is integral to the air defense employment guidelines of defense in depth, overlapping Fires and mutual support. Unfortunately, there is not one air defense system that can do everything. For this reason, it is critical that we build a network of systems with complimentary capabilities which support one another and defend the force. As we strive towards this goal of integrating M-SHORAD units with the maneuver force, we must also stress the already organic expeditionary capability of other air defense systems.

A culture shift within the Army's high to medium ranged air defense (HIMAD) forces must occur. Units like 108th Air Defense Artillery Brigade have already begun a transformation centered on expeditionary operations and a 24/7 tactical mindset. This flexibility is crucial in order to appropriately defend critical assets at the strategic level, like division or corps headquarters; whose locations will, during a war with near-peer competitors, most certainly ebb and flow with the front line.

A vast compliment of air defense systems and units on the modern battlefield will help enable victory for U.S. forces and deter aggression from America's adversaries. While other parts of the Army re-organize themselves to better protect the nation, the Air Defense Artillery Branch is no exception. By modernizing our weapon systems and transforming our culture, we will always remain "First to Fire" in defense of liberty.

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2 *Judson, Jen. "US Army's Interim Short-range Air Defense Solution Crystallizes." Defense News. June 29, 2018. Accessed Dec. 8, 2018. https://www.defensenews.com/land/2018/06/28/us-armys-interim-short-range-air-defense-solution-crystallizes/.*

A U.S. Army Terminal High Altitude Area Defense (THAAD) launching station sits at the ready in Israel, March 4, 2019. The deployment of a THAAD System to Israel is an exercise involving U.S. Army, U.S. Air Force and Israeli forces, under the Dynamic Force Employment concept. The exercise builds readiness and interoperability in the region, demonstrates the U.S. capability to rapidly deploy air defense assets globally, and demonstrates U.S. Army Europe's mission to deter potential adversaries and support allies. (Staff Sgt. Cory D. Payne/U.S. Air Force)

Factors of success in ADA Global Force Projection

Dynamic Force Employment Concept

By 1st Lt. Michael Davis

An air defense unit deployed under the Department of Defense's Dynamic Force Employment Concept (DFE) for the first time in early March 2019. This deployment was the first of what surely will be many for America's units with strategic air and missile defense capabilities. This essay highlight's air defense's role in the DoD's new DFE concept and identifies the factors that made this deployment successful for B Battery, 2nd Air Defense Artillery Terminal High Altitude Area Defense (THAAD).

According to the Department of Defense's 2018 National Defense Strategy, the DFE concept calls for a more rapid and unpredictable deployment of forces around the world. The National Defense Strategy lays out a deliberate approach to force posture that is designed specifically to address global competition against China and Russia. The strategy relies on posturing the force to reflect the strategic priorities of the U.S., and wielding that force dynamically to deter global competitors and regional aggressors. As concern of missile use prevalence from both China and Russia evolves, coupled with threats in the Arabian Peninsula and Iran, air and

missile defense's relevance takes center stage. Many actors can now field a broad arsenal of advanced missiles prompting the decision to rapidly incorporate U.S. air defense capabilities and systems. As part of perhaps the highest profile DFE modeled mission so far for U.S. Army, 11th Air Defense Artillery Brigade deployed a THAAD battery to Israel. The deployment was true to the stratagem by being operationally unpredictable. The successful deployment of THAAD system's in Israel was made possible by an excellent combination that involved adherence to the Sustainment Readiness Model (SRM), expert battery leadership, and focused training on unit movement operations (UMO).

B-2nd ADA's mobilization was a far cry from the norm principally because of its departure from the predictable rotational schedule inlaid in the Army SRM. B-2nd ADA faced many challenges, chiefly the issue of time. Typically, units receive their orders to deploy months in advance, yet Imperial Brigade's adherence to the DFE concept directed that B-2nd ADA's mobilization be reduced to 45 days. In stride, B-2nd ADA was able to meet the Army SRM's guidelines for mobilization in the train/ready cycle well before its actual call to arms. B-2nd ADA achieved a baseline level of decisive action proficiency and ability to deploy in an extremely compressed timeline. The unit relied heavily on the use of Army-wide processes such as Emergency Deployment Readiness Exercises (EDREs). These EDREs made the unit eligible to be certified by quickly meeting several requirements that included pre-deployment training, gear staging and the initial steps toward unit movement operations. Additionally, B-2nd's training posture was in-line with the Army's train/ready cycle which smoothly facilitated the unit's transition through both bureaucratic and logistical hurdles that could have potentially crippled its mobilization.

Implementation of mission command by capable leaders was a central force for 11th Brigade's ability to dispatch a THAAD battery autonomously in theater. As a seasoned commander, B-2nd ADA's battery commander, Capt. Samuel Baldwin capitalized on the wealth of knowledge at hand from experienced warrant officers and within the enlisted ranks to direct the movement of his Soldiers, equipment and supplies in a considerably short time frame with zero issues. Only through his ability to provide purpose, direction and motivation to his troops was this feat remotely possible. Following the initial receipt of orders to deploy, B-2nd ADA's leadership initiated focused-training for air, sea, rail, port operations and in-stream unloading. He also provided expert guidance that synchronized the various personnel, sections and agencies to the unit's compressed movement timeline.

B-2nd ADA had a simple unit movement process for its rapid deployment. This was made possible exclusively because of the established systems afforded by Fort Bliss' robust mobilization infrastructure. Fort Bliss holds the distinction of being one out of the only two Mobilization Force Generation Installations (MFGI) in the United States. B-2nd ADA made great use of its facilities to take advantage of its mobilization stations to conduct its pre-mobilization training to prepare Soldiers for the pending deployment. Soldiers appointed for unit movement operations went into action to spearhead the bulk of the processes that included internal unit inspections, documentation of the battery's rolling stock and containers as well as familiarization with the specialized air assets needed for specific THAAD equipment movement. UMO's also performed the roles of liaisons within Fort Bliss' mobilization and deployment division as they utilized their civilian counterparts' logistical and administrative support to streamline Soldier readiness processing requirements, Rapid Fielding Initiative and unit transportation requirements. B-2nd ADA's use of Army doctrine, regulations and UMO techniques complimented by EDRES and other deployment systems allowed the rehearsal of movement which in-turn enforced processes that made the deployment easier.

The THAAD system's deployment to Israel capped a stunning finale brought to fruition exclusively by a series of calculated moves that included handpicked commanders, around-the-clock communication and semi-autonomous agency by the B-2nd ADA (THAAD) battery leadership. The Department of Defense's DFE concept was designed to showcase the military's agility to react to potential adversaries. In a contemporary sense, B-2nd ADA's ability to mobilize and deploy when called upon provides an example of the legitimate expectations of the DoD for units' capabilities in accordance with modules of the SRM. Staunch leadership and the ability to coordinate, synchronize and resource at the unit level is the benchmark that is expected of all service members in command positions. B-2nd ADA was successful exclusively because of its expert use of mission command and adherence to the SRM that drove focused training for pre-deployment and the overall mission at hand. The 11th ADA Brigade is indeed the most deployed and largest air defense organization in the world and its' ability to support contingent operations that require operational defensive coverage is noteworthy as a result of B-2nd ADA's accomplishment. Eleventh ADA Brigade has been steadfast in the dynamic force employment and readiness of Patriot and THAAD weapon systems whenever the need arises.

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5th BCD reimagines liaison to the Air Force intelligence, surveillance and reconnaissance community

By Capt. Robert Vadney

The 5th Battlefield Coordination Detachment has the distinction of owning all four of the Army's Reconnaissance Liaison Detachments designed to support the Air Force's medium-altitude remotely piloted aircraft (RPA) intelligence, surveillance and reconnaissance (ISR) enterprise. Each RLD is comprised of a military intelligence sergeant 1st class and a captain who has completed his key developmental position charged with integrating Army and Air Force intelligence efforts. As the Air Force continues to grow and evolve this capability, the BCD must keep pace or risk finding itself in an unfavorable position to integrate a capability that is on the cutting edge of warfare.

With this objective in mind, 5th BCD is moving ahead with a two-part plan to modernize its liaison support to the Air Force ISR enterprise: first, we are renaming the RLDs to intelligence support to targeting detachments (ISTD), and moving them from the MQ-9 flying squadrons to the intelligence producing elements called distributed ground stations (DGS); second, we are recommending that the ground liaison detachments be moved from the MQ-9 Squadron up to the group level in order to make the best use of limited Ground Liaison Detachment (GLD) personnel. This move will ensure that aircrews continue to receive proper air to ground integration support, and open up a new realm of intelligence and targeting integration between a powerful Air Force ISR structure and Army units on the ground.

To understand this realignment, we need to provide some background on the aircraft and the organization built to support its unique capabilities and demands. Initially the medium altitude RPA ISR capability existed as reconnaissance squadrons – hence the name Reconnaissance Liaison Detachment – equipped with unarmed MQ-1B Predators. As the strengths of the RPA in counterinsurgency operations were realized, it was upgraded to carry ordinance, and eventually redesigned entirely to become the MQ-9 Reaper that exists today. And while the Army now flies the MQ-1C, the MQ-1B was retired from active duty Air Force service last year, leaving only the MQ-9.

All active duty MQ-9 Squadrons are now designated as attack squadrons instead of reconnaissance squadrons, reflecting the expanded mission set and focus on what the Air Force dubs "Persistent Attack and Reconnaissance." This shift in focus towards attack means that the MQ-9 Squadron itself is mostly concerned with flying the aircraft and employing its weapons, leaving the ISR functions to the DGS and

A U.S. Air Force MQ-9 Reaper flies during Red Flag-Alaska 19-2, June 19, 2019, at Eielson Air Force Base, Alaska. (Senior Airman Daniel Snider/U.S. Air Force)

the supported unit's collection managers. This means that the flying squadron's needs are now best fulfilled by the FA personnel in the more traditional GLD; just like other attack wings have relied upon for decades to assist them with air-to-ground integration.

The "MQ-9 Enterprise" as it is often called, functions as three separate pieces operating in concert in what is known as Remote-Split Operations (RSO). The first piece is the Launch and Recovery Element: a forward deployed squadron that launches and lands the aircraft with line-of-sight controls and handles things like maintenance and ordinance. The second piece is the Mission Control Element (MCE) – what is typically thought of as the actual flying squadron – which flies the sortie via satellite communications from ground control stations scattered around the continental U.S. The MCE has multiple sets of pilots and sensor operators who fly the aircraft in shifts over its 20 plus hour sortie. The third element is less commonly thought of as being part of RSO, but is the focus of our shift in liaison support – the DGS.

Each of the primary DGS is an intelligence group, like an MI brigade, that is part of a larger system called the Distributed Common Ground System which does all the processing, exploitation, and dissemination (PED) for Air Force ISR assets across the globe. This includes MQ-9 full-motion video (FMV), high altitude imagery (U-2 and RQ-4), as well as the spectrum of sensor packages carried by RPAs.

The Air Force does not let a single MQ-9 fly without analysts monitoring the FMV feed, or other sensors, who are qualified to identify objects or events detected during the sortie. Screeners are the only ones allowed to make "callouts" in the internet relay chat window to the supported unit, neither the pilot nor sensor operator are qualified to do so. These screeners are responsible for answering the supported

unit's essential elements of information, and producing the end of mission products they requested. Also on the same operations floor, but separate from the PED cell, each DGS has an Analysis and Reporting Team (DART) that is concerned with fusing multiple sources of intelligence to answer specific questions for supported units.

Each DART receives an area of focus within their designated theater from the reconnaissance, surveillance and target acquisition annex of the ATO. The fusion lead then directs work on requests for information it receives through the Geospatial Enterprise TPED System, or other requirements directed by the DGS commander for the Air Component or other organization.

If you're still reading this, I assume it's because you are starting to realize the implications for intelligence sharing and targeting support that these DGS have the potential to provide. Few Army units understand the vast array of sensor packages that an MQ-9 can be outfitted with, or that it comes with the support of what is basically an MI brigade on the back end to help them pursue targets by filling intelligence gaps and fusing intelligence from across the network of Air Force intelligence systems. Currently, the DGS is poorly connected to ground units, and is therefore an underutilized resource for the ground force commander. With the movement of Army Intelligence personnel from the MCE to the DGS, ground forces gain an advocate and facilitator who can help them ask the right questions and receive better products sooner.

I'll give you an example. About a year ago, when we first started to explore the possibility of moving the RLDs to the DGS, we sent a reconnaissance liaison officer (RLO) down to one of the primary DGS sites for three weeks to identify possible areas to support. This DGS had recently been assigned specific "time-dominant problems" as a fusion focus for the air component. The DGS was obviously aware that ground forces were working in the area, but were unsure who they were and what their mission was. The RLO contacted the ground unit's intelligence and targeting cells and in one afternoon pulled the ground unit's intelligence picture and targeting priorities. This enabled the DGS to understand what the unit was trying to accomplish, what they already knew, and what their intelligence gaps were, in order to determine what kinds of information would be pertinent to their mission.

Over the next three weeks, the DGS produced six major packages of intelligence for the unit, not just on their known intelligence gaps, but also on things that they did not even know existed. Having the ground unit's intelligence picture allowed the DART to confirm single source intelligence with sources from other types of intelligence, greatly strengthening some of their targeting packages. Much of what the DGS was able to provide to the ground unit was from within Air Force systems that were not easily queried by outside organizations due to network restrictions.

As with all intelligence, it's hard to quantify exactly how much this information helped the ground unit achieve their goals in the battlespace, but the RLO did help the DGS to confirm information they already had with second sources, and help them tap into intelligence that already existed within Air Force systems but would never have been discoverable by the ground unit otherwise.

The relationship the RLO helped to establish continued until the end of major operations in that area and the DGS was assigned to another. It's important to note that this relationship wasn't one that was specifically directed by the air operations center, but because an intelligence liaison was on hand to coordinate, an Army unit reaped very useful benefits. This kind of coordination was repeated several times over the last year as we continued to refine the concept.

With a solid proof of concept and concurrence from Fires Center of Excellence, Office of the Chief of Military Intelligence, the other BCDs, and United States Army Pacific Command; the 5th BCD is moving forward with the transformation of the RLD to ISTD. As the current RLD personnel stationed at Creech AFB are reassigned, the new ISTD positions will be filled at DGS-1 in Langley, Va., under the 4th BCD; DGS-2 at Beale AFB, Calif., under the 5th BCD; DGS-4 in Ramstein, Germany, under the 19th BCD; and DGS-5 in Joint Base Pearl Harbor-Hickam, Hawaii, also under the 5th BCD. The GLD at Creech will stay in place until the 12th Air Force Persistent Attack and Reconnaissance Operations Center moves bases to either Shaw AFB, S.C., or Tyndall AFB, Fla., in mid-2020. There is currently a GLD at DGS-1, owned by 4th BCD, who will be freed up to support another unit once the ISTD replaces it, and we are recommending that the 4th BCD send it to support the 25th Attack Group (MQ-9) at Shaw AFB who currently are without direct GLD support.

Since the Army just initiated a long overdue review of the Army-Air Force Liaison Memorandum of Agreement, now is the time for the BCD enterprise to reassess its liaison distribution to ensure that the right kinds of Air Force assets have the right kinds of support to ensure that the Army reaps the greatest benefits it can from the platforms it needs the most. This transformation is the right move to ensure the BCDs will be able to facilitate not only air-to-ground integration of the MQ-9, but also intelligence and targeting support from within the central hubs of the Air Force ISR enterprise.

Capt. Robert Vadney is an active duty field artillery officer who has served as a ground liaison officer to the 432nd Wing at Creech Air Force Base, Nev., since late 2016.

Converting the M992A2 into an FDC platform

By 1st Lt. Matthew Spearman

Shoot, move, and communicate. This is an adage all fire support personnel should be familiar with, but its importance remains indisputable. In 2018, 1st Battalion, 5th Field Artillery, 1st Armored Brigade Combat Team (ABCT), 1st Infantry Division, "Hamilton's Own," needed to find a dependable fire direction center (FDC) vehicle that was capable enough to maneuver with and support the newly delivered M109A7 Paladin system during robust field trials and exercises at Fort Riley, as well as National Training Center (NTC) Rotation 18-10. The FDC plays an integral part in the Fires warfighting function. FDC operations include, but are not limited to, safely processing firing data, establishing voice and digital communications with higher headquarters, and serving as a tactical level command node. These various functions of the FDC must be based on a durable, reliable and flexible platform. Currently, FDC operations are conducted out of the M1068A3 Standard Integrated Command Post vehicle. However, it is also well known that the M1068 has severe limitations operating on today's battlefield. This article will discuss the need for a new vehicle to replace the M1068A3 as an FDC platform and provide some insight on 1-5th FA's testing of the more reliable M992A2 Field Artillery Ammunition Supply Vehicle (FAASV) as an interim solution.

A 1960s platform in a 21st Century battlefield

The M1068 series has been in service since the early 1990s and continues to serve as the primary vehicle for mobile command posts and FDCs. However, the M1068 is merely a conversion kit upgrade on the original M113/M577 series of vehicles, whose technology dates back to the early 1960s. These vehicles have not received any significant mobility, armament or crew protection upgrades since their introduction nearly 60 years ago. Most importantly, the M1068A3 fails to provide basic internal nuclear, biological and chemical (NBC) protection. In addition to this lack of internal protection, the track commander (TC) has no way to maneuver the vehicle while the TC hatch is closed due to a lack of external optics.

Furthermore, the substantial maintenance requirements of the M1068A3 continue to be a significant concern to the operational readiness and combat effectiveness of a firing battery. During 1-5th FA's M109A7 Paladin Integrated Management (PIM) fielding in early 2018, one FDC section needed to use five different M1068A3 vehicles, in the span of three months, because of non-operator level mechanical issues. Leading up to and through NTC 18-10, the operational readiness level of the M1068A3 fleet throughout 1st ABCT, 1st ID was of great concern to the tactical and operational commanders. Throughout NTC 18-10, 1-5th FA was only able to sustain two of its 10 M1068A3s; an eye-opening weakness of the battalion's inability to provide fire direction on its organic platform. This inability to rely upon the M1068A3 directly affected the capability of the firing batteries to displace quickly and maintain effective communication with a higher headquarters. These maintenance issues forced the firing batteries to use FAASVs to tow the inoperable M1068A3 vehicles, subsequently taking ammunition supply vehicles out of the fight, and in some cases, utilizing HMMWVs as an emergency solution to maintain some fire direction capability.

Finding a replacement

The development of a next generation FDC vehicle is directly related to two of the Army's six modernization priorities: Long-Range Precision Fires and the Next Generation Combat Vehicle. An improved FDC vehicle should also possess multi-domain capabilities and support future Army network systems. Through the Extended Range Cannon Artillery (ERCA) program, the Army has invested in the future strategic and tactical capabilities of the Fires community. However, there can be no effects on target if the FDC sections are non-mission capable due to maintenance issues, survivability concerns or an inability to maneuver at the pace required by other battlefield systems. While the Army has focused heavily on the "shoot" side of the Fires equation, equal emphasis should be placed on "move and communicate" (sensor and processing). In order to explore temporary solutions to this problem, 1-5th FA made the decision to convert surplus M992A2 FAASVs, which were recently replaced by the M992A3, into FDC vehicles in preparation for NTC Rotation 18-10.

The M992A2 FDCV received extraordinary praise from both operators and observer controller trainers (OC/T) during the NTC

An M992A2 during the reconfiguration process. (Courtesy photo)

rotation. It proved to be an exceedingly dependable platform during high-tempo operations. The M992A2 FDCVs experienced significantly less maintenance issues compared to the battalion's M1068 fleet. From a targeting perspective, the M992A2 FDCV was able to maintain a tactical profile while maneuvering behind howitzer sections, limiting the chance of enemy observation and detection. This is especially important since FDC vehicles are a high priority target for enemy Fires. The M992A2 FDCV's similarities to the M992A3 CAT make it indistinguishable on the battlefield allowing it to stay hidden in plain sight. The M992 platform also allows the FDC the ability to better secure their own position with a mounted heavy weapons systems, which the M1068A3 does not offer.

The desire to find a replacement to the M1068A3 as an FDC vehicle has actually been done before. In the 1996-1997 timeframe, 4-42nd FA, operating as part of Task Force XXI (TF XXI), converted M992 vehicles into Platoon Operation Centers, which combined the functions of an FDC with advanced command and control capabilities. The performance of 4-42nd FA's FDC-Vs during a series of advanced warfighting experiments, culminating with an NTC rotation, mirrored those of 1-5th FA: the FDC-V was the superior platform regarding mobility, reliability, and communication. Although the Army has a new command post M113/M1068 replacement program in development, the M992A2 offers a simple and quick replacement to the meager M1068A3 and can rapidly fill the capabilities gap in the interim until the new platform is in place.

The M992 FDCV Loadout plan

The M992's modular internal design offers the space and potential to function as a modern FDC

platform. The 1-5th FA removed the ammo racks, and hand-made desks and shelving units were installed (see Figure 1). The only major external modification required is installing a 24V DC/1800-watt power inverter to power the AFATDS, internal lights, and other optional electronics.

The figures illustrate the internal (Figure 1) and external (Figure 2) loadout plans for the M992A2 FDCV.

In addition, it is believed that installation of a Quick Erect Antenna Mast System (QEAM) and High Frequency (HF) transceiver and antenna would greatly expedite establishing long range communications capabilities. However, these desired modifications were not possible in the short term. Safely attaching the QEAM antenna and HF radio components to the exterior of the vehicle would require approval to drill into the armor, a lengthy process that requires approval from division headquarters. However, having these modifications approved is worthwhile. Providing the ability to provide high frequency, frequency modulation voice, and frequency modulation digital while moving is incredibly appealing to an FDC on the modern battlefield.

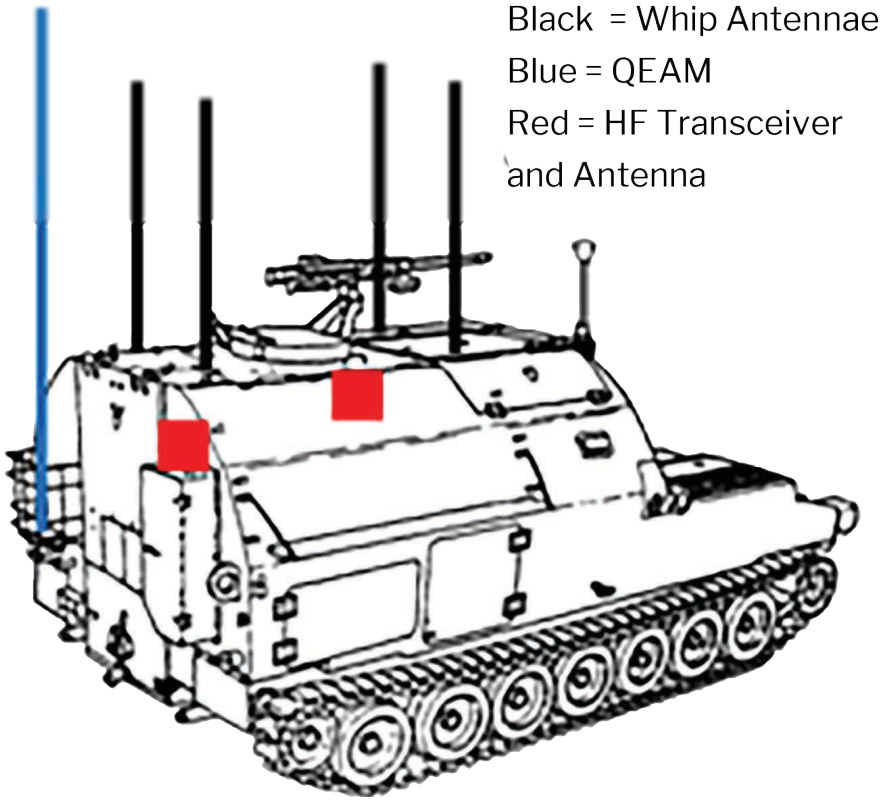
Looking to the future

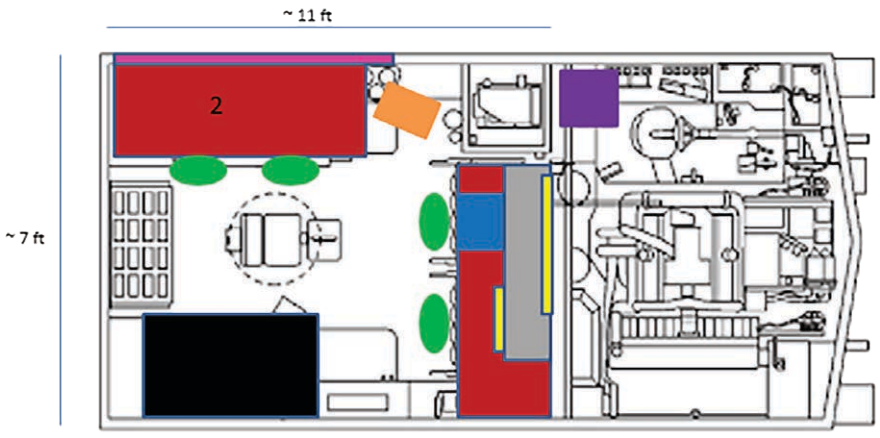
In January 2019, 1-5th FA rotated to Poland in support of Operation Atlantic Resolve and the decision has been made to continue the experiment of converting the M992 into a fully functional FDC platform.

Not only will this be the first rotational fielding of the M109A7s, but 1-5th FA will also have the opportunity to test and improve the M992A2 as a temporary replacement for the M1068A3. Due to the fielding of 18 M992A3 CATs, 1-5th FA is uniquely capable of testing this concept further because they currently have 18 M992A2's awaiting disposition. Now that they have developed a standard for transitioning the systems from ammunition supply vehicles to FDCVs, 1-5th FA is in position to prove the concept for the Army. It is hoped that this testing results in similar results to those found in TF XXI experiments, in which Soldiers from 4-42nd FA concluded there's no question in the minds of the crews who spent months operating and testing the vehicle: the FDC-V increases the [FDC's] ability to shoot, move and communicate with a Paladin platoon. If these lessons from the past hold true, then the future looks bright for the M992 as the FDCV for "Hamilton's Own."

1st Lt. Matthew Spearman is the battery executive officer for Alpha Battery, 1st Battalion, 5th Field Artillery, 1st Armored Brigade Combat Team, 1st Infantry Division. As the battery executive officer, he oversaw his battery's implementation of the M992A2 conversion into an FDCV. He graduated with a B.S. in Political Science from Clemson University.

Figure 1. (Top) The changes made to the communication equipment during the reconfiguration process. (Courtesy illustration)
Figure 2. (Bottom) The loadout plans for the M992A2 after reconfiguration for FDC operations. (Courtesy illustration)





An AN/MPQ-4 Sentinel Radar, which can provide 360-degree detection of airborne threats, can be integrated into Patriot architecture to improve capability against off-axis threats. (Photo courtesy of U.S. Army Acquisition Support Center)

Wide azimuth defense

Adapting Patriot operations to counter multi-axis threats

By Capt. Paul Spikes

Forward - deployed Patriot forces in Central Command are faced with threats from multiple actors and, as a result, multiple directions. Gone are the days of defending against attacks from a single, known adversary; Patriot battalions must be prepared to defend against attacks from all directions. First Battalion, 43rd Air Defense Artillery Regiment has responded to this challenge by pushing the system to its maximum directional capability. They have created a roadmap for providing maximum firepower against any and all threats, and concepts they have developed are influencing planners throughout the area of responsibility.

The 1-43rd ADA deployed to CENTCOM in 2018 to an environment that was rapidly evolving into a much more dangerous situation than previous units had experienced. New enemy capabilities emerged that threatened U.S. and coalition forces from multiple directions. Battalion leadership and tacticians quickly realized the traditional Patriot configuration had to be adapted to be effective in this new threat environment. After numerous simulations and site surveys, the solution focused on three areas: (1) site configuration and equipment layout; (2) mutual Fires support; and (3) integration of additional sensors. With all three aspects pushed to their limits, 1-43rd ADA has been able to provide maximum directional coverage without requiring an increase in system resources.

Site configuration and equipment layout

Through meticulous planning and simulations, 1-43rd ADA developed a site layout that ensured every enemy avenue of approach was defended redundantly, without sacrificing combat power against the primary threats. This was accomplished through a complete remodel of the traditional Patriot layout, which coincided with occupation of new fighting positions. With an eye on utilizing overlapping Fires and

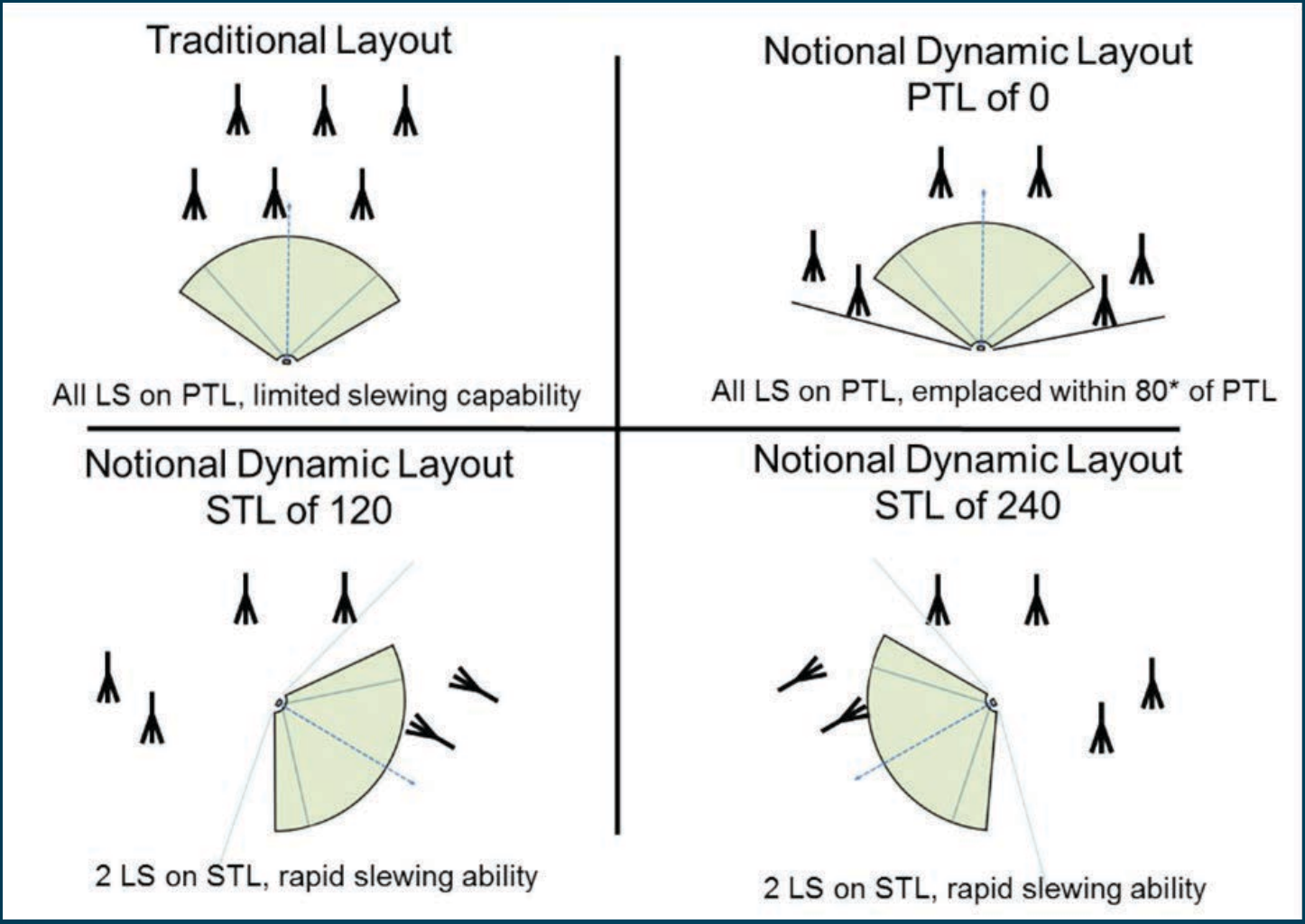


Figure 1. LS Emplacement Azimuths: A notional depiction of Patriot Launching Station layout options. When positioned within 80-degrees of the primary target line, the system can utilize the launcher's compliment of interceptors against an inbound threat. (Chief Warrant Officer 2 Ron Steeg/1-43rd ADA)

mutual support, "Cobra Strike" planners, led by Chief Warrant Officer 2 Ron Steeg and Sgt. 1st Class Jared Pointer, maximized the capabilities of the system with a revolutionary layout that takes advantage of Patriot's inherent versatility. Through careful and detailed analysis of threat capabilities and likely methods of attack, dozens of configurations were tested with the goal of having the most interceptors available in every situation.

Mutual Fires support

A single Patriot site, with innovative system emplacement, can provide capability in numerous directions. When collocated with a second fire unit, capability continues to multiply, with full 360-degree sectored coverage possible. Capabilities extend further than simply adding more target lines and a wider azimuth, however. Integrating the defense designs of both fire units into a single plan provides an opportunity to mass interceptors from both units against a single (i.e. most powerful/dangerous) threat while simultaneously covering against an off-azimuth avenue of approach. Here is another example of innovative site layout paying dividends: taking advantage of an adjacent unit's launching stations, two units may be arrayed such that one can control the preponderance of the other's launchers while the other guards against an alternate avenue of approach. If this avenue requires a much smaller number of interceptors to defend, that unit's other launching stations can be used in the fight against the deadlier, numerically superior and/or more critical threat.

External sensor integration

Patriot operations are no different than any other: they cannot, and should not, happen in a bubble. True wide-azimuth capability cannot be effective without integration of external sensors to close down any gaps and seams that may exist in coverage. This may seem to be a moot point in so many combatant commands, where Patriot operates in fixed locations and is surrounded by a litany of joint and coalition sensors. Concern grows when faced with a return to large-scale ground combat operations, which would likely require Patriot units moving con-

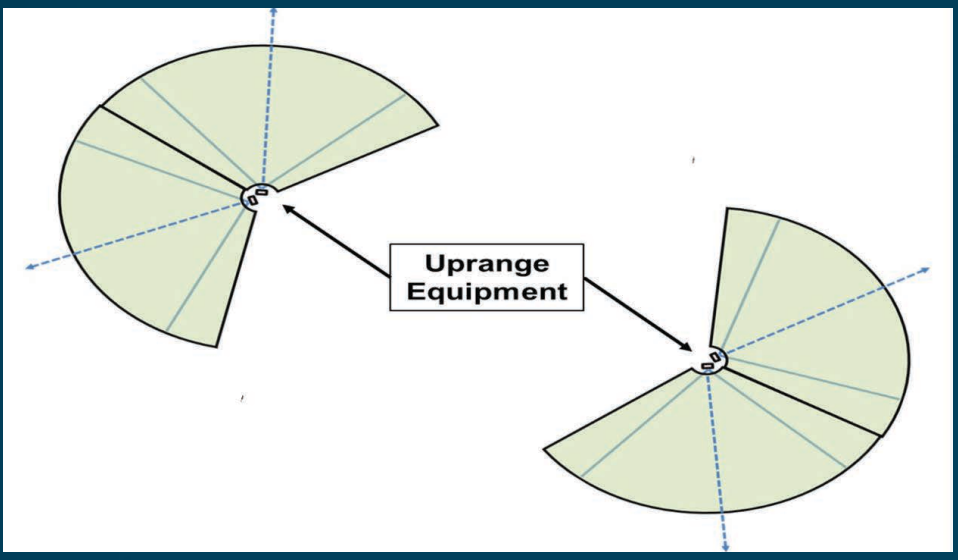


Figure 2. Mutually Supporting Fires: A notional depiction of two co-located Patriot firing batteries providing wide-azimuth defense. With proper planning, two fire units can provide sectored coverage against a threat from any azimuth. (Chief Warrant Officer 2 Ron Steeg/1-43rd ADA)

stantly, far away from the fixed sensors and robust communications architectures that provide such extensive early warning. It's been long assessed as necessary to improve the system in order to defeat 360-degree threats; the future Lower Tier Air and Missile Defense Sensor is projected to have continuous 360-degree coverage capability for this reason, but is still in the bidding phase and is over a year away from fielding.

The 1-43rd ADA's solution is to incorporate a Sentinel radar that can provide 360-degree coverage and can keep up with a unit on the move. Chief Warrant Officer 2 Travon Graves, 1-43rd ADA C2 systems integrator, developed the datalink architecture needed to integrate the Sentinel into the Patriot battalion mission command element. He said, "The Sentinel-Patriot integration is key to providing the all-axis early warning that makes our wide-azimuth design effective. Sentinel is the perfect system for this concept. It gives us the versatility and mobility needed in an uncertain operational environment, and is a perfect match for our systems."

Considerations

A site with this capability does require additional planning and meticulous preparation. "One of our biggest challenges was to mitigate all the safety hazards," said Pointer. "Establishing radiation and back-blast hazard areas is simple if you are facing a single direction. Operating on multiple azimuths at multiple times requires a complete site redesign. Roads, support equipment and work/life support facilities need to be carefully planned in order to keep the site safe. It required a lot of analysis to execute correctly."

Once in place, the final step was to build a plan to train and certify crews to operate the system in this configuration. Crew certification verifications, a theater-specific gunnery evaluation, were modified to incorporate all additional tasks while ensuring all existing Patriot requirements were met and standards enforced. Capt. Dennis "Chip" Stanford, commander of Alpha Battery, 1-43rd ADA, has overseen the daily operations of the new site configuration. Despite a system layout that has never been attempted in theater, his Soldiers have proven to be up to the task.

"Once our new site layout was implemented, expeditionary combat support and hot crew personnel created never-before-attempted tactics, techniques and procedures and standard operating procedures. Lieutenants and NCOs began to rewrite doctrine on a daily basis, refining how we exercised our new capabilities."

Way forward

The success of this new design has permeated throughout the branch. At the 32nd Army Air and Missile Defense Command Quarterly Tactics Review in January 2018, Brig. Gen. Clement Coward, commanding general, called on all CENTCOM Patriot units to consider threats from multiple azimuths and begin planning to counter them. The optimization of the Patriot layout by 1-43rd ADA to better defeat the evolving enemy situation has reinvigorated air and missile defense planning. As the U.S. returns to a national military strategy that focuses on great power competition with a near-peer competitor, predictability for future operations will be much less than the past 15 years.

"We won't be able to count on defending permanent assets, or, more importantly, defending against a fixed threat," said Maj. Daniel Goodwin, 1-43rd ADA operations officer in charge. "Now is the time to test the limits of the system and pass these lessons learned throughout the force."

By allowing planners to effectively detect and destroy threats from multiple azimuths, the Patriot system will prove to be an even more capable weapon system in any future conflict.

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Leveraging the virtual gaming network enabled maneuver and fire support elements to demonstrate their proficiency prior to live-fire exercises. (Courtesy photo)

A way to more efficiently train and certify fire supporters in a BCT

By Maj. Steven Huckleberry and Sgt. 1st Class Benjamin M. Block

Last year, several key leaders transitioned roles in the brigade combat team (BCT) Fires Cell and D Battery was deactivated just as the team was ramping up to conduct its bi-annual Fire Support Team (FIST) certification following a recent National Training Center rotation. The culmination of this FIST certification being a virtual Fires coordination exercise (FCX) in the virtual battlespace 3 (VBS3). Over the course of this certification, the new leadership noted a few items that warranted a reassessment and review of policies and procedures in an effort to make it a better process. First, there were several inefficiencies noted in the management of the program. This presented a throughput issue that challenged the fire supporters, given the diverse schedule of each task force and the number of hours it takes to conduct a proper certification. Second, the management and execution of the certification program reduced much of the responsibility inherent on subordinate level leaders to train and manage their formations. Not only did this diminish an exceptional opportunity to professionally develop these leaders before they assumed roles of greater re-

sponsibility, but it also reduced the opportunity for creative solutions to the time management issue. Third, there was very little investment by the maneuver commanders in the FCX, a critical component to Fire Support (FS) Tables III and IV. Their involvement varied across the formation, but ranged from sending only a handful of Soldiers with the company commander to a couple of lieutenants representing the entire unit. In the end, everyone worked through the friction but it took more time to complete than would be acceptable and sustainable in a more rigorous training schedule. In all, the certification took approximately eight weeks to accomplish, spread across three months.

First, we worked to develop a model that would provide a sustainable readiness for our FIST teams. Forward observer certification takes 12.5 hours for each fire support Soldier. Historically, most of this is conducted in the Call for Fire Trainer (CFFT). The CFFT most accessible to our brigade was capable of holding 15 Soldiers and evaluating one or two at a time. With a formation of over 100 fire supporters, certifying in this way could take over 150 working days to complete with one CFFT operating at eight hours a day. Additionally, the CFFT is limited to use during the working hours of 8 a.m to 4 p.m., Monday through Friday. Moreover, what was apparent is that once the brigade's tempo picked up, as it progressed in its training cycle, it would be unfeasible for all the brigade's fire supporters to be consolidated that long for certification. To combat this, we developed a sustainable readiness model that many would recognize as the R-A-G (Red-Amber-Green) cycle.

The goal for our internal Fire Support R-A-G cycle was to dedicate time and space for each of our battalion FS elements to conduct training and certification. We would do so by first tasking those organizations identified as red for support to FS specific requirements and, if necessary, secondly those teams identified as amber, in an effort to protect the task force identified as green. This afforded an opportunity for each battalion Fires element to focus on its collective training opportunities when it was green and focus on individual training opportunities while it was amber, before going "red" and serving to provide fire supporters for FA live Fires and other FS centric taskings that were not tied to their habitually supported maneuver battalion. With four battalion fire support elements, we developed two classifications of amber. The first month on amber equated to second in priority for tasking, while the second month on amber made a team third in priority, providing a predictable schedule in all but the most task-saturated months. This R-A-G cycle was carefully developed by reviewing the brigade and each maneuver battalion's long range training calendar to identify time periods in which each element's fire support teams must be trained, ready and available to support the appropriate collective training events and then balancing it against the needs of the artillery battalion.

Second, the disbanding of the battalion's D Battery, concurrent with execution of the certification, provided an opportunity to reassess the roles and responsibilities of key leaders and the management of our resources within the fire support community. While there is much value in the fire supporters returning to their Modified Table of Organization and Equipment headquarters of the battalion's HHB, it quickly became apparent that adding this many personnel, with such a diverse training schedule, to another complex formation tested the span of control for the HHB command team. In consideration of this issue, the fire support coordinator (FSCOORD) approved a new policy defining the duties and responsibilities at echelon for leaders of the fire supporters within our formation. It directed that the development and management of the R-A-G cycle was the task of the brigade Fires cell, providing training oversight of the battalion's fire support teams and reducing the burden upon the HHB command team. This was due, in part, because the brigade fire support officer (FSO) and fire support noncommissioned officer (FSNCO) were better positioned to maintain oversight of training events across the brigade. This also implied that the brigade FSO and FSNCO would have tasking authority over the subordinate fire supporters.

The policy memo also codified that each task force FSO and FSNCO would be responsible not only for ensuring their subordinate teams were trained and prepared to conduct certification, but also for resourcing their certification. By requiring each task force to plan and manage the resourcing of artillery skill proficiency skills (ASPT) and FS Tables I-II, we empowered them to take ownership of their schedule and provided a developmental opportunity for each to plan and manage training before becoming a part of a battery command team. While the brigade FSNCO would continue to serve as the quality assurance check, undersigning who could serve as certification evaluators for ASPT and Table I and providing oversight to each event, several leaders within the brigade fire support cell provided mentorship, professional development and enabled synchronization through weekly "FSO Synchs" with battalion cells. Guidance, feedback and an assessment on the training and performance measures were provided twice monthly by the FSCOORD via a formal meeting dubbed the "FSCOORD Synch," that served as a training meeting with some pertinent elements of a command and staff incorporated. Additionally, FSCOORD Synchs predominantly focused on the material readiness of fire support specific equipment, certification and readiness of FIST teams, and a review of upcoming planned

Teams conducting a rehearsal prior to execution in the virtual based gaming system. (Courtesy photo)

training by each of the battalion FSO/FSNCOs by T weeks. The meeting was chaired by the FA BN CDR, led by the BDE FSO, and attended by representatives from the BN S4, S6, BMO, BDE Fires cells, and ALO sections, in addition to the HHB CDR/XO, radar acquisition platoon leadership, and each BN FSE. This meeting, much like a battalion training meeting, provided an opportunity for the FA battalion commander to review the training and readiness of each element within the brigade's Fires Warfighting Function. The regular formal interaction with the battalion commander also served to reinforce the professional development opportunities for the prospective future battery commanders and first sergeants.

To further maximize team readiness and reduce the time required to conduct certification, we looked to exploit training opportunities that could serve a dual role as certification events. TC 3-09.8 allocates that once every team completes their FIST certification, they have 180 days before it must be completed again. Rather than waiting until their certification was ready to expire, we worked to instill the mindset across the formation that the teams now had 180 days to complete all the task required for their next certification. By taking this approach, task forces were provided substantial flexibility in how they accomplished the required task. Conceivably, they could execute a FS Table II every time one of their teams were dispatched to an observation post to support a mortar training and evaluation program (MORTEP) exercise or a Table VI, XII, or XV for the firing batteries. It simply required the battalion FSO/FSNCO to ensure the conditions were set and coordinate for an evaluator to be on hand for its execution. Moreover, they could leverage the call for Fires (CFF) executed during the course of the exercise to count towards the appropriate fire missions dictated in the FS Table I. By requesting the list of targetry grids from range control to help determine target location error and conducting prior coordination with the mortar leadership or controlling fire direction officer, the FSO could script the master scenario event list (MSEL) to provide a variety of CFFs to better suit their needs. This provided numerous opportunities for the FIST teams to benefit from training and evaluation conducted under more realistic circumstances than those replicated in the CFFT, while reducing the burdensome requirements of their certification. After a few iterations of this, task force fire support elements (FSEs) began to increase the complexity by incorporating additional assets, such as Army Attack Aviation and joint terminal attack controllers (JTACs), to increase the training value and help maintain joint fires observer (JFO) proficiency.

A Fire Support Variant Stryker occupies an observation post during a DIVARTY exercise. Training events such as this present an opportunity to complete fire support certification requirements. (Courtesy photo)

Finally, we sought to rectify the issues identified during the execution of the brigade virtual FCX, serving as the FS Table III and IVs. To this end, our brigade commander provided the critical incentive to get subordinate maneuver battalion commanders invested in our training event. His intent was to make our virtual FCX serve as a train-up and rehearsal for the brigade's upcoming company combined arms live-fire exercises. To achieve this, we structured the exercise to imitate the execution of company live Fires, with time and space designated for troop leading procedures (TLPs), operations order briefs, and combined arms rehearsals. We then developed the scenario to replicate what company-level leaders would see and face, on similar terrain when later conducting company-level live Fires. Moreover, the brigade commander directed that each company's execution would be evaluated against the appropriate training and evaluation outlines by himself and the FSCOORD. When the commander's schedule precluded his participation, one

of his subordinate battalion commanders would fill in to evaluate the maneuver aspect of execution. The result was a brigade training event that garnered the attention and investment of subordinate maneuver commanders at all levels. As each company executed its TLPs and virtual iteration, it was observed by senior leadership who provided feedback on planning and execution of the operation; with emphasis on tactical movement, command and control, offensive fire control and integration of fire support assets. Commanders at all levels provided positive feedback to the value of this training event, not only in its preparation for later LFXs, but also in its use of a virtual enemy that could maneuver and fire on friendly elements, presenting dilemmas and challenges that are hard to replicate in any other kind of training environment. Demonstrating the value of this exercise ensured buy-in from the maneuver battalions' leadership and paid dividends to the level of involvement when planning began for the next brigade FCX.

The work to refocus our training and certification efforts resulted in 1st Battalion, 37th Field Artillery fire supporters increasing the efficiency of the program, while also providing formations the capacity to maximize the benefits offered by regular training exercises. These efforts were not without friction. There were times when nearly every fire support team was simultaneously arrayed against a variety of task and competing requirements, disrupting pre-planned training and certification events for task forces that was supposed to be sheltered, as well as instances when a maneuver battalion cancelled a training exercise that the Fires cell had planned to leverage for its certification, forcing its leaders to adjust their plan. Nonetheless, it provided the fire supporters more predictability, flexibility and better opportunities for integration, ultimately improving the sensor-to-shooter capability within the BCT.

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Army Target Production Centers
Building a multi-domain operations enabled Army

By John A. Scotto, Capt. Tiago Camilo and Chief Warrant Officer 3 Jordan Kness

As this goes to press, senior Army leaders are grappling with how to build a force capable of facing and prevailing over a peer or near-peer adversary. This is likely an adversary who can field large forces, probably numerically superior to U.S. forces in the land domain, against whom the U.S. may have no advantage in those areas where we have become accustomed to operating with near impunity – the air and maritime domains – and who seeks to leverage the space, and cyberspace domains against U.S. forces. The Army's response is to move toward multi-domain operations which envisions employing capabilities from all domains in concert to develop windows of advantage as needed to enable freedom of action. Fortunately, there is an existing system for integrating all types of capabilities, regardless of domain or service of origin, to produce a desired effect upon the adversary in order to achieve the commander's desired end state – it is the Joint Targeting Process.[1] Unfortunately, the Army lags in understanding and employing this system which could prove detrimental in large-scale combat operations against a peer adversary unless corrected.

In truth, Army leaders have recognized this problem for some time now. In 2014, the Army tasked Training and Doctrine Command to conduct a study examining the service's operational-level targeting -- joint targeting-- capability, in response to an Army Lessons Learned Forum – general officer steering committee identified shortfall. That study found that the Army had significant leadership education, operator training and overall doctrinal gaps regarding joint targeting, the very process that harnesses capabilities from all domains to achieve the desired end-state, a key enabling capability for true multi-domain operations.

Following the release of the study findings, the Fires Center of Excellence moved to establish a targeting center, ultimately approved by the chief of staff of the Army as the Army Multi-Domain Targeting Center (AMTC), to act as a focal point for targeting doctrine, organization, training, materiel, leadership and education, personnel, facilities and policy (DOTMLPF-P) integration within the Army, and as an entry point for the Army to the wider joint targeting enterprise. The good thing is there is now an Army's "hub" for targeting, promoting discussion and thought, particularly in the area of joint targeting. The bad thing is the Army still largely does not organize, man, train (this is being addressed as we will explain shortly), or equip to execute the joint targeting process. The ugly thing is there still is no agreed-upon roadmap for the Army to achieve a state in which it can as easily employ the joint targeting methodology to access joint capabilities as it does its own more familiar decide-detect-deliver-assess[2] methodology to employ Army organic capabilities. The goal of this short article is to start, not dictate the end of, a conversation that describes how the Army could organize to employ joint targeting. The authors also hope to reach out beyond the Fires and Intelligence communities, both institutional and operational, to gain perspectives and build a consensus on the best way to establish a sustained Army capability for joint targeting, a key enabler of multi-domain operations. This outreach is absolutely necessary since targeting, by its nature, is interdisciplinary and reaches across MOS, warfighting function, service and domain and requires input from a very broad spectrum of capability owners, planners and integrators in order to be successful.

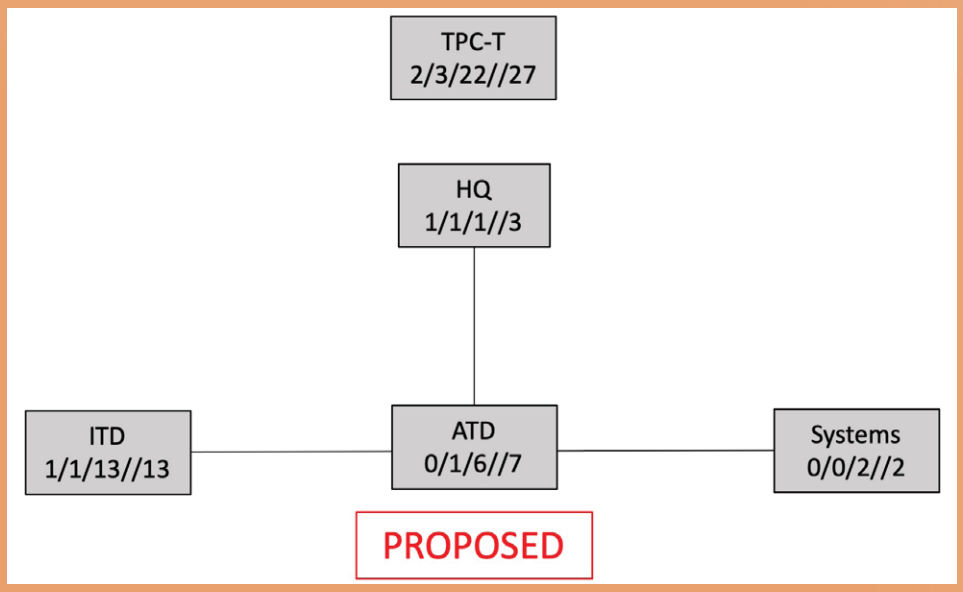
Because engaging the joint targeting enterprise is still a relatively new and not very well understood activity within the Army, in this article we will limit our discussion to a limited subset of DOTMLPF-P concerns. We will also, for simplicity's sake, avoid extensive discussion of the Department of Defense regulatory structure that governs joint targeting - let it suffice to say that wherever we discuss accreditation or certification in this article we mean to joint standards that would allow Army headquarters to create, edit and submit targets to joint target databases, such as the Modernized Integrated Database (MIDB), for inclusion on joint target lists. Instead, we will detail specific actions the AMTC has taken in regard to joint targeting training and then propose a framework for the operational force to capitalize on those by organizing to create a more joint targeting/multi-domain operations capable force. The ultimate goal is that operational force commanders gain capability while the AMTC ensures that the overall Army targeting program meets existing and future regulatory requirements in a manner that is largely transparent to the operational force.

The AMTC has taken action to address the gap in targeting training by establishing Army-taught

1 *JP 3-60, Joint Targeting, 28 Sep 2018*
2 *ATP 3-60, Targeting, May 2015*

joint targeting courses. This was necessary because joint force and sister services training pipelines were unable to support a sustained Army need in addition to their own requirements. The Army now has its own (Defense Intelligence Agency accredited) Joint Intermediate Target Development (JITD) Course. The Army has also added a Target Material Production (TMP) Course and established a service TMP Program (anticipating National Geospatial-Intelligence Agency accreditation in late FY19) enabling the accreditation of TMP work centers and certification of TMP analysts across the Army. Together with the previously existing Weaponeering and Collateral Damage Estimation (CDE) courses, the Army now has the capability to train the skills for intermediate and advanced target development. Mid-grade staff and leader education of joint Fires integration and joint targeting is addressed through the Joint Operational Fires and Effects Course (JOFEC), with a shorter JOFEC Executive Session for colonels and above under consideration as well.

However, training alone does not produce increased capability for the operational force. Of primary concern is the absence of Modified Table of Organization and Equipment (MTOE) codified work centers for the Army's trained targeting experts to reside. This creates two problems. First, newly trained Soldiers are returning to their units and quickly absorbed back into work sections that are not dedicated to, or even significantly involved in, target development and ill-positioned to maintain the currency requirements necessary to maintain proficiency. Second, proper, detailed and well-researched characterization of enemy target systems and entities is only achievable when analysts are unhindered with competing tasks and dedicated to regional target familiarization. A Target Production Center (TPC) could be a solution to these issues that will enable an organic, sustained capability to produce and submit targets to be serviced as required by the full range of joint/multi-domain capabilities available.



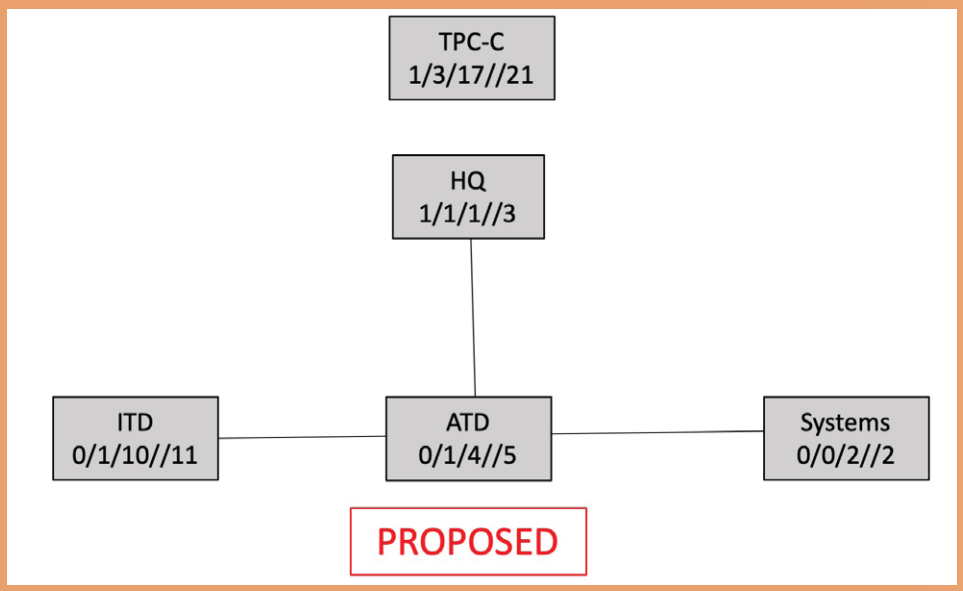


Figure 1. (Top) An example of a TPC-T. (Courtesy illustration)
Figure 2. (Bottom) An example of a TPC-C. (Courtesy illustration)

This article proposes that TPCs be created at the geographic Army Service Component Commands (TPC-Theatre or simply TPC-T) and the Corps (TPC-C). Note - Division TPCs (TPC-D) and Functional/ Global Army service component commands (ASCCs) are beyond the scope of this paper and will be addressed separately at a later date.

Target Production Centers are:

All-domain. The TPCs will be comprised of Soldiers with expertise in all domains and the information environment. Target development and targeting solutions require analysts to characterize targets and think creatively with regards to the peculiarities in air, land, sea, space, cyberspace and the information environment.

Multi-disciplined. Personnel from across the intelligence disciplines will contribute to a holistic target development approach; avoiding stovepipe views of systems and entities.

Regionally focused. TPCs will be focused on gaining mastery of enemy target systems and entities within combatant commands area

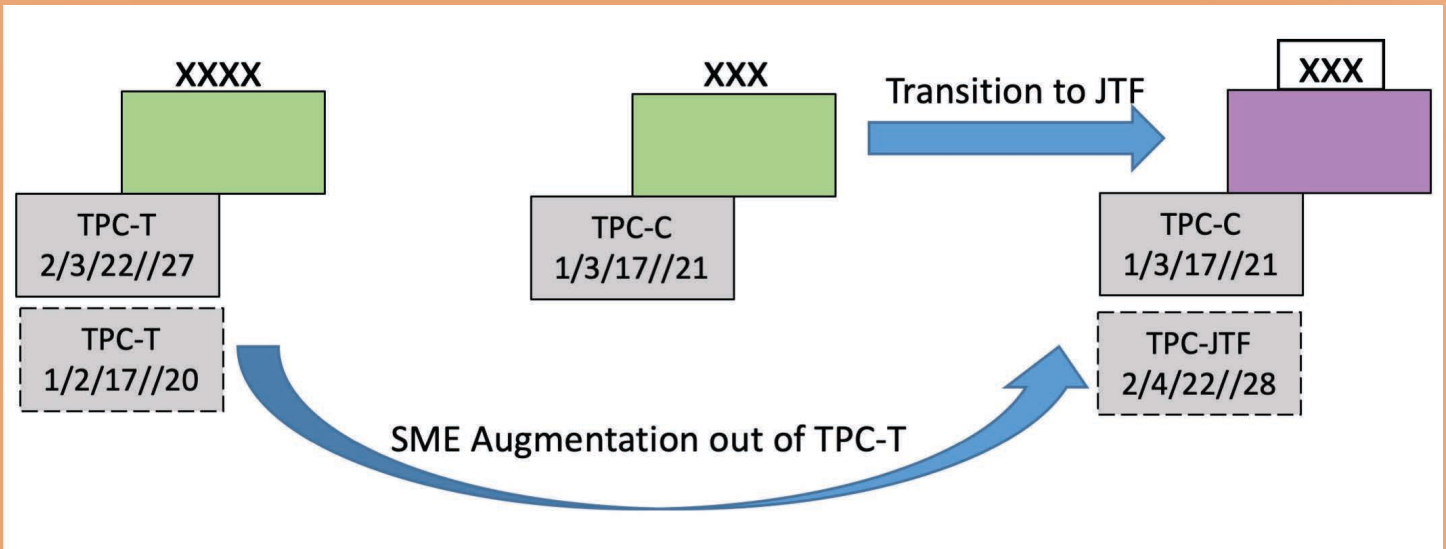


Figure 3. An example of corps transition to JTF with TPC-T augmentation. (Courtesy illustration)

of responsibilities. TPC-T will be regionally focused. TPC-C will be capable of sharing target development workload from the TPC-T. Depending on corps mission and focus, TPC-C may have a dedicated target production responsibility to a COCOM AOR. This will enable the TPCs to be viable producers of intelligence support to joint targeting. As a best practice, it is recommended that analysts serving in a TPC have longevity within the organization to obtain and maintain the level of expertise required for systems and entity mastery.

Integrated. TPCs establish and maintain continuity with the Joint Intelligence Operations Centers (JIOCs), battlefield coordination detachment, multi-echelon integrated brigade training, and joint, interagency, intergovernmental and multinational partners with regards to target development and federated target development workload. (MIB-T will play a vital role in target development either in function or in personnel. A TPC-T may reside within a MIB-T vice an ASCC G2. This is currently being examined.) These tasks are primarily for the TPC-T, but TPC-C will contribute via established relationships, tasking or agreement.

Tailorable. TPCs will allow for quick augmentation from other TPCs. For example, a TPC-C could be augmented from a TPC-T during the formation of a joint task force. Based on the scope of the mission, size of the joint operations area and duration of the mission, TPCs could be augmented to provide additional target development capacity. The TPC concept can also be readily adapted for emerging formations such as the multi-domain task force. A codified TPC will ensure all gaining commands are equipped with all workstations, equipment and software packages necessary to complete entity-level target development. We assess that with relatively modest organizational changes to capitalize on already existing training, the operational force can make significant strides toward building an organic capability to access and employ the Joint Targeting Process, the entryway to the full array of joint/multi-domain capabilities.

We do not assume or maintain that targeting training or even targeting training in conjunction with organizational changes, such as establishing TPCs, will by itself address the Army's challenges against a peer or near-peer adversary. However, absent these or other changes to address systemic capability gaps related to engaging the Joint Targeting Process, the Army will not be postured to access the full range of joint and multi-domain capabilities that are available, and that will need to be employed in concert in order to succeed against a sophisticated, capable adversary determined to challenge U.S. military might. Organizing for joint targeting is not "the solution" but it lays a necessary foundation upon which to build a credible Army response to the much more dangerous foes that we face moving forward.

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A cautionary lesson from history for FA doctrine development

FA and tank destroyers in World War II

By Dr. John Grenier

The Field Artillery Branch's doctrine writers face a difficult task in 2019. As the Army pivots from counterinsurgency (COIN) that defined the War on Terror to large-scale, ground-combat operations (LSGCO) against potential peer competitors, they must develop the doctrine to properly man, equip, train and employ FA. Current writing on Multi-Domain Operations (MDO) offers guideposts for a new or revised FA doctrine. Its focus on the tactical and operational-level problems that today's increasingly lethal and expanded battlefield present also paint a bleak picture of the challenges FA will confront as it tries to maintain its place as the King of Battle. The Army's new FM 3-09, as its subtitle Fire Support and Field Artillery Operations suggests, is a yeoman-like effort at conceptualizing the structure and roles for FA on tomorrow's battlefields. Like all doctrine, it necessarily tries to predict the future, something that no one, of course, can do.

Fortunately, history offers lessons that can help guide us as we think about, plan for, and exercise the capabilities we need for tomorrow's wars, provided we ask the right questions. In the

A World War II propaganda poster. (Library of Congress)

late 1930s, we should remember, the Army and the FA Branch faced an "increasingly complex environment" that seemed, at the time, as daunting as the one we confront today. The German Wehrmacht had developed a new combined-arms synthesis — popularly known as Blitzkrieg (Lightning War) — of ground and air forces that threatened to toss to the trash heap of history everything the Army thought it knew and understood about modern land battle. When German armor divisions (Panzerkorps) supported by airpower rolled over Poland in the autumn of 1939, smashed through the French Army in the spring of 1940, and drove the British Army from the Continent, American Soldiers were, to say the least, disconcerted. The Panzers and their Lightning War seemed unstoppable. American forces were woefully unprepared to meet this new competitor — not our peer, but our superior who outnumbered, outranged, and outgunned us — on the battlefield in 1941 or 1942.

The Army initially did not know the kinds of forces to field to deal with Panzers. A fundamental "problem" grew from its commitment to the regimental combat team (RCT), a maneuver unit that evolved from the U.S. experience in World War I, when armor forces made their first appearance on the battlefield. The typical RCT, the building block for American divisions, consisted of infantry regiments with organic FA battalions supported by, not in support of, independent armor forces. The small and money-strapped Army of the 1930s, however, chose to give little thought to anything above division-level maneuver.[1] The Panzers' great wave of battlefield victories forced the Army to think beyond the tactical level of war, and consider employing corps and field armies. Many believed the obvious lesson of 1939 and 1940 was that the only effective countermeasure for a tank was a tank. Artillerymen, not surprisingly, did not concur. They were concerned that, in the rush toward building an armor-centric force tailored for armor-on-armor operations at corps-and-above, the Army might throw the baby out with the bathwater. After much consideration of the matter, the Army acknowledged that it needed to find a way to beat the Panzers — now clearly a dominant player on the battlefield — at the tactical level, and then build from there.

Once they recovered from the initial shock that came with the Panzers' rapid string of victories, some of the more insightful thinkers in the Army recognized Blitzkrieg's Achilles Heel. The deeper they plunged through enemy lines, the more vulnerable the German (or any, for that matter) armor columns became to attacks on their flanks and rear. The Wehrmacht attempted to solve this problem with the creation of motorized infantry that could "keep up with the tanks" and protect their lines of communication and supply. The U.S. Army tried to follow suit, and in 1940, it formed its first motorized infantry division, the 4th Infantry Division, for the day when American armor columns might go head-to-head with German armor columns. Indeed, the thinking in American military circles in mid-1940 was that American and German armor forces could look forward to meeting in large tank battles, across fronts thousands of yards wide, and engage in a dangerous dance of thrusts and parries.

Maj. Gen. Lesley McNair, the officer whom the Army vested in 1940 with responsibility for building the army that eventually fought the Wehrmacht in North Africa and Northwest Europe, believed that to wage decisive armor warfare, the U.S. must develop a means of neutralizing enemy armor forces with capabilities other than tanks or infantry in trucks.[2] An FA officer by training and inclination, he naturally turned to artillery as a possible neutralizer of Blitzkrieg. But McNair and his staff faced two main questions: could heavy, big-gun FA keep pace with friendly and rapidly moving armor and motorized infantry, and how might it fare if field commanders placed it at "pointy end of the spear" to blunt German armor attacks? The answers were not encouraging: it couldn't, and poorly. The solution thus became building mobile tank destroyer (TD) units equipped with self-propelled or towed anti-tank (AT) guns.

McNair's interest in TD thus is best seen as the catalyst that sped up thinking about how the Army could use its new AT weapon system. In 1936, the Army developed a gun specifically for AT operations, and in 1939 it began production of a 37 mm AT cannon based on, not coincidently, a Wehrmacht model. But the chief of infantry, whose branch held responsibility for AT doctrine, completely ignored it, and the Army's FA doctrine discussed AT operations in a mere six pages. Army Chief of Staff George C. Marshall, thanks to McNair's advocacy for TD, recognized this was inadequate, and in April 1941 he tasked the Army's G-3 (Operations and Training) to expand the doctrine. The fighting in France offered striking lessons. The Wehrmacht proved itself notoriously good at employing AT weapons: Panzers thrusted, and then pulled back their forward units, which British armor, time and time again, pursued to a line of immobile German 88 mm anti-aircraft guns that opened British tanks like sardine cans. The resulting American AT doctrine therefore explained how each infantry division should possess a TD battalion that served as a highly mobile force to engage enemy armor after it breached American lines and thereby exposed its flanks. Thus while each RCT should include a TD battery that supported it, commanders

1 *David E. Johnson, Fast Tanks and Heavy Bombers: Innovation in the U.S. Army, 1917-1915 (Ithaca: Cornell University Press, 1998).*
2 *Mark Calhoun, General Lesley J. McNair: Unsung Architect of the U.S. Army (Lawrence, KS: University Press of Kansas, 2015).*

must avoid posting TD forces at the front. The great fear was that if TD tried to blunt head-on German advances, the more mobile and more heavily armed Panzers could easily outmaneuver, isolate, outgun and annihilate them. The bottom line thus became that TD should serve in defensive as opposed to offensive roles, attack the Panzers on their flanks and rear and avoid head-to-head engagements with them.

McNair decided to exercise, and perhaps validate, TD doctrine in the Louisiana and Carolina Maneuvers of 1941. During the summer's Louisiana maneuvers, two field armies—Blue and Red—ranged across the area that became Fort Polk. Later that fall, near the Thanksgiving holiday, Blue and Red took their "war" to the border region of North and South Carolina.

The two training venues enabled McNair to "switch up" TD play, which offered opportunities to compare and contrast training and outcomes. For the Louisiana Maneuvers, McNair gave Blue two FA brigades to organize in nine TD battalions divided among three regiment-sized TD groups. He insisted that in the first phase of the maneuvers, only Blue would possess a TD capability. "These groups were to be highly mobile, relatively self-sufficient, and designed to serve as an aggressive army-wide anti-tank reserve."[3] Despite the notion that towed 75 mm guns, and artillery pieces strapped in the back of half-tracks, were to serve primarily as an army-echelon reserve in a defense posture, McNair also instructed them to employ offensive tactics whenever possible. During the second phase of the maneuvers, both Red and Blue contained TD groups.

McNair and the advocates for TD were most pleased with the exercises. Initial analysis suggested that in the Carolina phase, 760 AT guns destroyed, disabled or stopped an equal number of tanks. Follow-on analysis suggested, however, that FA battalions in support of infantry regiments as part of RCT took a higher toll on adversary tanks than TD battalions. This actually made sense: most tanks had thick frontal armor that light guns could penetrate only with difficulty; tank decks were lightly armored, which made them vulnerable to plunging fire. Regardless of who "killed" whom, McNair remained convinced that the maneuvers proved "that the tank could be stopped," and the positive results of the experiments should inspire the Army to develop TD doctrine, organization, and capabilities.[4] The stage was set, as a result, for a major debate within the FA community as it decided how many of its eggs — aka its guns — it should put in the TD basket.

Events quickly overcame the theoretical debates over TD. The Secretary of War held a meeting in Washington D.C. on Dec. 3, 1941, to discuss maneuvers' implications; four days later, Imperial Japan attacked at Pearl Harbor. In the wake of the Japanese Blitzkrieg across the Southwest Pacific Area (SWPA), President Franklin D. Roosevelt shifted defense priorities, and with them funding, to the Navy, the Army Air Forces, and the Lend-Lease Program for our allies. Still, in 1942, McNair called for 222 TD battalions; the War Office approved 144. The Army eventually fielded 106 TD battalions, and at war's end, 68 remained in service; over 100,000 Soldiers served in TD units that fought in North Africa, the Pacific Theater and Western Europe. It should be noted that the Army retained towed AT guns throughout the war. After the half-track mounted guns failed in North Africa, TD units in the field received turreted guns, which worked well, except the Army, to provide spotters a wide field of view, gave them open turrets, which meant Soldiers could not "button up" and they thereby became incredibly vulnerable to anti-personnel fire from the enemy.[5]

With the bean counting of resource apportionment and allocation well in hand, the time for bold action had arrived. Instead of spending more effort discussing TD organization and weapons development, or conducting further evaluation to resolve the disconnect between the initial and subsequent findings on the effectiveness of TD as compared to FA as AT forces, the War Department, with the swipe of pen, essentially created a quasi-branch, with its own insignia, for TD.[6] A name change marked the first step: all divisions must designate their AT units as TD. Then, significantly, each division must surrender control of its 36-gun TD battalions to the army, not the corps, under which it served. The G-3's suggestion that each division retain an organic TD battalion therefore quickly became a doctrinal relic. As the Army prepared for land battle in 1942 or 1943, it assumed enemy armor presented the primary threat to American and allied ground forces; this allowed the advocates who argued that TD not serve as front line units, but instead as AT reserves, to win the debate on that important force-protection and sustainment matter. Yet even in their defensive posture, most believed that TD units' mobility and firepower might allow them to realize the branch's motto of "Seek, Strike and Destroy." Few at the time seemed to notice the contradiction in the guidance that while TD must avoid "slugging matches" with armor, they should search out the offensive whenever possible.

The Army's initial engagements with the Wehrmacht in North Africa and Sicily, and with the Imperial Japanese Army in the SWPA, suggested that the pre-war angst over the Blitzkrieg had

3 *Christopher R. Gabel, The U.S. Army GHQ Maneuvers of 1941 (Washington, DC: US Army Center of Military History, 1991), 54.*
4 *Ibid, 171.*
5 *Harry Yeide, The Tank Killers: A History of America's World War II Tank Destroyer Force (Philadelphia: Casemate, 2005).*
6 *https://www.cavhooah.com/info/sections/branch-insignia/*

Cpl. Hanry Manoni and Sgt. Joseph Loftis sight through a rangefinder in the process of aiming big guns of their artillery battery during an unit maneuver exercise. (Library of Congress)

perhaps been much ado about nothing. While the Soviets and Nazis fought massive armor battles on the Eastern Front, by mid-1943 it was clear that land battles on the Western Front and in the SWPA were won or lost, at least on the American and British side, by infantrymen and artillerymen, and aviators who supported their brothers on the ground. During the war, American TD fought in only one battle — at El Guettar in Tunisia in the spring of 1943 — such as the 1941 doctrine and exercises envisioned. The paucity of targets for TD forces, and the conflicting guidance on their employment, led commanders toward "tacitly rejecting tank destroyer doctrine altogether."[7] They broke their TD battalions into companies and platoons and attached them to infantry battalions who used them for direct fire missions against enemy infantry and entrenched positions. By 1945, the Army acknowledged, "the separate tank destroyer arm is not a practical concept on the battlefield. Defensive AT weapons are essentially artillery. Offensively the weapon to beat the tank is a better tank." [8]

The question thus becomes: what can the FA branch learn today from the Army's experience with building TD doctrine in the months leading to World War II? The TD debate suggests that we should measure carefully the threat we face, and not get too far over our toes with new doctrine that drives us to assumptions and rash decisions about battlefields whose shape and nature we can only vaguely predict. The TD experiment in the 1941 Maneuvers seemed to offer an easy lesson, indeed a panacea, to the tactical- and operational-level problems that Blitzkrieg presented. But, in the end, field commanders in the cauldron of battle "stuck with what they knew," and they probably would have preferred the Army devote the resources it spent on TD to more large-caliber FA such as the M114 155 mm howitzer, or accelerating the development of an American heavy tank. The heavy M-26 Pershing with its 90 mm cannon, the replacement for the medium M-4 Sherman and its 75 mm gun, was not available, for instance, until 1945, at the end of the war. This is by no means to discount the challenges the Army will face on tomorrows' — or tonights' — battlefield, or the many difficulties in transitioning from a decade-and-a-half of COIN to LSCGO against a peer competitor. But if history teaches anything, it's that sometimes the newest, shiny things won't stand the test of time. The "old ways of doing things" became old because they worked. Field artillery, for good reason, has been, is, and will remain the King of Battle!

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7 *Gabel, Army GHQ Maneuvers of 1941, 191.*
8 *Ibid., 192.*

FA BOLC-B transformation

Preparing officers for the future fight

By Maj. Daniel Beck and Capt. Matthew Van Arsdale

The last decade saw the creation of a security environment more complex than any in recent memory. Complex, hybrid threats from non-state actors are now combined with more traditional threats from re-emerging and rising nation states like China, Russia, Iran and North Korea. The re-emergence of peer competitors has made the threat of large scale ground combat operations (LSGCO) more real and urgent than any time since the 1980s. Success in this complex strategic environment demands leaders that are competent, resilient and confident. While senior leaders aggressively pursue equipment modernization, Training and Doctrine Command and the institutional training organizations must aggressively modernize and improve training. The Field Artillery Basic Officer Leader Course-B (FA BOLC-B) is transforming its Program of Instruction (POI) and methods of instruction to train entry-level lieutenants to increased levels of fundamental competency through a deliberate pursuit of academic and physical rigor. Academic and physical rigor in this context is achieved by repeated execution of foundational skills through more engaging practical exercises, dynamic simulations and demanding field training. Repetition — the repeated performance of core competencies in varying environments — is the key aspect of the current training revision.

The foundational component of preparing lieutenants for LSGCO is achieving the transfer of knowledge about FA theory, doctrine and tactics, techniques and procedures. Simply put, FA BOLC-B is spending less time talking in a static classroom, and more time applying learned concepts in dynamic and realistic settings. While traditional classroom instruction remains a critical step in the learning process, particularly for theoretical concepts, increasing repetitions in a simulated or live training exercise allows students to build confidence, learn from mistakes and build a depth of understanding in their core tasks and competencies. In the redesigned POI, the curriculum quickly moves beyond the instructor-centric, classroom-based teaching methods. Traditional classroom instruction is used to foster initial conceptual understanding, but students quickly move beyond this model to more effective methods of learning. As such, students are pushed to apply skills within the context of a realistic training set. In this training set, FA BOLC-B lieutenants progress through a practical exercise (PE), simulation and culminate with a field exercise. During PEs, students complete foundational tasks in a relatively controlled setting with the required tools, but gain valuable perspective and practical lessons learned that aren't possible to achieve in a classroom. Next, cadre leverage simulations to add a layer of complexity, realism and stress. Students are confronted with new challenges that force them to adapt and apply their recently learned skills to a new and changing set of circumstances. The students are now engaging with an uncertain environment.

Finally, students move to the field. The most significant feature of the redesigned POI is the increased time spent in the field. This additional field time is the most impactful and enabling change in the FA BOLC-B POI. Discussed in more detail below, field exercises provide opportunities for students to get live-fire repetitions of training objectives while integrating multiple concepts and skills. Within the new POI, traditional FA BOLC-B field events are redesigned to allow for additional iterations of each training task. These events are also simplified in order to focus training on specified tasks. Short scenarios are executed repeatedly to facilitate rapid decision making, application of theory and doctrine and maximize student participation. This PE-simulation-field training paradigm is embedded within the new POI and is creating more opportunities for reps and sets, thereby facilitating retention of newly acquired combat skills.

Physical preparation is the second foundational tenet of combat readiness and is at the heart of the redesigned POI. First, students experience a reinvigorated approach to daily physical training (PT). FA BOLC-B students are spending more time conducting PT under the supervision of cadre, and the training is deliberately planned and conducted to facilitate physical progression. PT equipment is also more accessible, with the addition of Ligons-Allton Functional Fitness Gym located inside Summerall Hall and the FA BOLC-B footprint. A second and related effort is the expansion of foot marches. Conducted during PT hours and as part of field exercises, FA BOLC-B students now foot march more than 60 miles, a 100 percent increase from previous POIs.

The third way in which FA BOLC-B students are physically prepared is through demanding field exercises. Compared to previous POIs, entry-level artillery officers now spend an additional week in the field. Not only is the field time increased, but how that

Field Artillery Basic Officer Leader Course students conduct a walk-through of the impact zone during a fire support coordination exercise (FSCX) Jan. 17, 2019, at Fort Sill, Okla. The walk-through was a new addition to the exercise. The FSCX was one of the training events conducted during Red Leg War, which is the culminating event for the FA BOLC students. (Daniel Malta/Fort Sill Public Affairs)

time is spent is reimagined. The eight field exercises included in the POI feature completely new and wholly redesigned evolutions. The reform of field time is critical to FA BOLC-B's larger transformation because field training events enable and facilitate the most effective training. In the field, students are exposed to and forced to operate under simulated combat conditions. They apply the skills and knowledge they have attained while confronting the real world challenges of terrain, weather, leadership, fatigue and a full combat load.

The marquee field evolutions within the updated POI include a common core field training exercise (FTX) and a fire support coordination exercise (FSCX), the latter of which is a component of the course's culminating training event. Within one month of arrival at Fort Sill, FA BOLC-B students execute the FTX, which establishes a foundation of knowledge, skills and performance expectations that carry-through the remainder of the course. The first three weeks of FA BOLC-B have been restructured to focus on combat fundamentals: Troop leading procedures; operations order (OPORD) and convoy briefs; operating tactically as a small unit; moving in full combat gear; operating communications equipment; and employing individual and crew-served weapons. The culmination of the first three weeks is a four-day FTX where students are tested and evaluated on their ability to execute the trained tactical tasks. The purpose of the FTX is to increase the number of repetitions students perform on each tactical task, building familiarity, competence and confidence. During the FTX, students complete four OPORD briefings over terrain models, a modified hand grenade qualification, M4 qualification, individual land navigation, and Situation Tactical Exercises. The repetitions on these foundational tasks increases the academic and physical rigor of FA BOLC-B while establishing a strong foundation of basic leader skills. Students leave the Common Core FTX more confident in their abilities as leaders and better prepared to start FA-specific training.

The capstone event for the community's entry-level officers is the FSCX, also known as the "Walk and Shoot." During execution, students conduct a company-sized deliberate attack against an enemy strongpoint, integrating multiple live indirect fire systems. While maneuvering over a kilometer into the installation impact area, lieutenants echelon 105 mm and 155 mm cannon artillery, continually suppressing multiple enemy targets and closing to within 750 meters of live high-explosive artillery impacts. More impressively, the live Fires being controlled by the maneuvering students are being provided by fellow students. FA BOLC-B lieutenants are also processing the requests for fire in the fire direction center and operating the howitzers on the gun line. Throughout the FSCX, students maneuver through the impact craters of rounds fired by their classmates.

Leaders "accept risk to create opportunities." The FSCX is deliberately elevating the risks taken during training in order to achieve a level of realism that is necessary for preparing leaders for future conflict. This risk is mitigated by the safety measures incorporated into range and exercise design. For example, the geometries of fire preclude overhead fire and maneuvering students remain at the minimum safe distances for each weapon system being used. Each executing platoon follows a fixed sequence of fire and maneuver. The most meaningful aspect of the FSCX may not be live execution, but, rather, the comprehensive, copious rehearsal requirements infused into the exercise. The FSCX is a premier event during which students demonstrate mastery of the fundamentals of the field artillery, from detailed planning and maneuver integration to effects-based Fires and extensive rehearsals. Despite the success of the training evolution thus far, cadre are continuing to add complexity as organizational proficiency grows. Future iterations will strive to include expanded employment of direct Fires systems, live close air support and Army attack aviation, and additional indirect fire platforms.

The reorganization and restructuring of FA BOLC-B's POI is a necessary initial step to improve the product the FA schoolhouse sends to the operational force. Through simple yet effective measures, students are leaving Fort Sill not only more passionate about artillery, but, more importantly, trained to a higher level of readiness. Aforementioned improvements notwithstanding, the most important work remains ahead.

This article summarizes how FA BOLC-B leadership modified the existing course to increase physical and academic rigor. Future FA BOLC-B POIs will incorporate these methodologies and concepts from the ground up. In the coming year, leaders at Fort Sill will take the next step: a comprehensive and deliberate transformation of the POI. Only a total POI rewrite will create the conditions required to take the education of our future leaders to the next level. From the initial response to the long-term way ahead, FA BOLC-B recognized the need to better prepare its graduates for future combat and has taken action. FA lieutenants stand more ready than ever to meet the demands of an increasingly complex and hostile world.

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In the next issue of Fires

September-October 2019, Fires achieving joint, multinational interoperability. There are various levels of shared knowledge and capabilities across sister services, allies and partners. How is Fires successfully integrating on the battlefield? This issue will discuss employing centralized vs. decentralized Fires; conducting joint/multinational tactical fire direction; developing a common understanding with joint/multinational Fires assets/systems; developing and refining fire support plans and supporting products; improving airspace coordination and clearance of Fires and more.

The deadline for submissions is Aug. 1, 2019. Send your submissions to usarmy.sill.fcoe.mbx.fires-bulletin-mailbox@mail.mil or call (580) 442-5121 for more information.

U.S. Marines with 3rd Battalion, 12th Marine Regiment, 3rd Marine Division, undergo an oleoresin capsicum (OC) spray course during the Artillery Relocation Training Program 19-1 at the Combined Arms Training Center, Camp Fuji, Japan, April 28, 2019. The course requires Marines to complete various physical tasks while under the effects of OC spray in order to prepare for potential real-life scenarios. (Cpl. Josue Marquez/U.S. Marine Corps)