A joint publication for U.S. Artillery professionals

March-April 2018

Fire

Fires strong

How is the Fires force staying fit for undetermined warfare?

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Fires

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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.

On the cover: Spec. Haden Finley runs power cables while emplacing the electric power plant during 2nd Battalion, 43rd Air Defense Artillery Table VIII Intermediate Patriot Gunnery Certifications. (1st Lt. Micah A. Uchida. (U.S. Army)

Fires in photos

Top-left: Pfc. John Priselac, junior enlisted winner with 4th Battalion, 5th Air Defense Artillery, 69th Air Defense Artillery Brigade, catches his breath after completing a grueling eight-mile ruck march during Lightning Warrior Week at Fort Hood, Texas, Jan. 18, 2018. The competition, held by 69th ADA, showcased the skills of the brigade's best and brightest Soldiers in a series of tough trials. (Sgt. Woodbridge Bullock/U.S. Army)

Middle-left: Second Lt. Brandon Tribble, commissioned officer winner with 69th Air Defense Artillery Brigade, pumps out push-ups during an Army Physical Fitness Test during the brigade-wide Lightning Warrior Week at Fort Hood, Texas, Jan. 19, 2018. The competition pushed many Soldiers past their limits to award the unit's best and brightest Soldiers. (Sgt. Woodbridge Bullock/U.S. Army)

Bottom-left: Col. Curtis King, 69th Air Defense Artillery Brigade commander (far right), and Command Sgt. Maj. Tom Williams, 69th ADA CSM, congratulate their Soldiers for a job well done during the brigade-wide Lightning Warrior Week at Fort Hood, Texas, Jan. 31, 2018. The competition, held by 69th ADA, showcased the skills of the best and brightest Soldiers in a series of tough trials. (Sgt. Woodbridge Bullock/U.S. Army)

Below: Col. Curtis King congratulates Sgt. Abelino Leal III during a recognition ceremony at the Mission Command Training Center for winning best non-commissioned officer during Lightning Warrior Week at Fort Hood, Texas, Jan. 31, 2018. (Sgt. Woodbridge Bullock/U.S. Army)

Soldiers from 2nd Battalion, 43rd Air Defense Artillery Regiment, 11th Air Defense Artillery Brigade, participated in the Qatar National Day Parade, by driving a Patriot launcher, Dec. 18, 2017, in Doha, Qatar. The parade route was approximately four miles long running along the waterfront on Al Corniche Street. Thousands of people lined the street to catch a glimpse of the parade and the military vehicles and hardware being shown in full display. (Cpl. Steven Anzures/U.S. Army)

Come join us as we discuss air defense artillery news, history and we interview special guests from the branch on topics affecting Today's Air Defenders!
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AFATDS: Over the horizon communication

By Capt. Curtis Joslin, Sgt. Ty Harshberger and Spc. Mathew Greeley

Integration of digital assets into the field artillery solution is necessary to improve capability for long-range precision Fires. Aerial observation deep into the battlefield will increase the range artillery can engage. The digital link between the Advanced Field Artillery Tactical Data System (AFATDS), Mission Command Support Center (MCSC) Network Operations Center (NOC), and Blue Force Tracker (BFT) equipped platforms, provides a greater capability for information flow. Particularly in Attack Aviation platforms, it increases visibility and decreases the digital distance to firing units than what is normally utilized.

Digital connectivity with BFT-equipped assets affects the speed and accuracy of data flow from sensor to shooter. As of October 2004, the only medium for over-the-horizon digital communication between the AFATDS and BFT equipped assets is the Variable Message Format (VMF). The Force XXI Battle Command Brigade and below (FBCB2), Joint Capabilities Release (JCR), and Joint Battle Command-Platform systems all use VMF for message transmission. The VMF provides limited messaging between the AFATDS and FBCB2 with two-way free text messages. As an aerial platform capable of maneuvering over large distances with advanced observation assets, the AH-64D provides a unique ability to identify and prosecute deep targets.

Due to the satellite nature of the MCSC NOC infrastructure, information exchange between BFT and AFATDS occurs over-the-horizon. Connecting the AFATDS to the MCSC NOC increases the functional range of the fire support officer (FSO). Currently, the FSO is limited to receiving voice communications from the pilots. However, the FSO can now process a digital call for fire (CFF) from further distances. While the tactical satellite platform is capable of the same ranges as the BFT platform, there is no method of digital communication to the AFATDS. VHF/UHF communications allows digital transmission between two AFATDS, but not between an observer and the AFATDS.

Integrating the MCSC NOC and BFT allows the commander to benefit from information sooner. In addition, the attack reconnaissance battalion (ARB) FSO also integrates with the division artillery (DIVARTY) digital communications plan to facilitate information flow. This digital link between the observer, ARB FSO, and DIVARTY reduces human error and gives the maneuver commander a common operating picture.

The maneuver commander relies on timely and accurate information from a myriad of sensors on the battlefield to make decisions. Because information transmission occurs instantaneously, the commander's understanding of the battlefield is more up-to-date. Aerial observers view the battlespace with a greater time and space capability than troops on the ground, allowing the commander to see well beyond the for-

An Advanced Field Artillery Tactical Data System (AFATDS). (U.S. Army Acquisition Support Center)

Staff Sgt. Nicole Mayberry completes a practical exercise using an Advanced Field Artillery Tactical Data System (AFATDS) at a field artillery military occupational specialty course hosted by the Wisconsin Army National Guard's 426th Regional Training Institute at Fort McCoy, Wis., in January 2016. New approaches to AFTADS upgrades will yield a system that's easier to operate and faster to learn, and is expected to begin fielding in 2020. (Capt. Joe Trovato/Wisconsin Army National Guard)

ward line of troops. As the AH-64D moves further into the deep fight, visibility on the fire support coordination line becomes more important. The AFATDS can populate current locations for observers throughout the battlefield, expediting contact to the forward unit. This provides situational awareness to the call for clearance of Fires into the battlefield.

The ability to contact any BFT from an AFATDS changes information flow through the command post. Policies and procedures must exist to prevent target duplication overwhelming the AFATDS and maintain safety. Currently, the radio telephone operator is required to receive, transcribe and transmit any information from forward observers. The radio telephone operator must then transfer the information into the AFATDS for further dissemination. Because the BFT can communicate digitally with the AFATDS, CFF distribution begins one step closer to the observer. Information from the pilots can facilitate the intelligence warfighting function due to the high integration of Fires and intelligence.

Synchronization of intelligence and Fires warfighting functions is critical to targeting and providing responsive effects. The AFATDS can receive data from several systems for immediate distribution into the intelligence network. Aggregating this data earlier will allow the targeting working group to make more informed decisions. As understanding of enemy movement increases, field artillery Soldiers can better affect the battlespace through lethal and non-lethal effects.

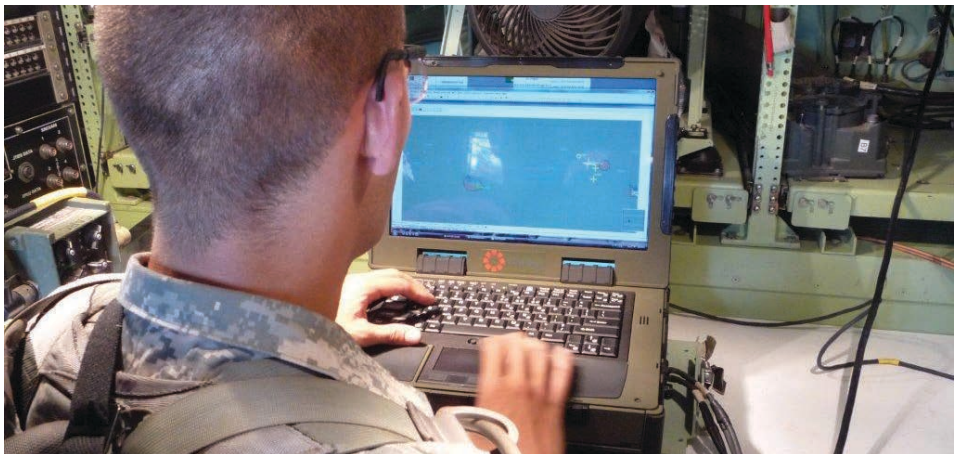
Reducing the digital distance to firing units will give maneuver commanders increased visibility of the battlefield and more efficient information flow from sensor to shooter. Long-range sensors on aerial platforms can send targeting information digitally, enabling artillery fire in the deep attack. AFATDS communication over the horizon offers artillerymen the ability to visualize the battle and engage with long-range precision assets.

Capt. Curtis Joslin is a 3rd Battalion, 319th Airborne Field Artillery Regiment, 1st Brigade Combat Team, 82nd Airborne Division fire support officer.

Sgt. Ty Harshberger is the 82nd Combat Aviation Brigade, 82nd Airborne Division fire support non-commissioned officer.

Spc. Mathew Greeley is an 82nd Combat Aviation Brigade, 82nd Airborne Division fire support specialist.

A Soldier works on the Advanced Field Artillery Tactical Data System. (U.S. Army Acquisition Support Center)



The future of the field artillery warrant officer

By Brig. Gen. Stephen Maranian and Chief Warrant Officer 5 John Robinson

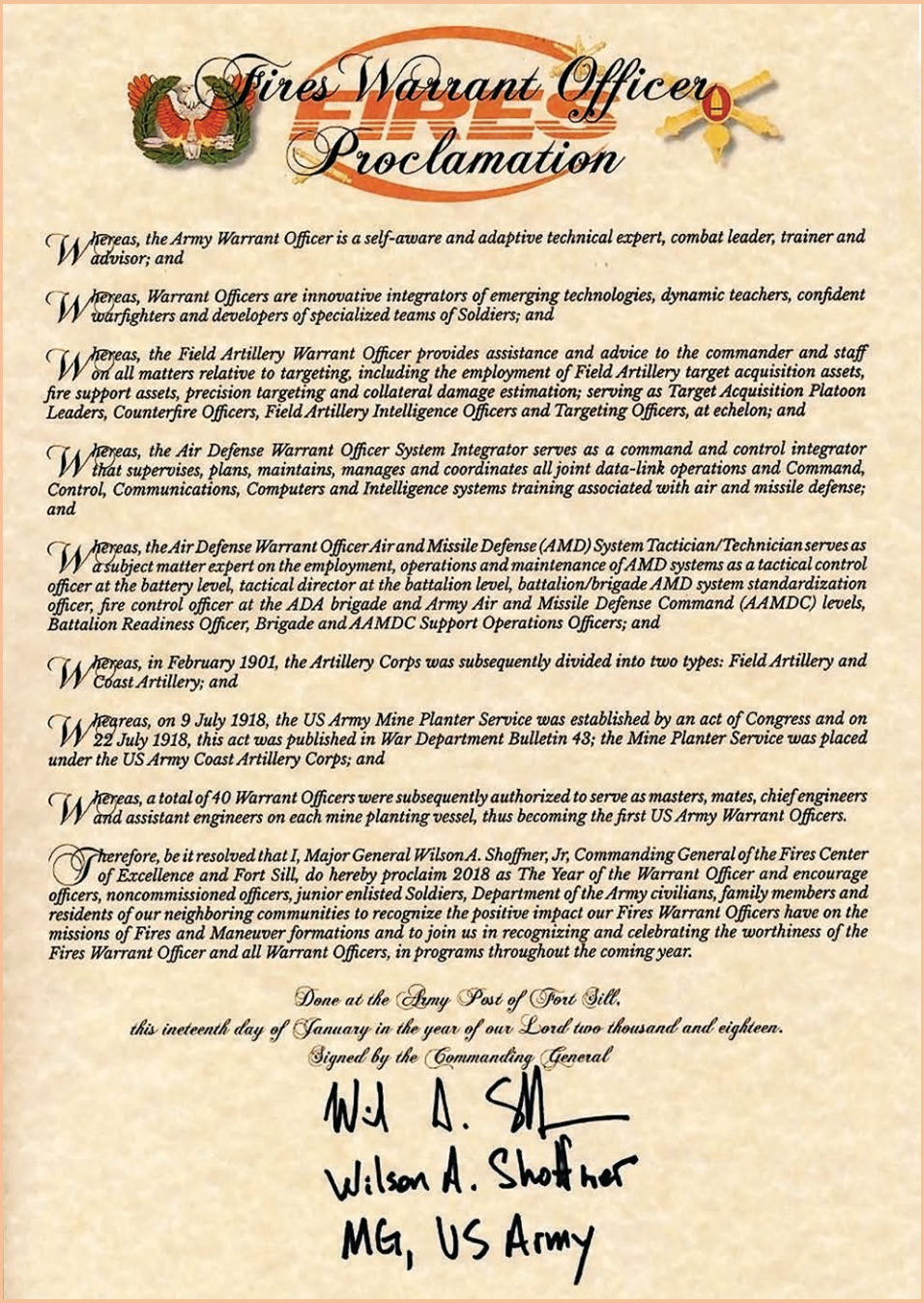
On Jan. 19, Maj. Gen. Wilson A. Shoffner, Jr., Fires Center of Excellence commanding general, declared 2018 as the Year of the Fires Warrant Officer on Fort Sill, Okla. Army warrant officers trace their lineage back to the July 1918 creation of the Mine Planter Service, a subordinate to the Coast Artillery, which in turn was subordinated to the Army's Artillery Corps. It is truly special that our modern-day Fires warrant officers are so directly connected to that moment in history. It's also an opportunity for the field artillery branch to look ahead to the next millennia of field FA technicians. What follows is our vision of the future of the FA tech, in some cases recapping recently made decisions, highlighting initiatives already under development and otherwise providing our prospective roadmap.

We will begin by formally announcing a change in military occupational specialty (MOS) title – from FA targeting technician to simply field artillery technician. Just seven of the 17 Army branches that have warrant officers have but a single MOS; ours is 131A. With just a single occupational track, we ask our warrant officers to lead, manage and develop the field artillery's most technical disciplines – target acquisition (TA) platoons, counterfire, FA intelligence and of course, targeting, at echelon. Since three of those four disciplines are related to, but not explicitly targeting functions, we should acknowledge the full breadth of our warrant officers' impact across the entire branch. Job titles, including TA platoon leader, counterfire officer, FA intelligence officer (FAIO) and targeting officer should not change, but moving forward, MOS 131A will be known as field artillery technician. This MOS title adjustment is already underway.

We will continue to ask our FA technicians to support the mission of the field artillery as stated in Army Doctrine Reference Publication 3-09, "to destroy, defeat or disrupt the enemy with integrated Fires, to enable maneuver commanders to dominate in unified land operations." Our FA techs are not merely system integrators, but rather are our lead integrators of a system of targeting systems (Figure 2). Using mission command digital platforms and tools like the Advanced Field Artillery Tactical Data System, the Joint Automated Deep Operations Coordination System, the Precision Strike Suite for Special Operations Forces and the Digital Image Exploitation Engine 2.0 for target mensuration and collateral damage estimation (CDE), our counterfire officers, FAIOs and targeting officers network with the Air and Missile Defense Workstation, the Distributed Common Ground System-Army and the Tactical Airspace Integration System to develop integrated battlefield designs, enabled by fire support and airspace coordinating measures. These designs must be permissive and responsive to maneuver commanders' objectives and missions. Again, targeting, integration and the delivery of Fires must enable maneuver dominance.

As we mitigate and reverse the proficiency gaps in fire support skills in our branch officer population, developed over years of execution of counterinsurgency (COIN) operations, we should make our FA techs part of the solution. Limited sets and reps at the combat training centers, as well as uneven home station training approaches, have had a significant impact on the operational force and have affected collective training strategies, as well as our ability to plan, rehearse and synchronize joint Fires. As we rebuild our capabilities to address these critical skills, we should re-configure and in some cases increase our capacity to provide integrated Fires planning at the tactical echelons. We should consider replacing the assistant fire support officer, typically a first lieutenant, with a junior FA tech at each maneuver battalion Fires cell (FC) – for both infantry and armor formations. This would establish greater continuity, as well as provide additional skill and maturity. This would also create a better developmental path for FA techs to assume future roles in the brigade combat team (BCT) FCs, where they now serve.

Over the last 15 years, we have grown our BCT FC capacity to include an increase in targeting officer grade from W-2 to W-3 and authorized a second FA tech (W-2) to assist the integration functions, particularly with the additional intelligence, surveillance and reconnaissance (ISR) assets made available or organic to the BCT. The duty title of this second FA tech changed from target analyst to targeting officer in the non-lethal element of the FC, but the actual mission of the officer has never really changed – that Soldier is the integrator of ISR and informa-



Fires Warrant Officer Proclamation

Whereas, the Army Warrant Officer is a self-aware and adaptive technical expert, combat leader, trainer and advisor; and

Whereas, Warrant Officers are innovative integrators of emerging technologies, dynamic teachers, confident warfighters and developers of specialized teams of Soldiers; and

Whereas, the Field Artillery Warrant Officer provides assistance and advice to the commander and staff on all matters relative to targeting, including the employment of Field Artillery target acquisition assets, fire support assets, precision targeting and collateral damage estimation; serving as Target Acquisition Platoon Leaders, Counterfire Officers, Field Artillery Intelligence Officers and Targeting Officers, at echelon; and

Whereas, the Air Defense Warrant Officer System Integrator serves as a command and control integrator that supervises, plans, maintains, manages and coordinates all joint data-link operations and Command, Control, Communications, Computers and Intelligence systems training associated with air and missile defense; and

Whereas, the Air Defense Warrant Officer Air and Missile Defense (AMD) System Tactician/Technician serves as a subject matter expert on the employment, operations and maintenance of AMD systems as a tactical control officer at the battery level, tactical director at the battalion level, battalion/brigade AMD system standardization officer, fire control officer at the ADA brigade and Army Air and Missile Defense Command (AAMDC) levels, Battalion Readiness Officer, Brigade and AAMDC Support Operations Officers; and

Whereas, in February 1901, the Artillery Corps was subsequently divided into two types: Field Artillery and Coast Artillery; and

Whereas, on 9 July 1918, the US Army Mine Planter Service was established by an act of Congress and on 22 July 1918, this act was published in War Department Bulletin 43; the Mine Planter Service was placed under the US Army Coast Artillery Corps; and

Whereas, a total of 40 Warrant Officers were subsequently authorized to serve as masters, mates, chief engineers and assistant engineers on each mine planting vessel, thus becoming the first US Army Warrant Officers.

Therefore, be it resolved that I, Major General Wilson A. Shoffner, Jr, Commanding General of the Fires Center of Excellence and Fort Sill, do hereby proclaim 2018 as The Year of the Warrant Officer and encourage officers, noncommissioned officers, junior enlisted Soldiers, Department of the Army civilians, family members and residents of our neighboring communities to recognize the positive impact our Fires Warrant Officers have on the missions of Fires and Maneuver formations and to join us in recognizing and celebrating the worthiness of the Fires Warrant Officer and all Warrant Officers, in programs throughout the coming year.

Done at the Army Post of Fort Sill,
this ineteenth day of January in the year of our Lord two thousand and eighteen.
Signed by the Commanding General

Wilson A. Shoffner
MG, US Army

Figure 1. The Fires Warrant Officer Proclamation marking 2018 as the year of the warrant officer. (Courtesy illustration)

tion collection assets within the BCT's targeting effort. Moving forward, we will call that person what they are, the FAIO. This duty title adjustment is already underway.

While our FA techs already serve as targeting officers for battlefield coordination detachments (BCD), we are considering the utility of positioning them in the subordinate ground liaison detachments (GLD). GLD teams are currently comprised of a captain and senior noncommissioned officer and are typically positioned with U.S. Air Force fighter and bomber wings. They serve a liaison function, to help prepare aircrews to deliver Fires in support of ground maneuver commanders. This positioning would also create a better developmental path for some FA techs to assume future like roles in the BCDs, where they now serve.

We are mindful that senior commanders value the capabilities our master FA techs bring to their formations. Ideally, every corps, theater Army and Army service component command would have a master FA tech assigned, but today, that structure remains uneven across the force. We are examining options to rebalance our master FA tech population to ensure a more equitable distribution across these formations, with a priority to those theaters with the highest operational need.

Leveraging the capabilities, limitations and profiles of a system of targeting systems – a combination of air, ground and weapons locating radar sensors, as well as the delivery platforms and the mission command platforms and tools to integrate them, is what we train our FA techs to do at the U.S. Army Field Artillery School. Positioning our FA techs in maneuver battalion FCs, in addition to the BCT, division and corps FCs in which they already serve would necessitate additional fire support instruction during their professional military education (PME). This ensures new FA techs are educated to a common baseline, regardless of previous enlisted MOS, and guarantees they are making the needed contributions to fire support planning, rehearsing and integration at echelon. As always, our Warrant Officer Instruction Branch (WOIB) would lead this effort. WOIB provides PME, including functional training, to establish the technical depth required of an FA tech, at echelon. Currently, WOIB includes the Warrant Officer Basic and Advanced Courses (Figure 3). WOBC is attended by newly-minted warrant officers 1 and moving forward, we recommend WOAC be attended by chief warrant officers 2 within one year of their chief warrant officer 3 promotion board (active) and by chief warrant officers 2 identified to fill a chief warrant officer 3 vacancy (National Guard).

The re-balancing of additional fire support instruction and existing instruction on target mensuration only (TMO) and CDE may result in cross-leveling some period of time between the current WOBC and WOAC programs. TMO and CDE have been essential in the COIN fight, but we must consider balancing their criticality with the additional counterfire and fire support instruction needed to excel in unified land operations. TMO and CDE, as components of advanced target development, will remain essential to the FA techs' toolbox.

To better provide the technical depth required of senior FA techs operating at the division/joint task force (JTF) levels and above, the Field Artillery School is developing a Warrant Officer Intermediate Level Education, Phase 3 course, designed to be attended by chief warrant officers 3 within one year of their chief warrant officer 4 promotion board (active) and chief warrant officers 3 identified to fill a chief warrant officer 4 vacancy (National Guard). This

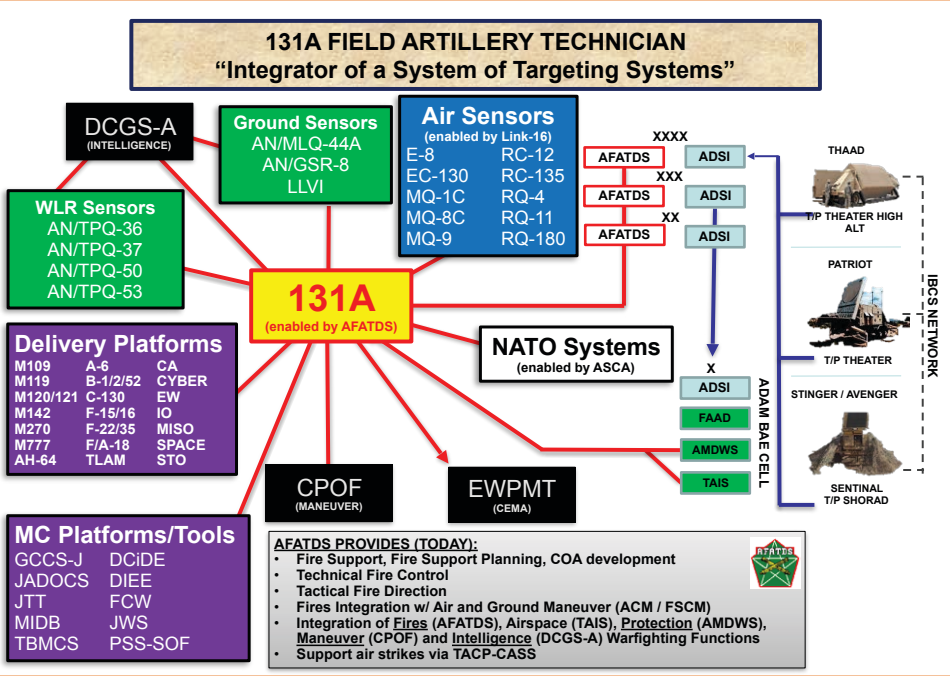


Figure 2. The 131A field artillery technician capabilities provided through the Advanced Field Artillery Tactical Data System. (Courtesy illustration)

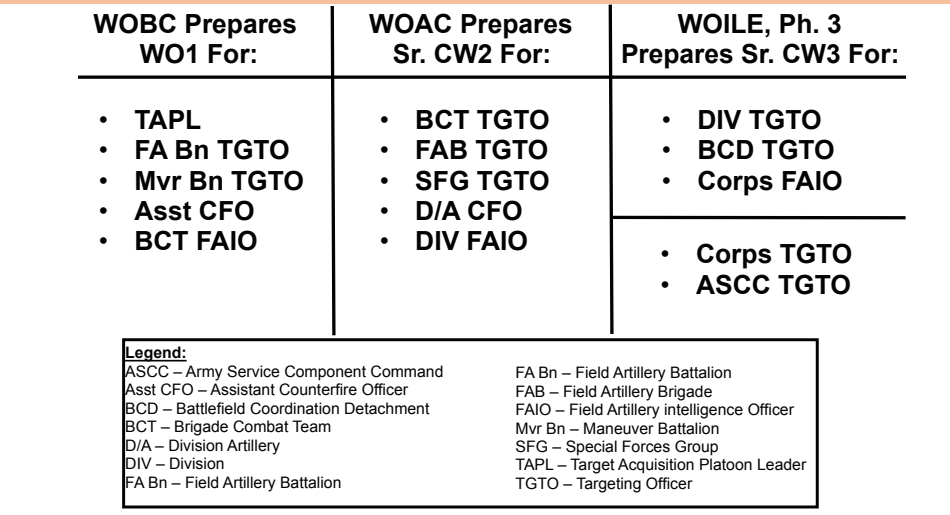


Figure 3. The future field artillery technical professional military education for warrant officers. (Courtesy illustration)

new course may be attended by FA techs either before or after their WOILE, Phase 2 (common core) attendance at the U.S. Army Warrant Officer Career College. While still not finalized, we intend to launch the first course in Fiscal Year 21. Attendance of all phases of WOILE would be mandatory, in order to later attend the Warrant Officer Senior Service Education (WOSSE) Course (for active 131As). The National Guard would not require the Phase 3 course for promotion to chief warrant officer 4, but would require it prior to WOSSE attendance.

We have developed this WOILE, Phase 3 in conjunction with our air defense artillery counterparts. The course is designed as a three-week, blended (distance learning and resident) program, with the final component having FA and ADA warrant officers in the same classroom, addressing common Fires issues at the division/JTF levels and above. With both branches using common doctrine and in the future, potentially using common delivery and acquisition platforms, it makes more sense than ever to provide senior Fires warrant officers common PME.

Wrapping up our education initiatives, we are considering a total force approach to our WOIB manning by adding a guardsman to the faculty. This is already something we do for the FA Captains Career Course and it would be win-win for both components; we relieve the active side of a manning requirement, while at the same time providing greater exposure to the nature of guard missions and experiences. It would also serve as a developmental job for a sharp guardsman and would prepare the officer to be a better leader, mentor and FA tech, once they returns to the ARNG formation.

The addition of new FA tech positions and increased responsibilities, at echelon, will not happen without command and senior FA tech emphasis on increased recruiting, across the force. We have recently expanded our accession pool to include MOSs 11B (infantryman) and 19D (cavalry scout), capitalizing on their maneuver know-how. Our earlier expansion to include MOS 11C (indirect fire infantryman) has proven to be a success. We are also willing to consider cross-service applications from U.S. Air Force Tactical Air Control Party Specialists (CMF 1C4) and select U.S. Marine Corps field artillerymen. Still, we ask that commanders and command sergeants major at all levels consider their most technically astute field artillery leaders as potential future FA techs. We would have to modestly increase our accessions in order to man our future formations, as envisioned.

The future of the field artillery technician is a bright one, filled with opportunities for positive impact on the maneuver fight, additional technical training and increased relevance to the total Army. This Year of the Fires Warrant Officer is just the beginning of that journey!

Brigadier General Steve Maranian is the 52nd Commandant of the United States Army Field Artillery School, the Chief of Field Artillery and the Director, Long Range Precision Fires Cross-Functional Team. His past commands include the 19th Battlefield Coordination Detachment; 4th Battalion, 319th Airborne Field Artillery Regiment; Headquarters & Headquarters Battery, 1st Cavalry Division Artillery; and Battery C, 2nd Battalion, 82nd Field Artillery. He holds Masters Degrees in Strategic Studies from the Army War College and Human Resources Development from Webster University, and a Bachelor of Science Degree in Business Administration from Bucknell University.

CW5 John Robinson is the 3rd Chief Warrant Officer of the Field Artillery. He has held leadership and staff positions from FA detachment through combatant command. He holds a Doctorate in Education from Argosy University, Masters Degrees in Military Art and Science from the School of Advanced Military Studies, International Relations from Webster University and Criminal Justice from Troy University, and a Bachelors Degree in Education from the University of Maine.

Air defense artillery in World War I

By David Christensen

This year marks the 100-year anniversary of the U.S. participation in World War I. It was in 1917 that Gen. John Pershing and his American Expeditionary Force embarked onto the shores of France to begin training and readiness into what became known globally as The Great War. As America entered World War I, new technologies from the Industrial Age were introduced into combat. These became overwhelming combat force multipliers to those who mastered their lethality; one such asset was the introduction of the aero-plane. The aero-plane soon became adapted by war planners to serve in a variety of missions ranging from aerial observation to long-range bombing missions deep behind enemy lines. By 1915, the Germans developed bombers that terrorized Paris and by 1917 Germany's Goth bombers were crossing the English Channel and successfully bombing London. To counter this new emerging threat, the war department reached out to the coastal artillery and elected Brig. Gen. James Shipton to be the first chief of the Anti-Aircraft Service. Shipton soon departed for France where he stood up the first American Anti-Aircraft School Sept. 26, 1917, while in theater with the AEF.

Original class of 1917

The first course of 25 coastal artillery officers, received their anti-aircraft instruction from French officers. After completing their training, this first group of officers served as cadre for the artillery section of the American AA School. Two more sections of instruction were soon added to the school: a machine gun section and the searchlight section. Shipton augmented these two courses of instruction by outsourcing other branches within the AEF. The machine-gun training was provided by infantry officers and the searchlight instruction was taught by engineer officers. In all, the American AA School produced 659 officers and 12,000 enlisted Soldiers by war's end.

Doctrine and tactics

The AA Service had a maxim that "firing should not be adjusted, but prepared." This maxim was adopted because of the inaccuracy of the 75 mm cannon and aiming adjustments became an impossible task. American gun crews developed the practice of preregistering their guns. This pre-registration consisted of firing a volley of rounds into the air, to determine where the desired air burst would occur. With multiple gun systems concentrating on the same avenue of approach, "volume of Fires" soon became the solution to the aerial problem. This solution was also a result of how the aircraft was typically employed. Aircraft pilots used terrain features to navigate, and they preferred linear routes. These observations of aircraft techniques allowed AA units to develop plans that employed their guns along these predicted routes. Diversity of Fires along these routes was also important. Machine guns were used against low-altitude targets, while air bursts delivered from the 75 mm engaged the high-altitude threat.

The Anti-Aircraft Service also developed a doctrine of deterrent Fires. It had become widespread knowledge that "although hitting a plane was common, bringing one down was regarded as a fortunate incident."

From this lesson learned, American AA students were instructed on techniques to deter the aircraft and keep it at a distance. Instructors drilled into the students that forcing an aircraft to fly at a higher altitude would decrease their accuracy, as was the belief that a successful volume of fire would discourage the pilot from reaching their objective.

The American AA Service was the principal user of searchlights during World War I. In all, the AA Service had 34 searchlight platoons activated while in theater. Most Europeans believed searchlights were impractical and would give frontline positions away to enemy targeting. The Americans however, adopted the searchlights primarily for rear defense. The searchlight made an impact as a deterrent to nighttime-bombing raids. Their success was achieved, in part, by the ability to track and highlight a threat. However, the nighttime tracking of aircraft by a searchlight hindered a pilot's ability to see and would cause them to become disoriented and ineffective, often abandoning the target.

The highlight for the newly formed service came to fruition May 18, 1918. A German observation plane was crossing between the security of the German lines and into the buffer of no-man's land, trying to collect information on AEF and French unit positions. An alert crew of the 2nd Anti-aircraft Battery was located approximately 2,700 meters away and was armed with two French 75 mm guns. As the crew prepared the shell fuses for the desired altitude, Lt. A. T. Slaten calculated the necessary data on range, location and speed.

Soon the air was filled with the burst of powder and fragmentation, and the effects provided results. The German observation plane went into a dive, followed by an uncontrolled spiral, finally crashing into the 500 meters of ground known as no-man's land. The crew managed to survive the crash and was viewed scrambling from the wreckage and behind German lines. That night, a French infantry patrol ventured across friendly lines to strip the enemy plane of its machine guns and other useful equipment.

The patrol was also successful in cutting away a piece of the aircraft underbelly and later presented it to the American battery commander, Capt. E. A. Mellon, as a souvenir and confirmation of the American's first recorded kill.

By the end of the war, America's AA Service was the most successful anti-aircraft service among the allies. The success was attributed to the tenets of good training, the developed doctrine and to the skill and discipline of the crews operating the weapon systems. When comparing the data, it took a British gun crew 10,000 rounds and the French crew 6,000 rounds to down a single plane. But, it took only 600 rounds for the Americans to bring one down.

First to fire!

David Christensen is the U.S. Army Air Defense Artillery School historian at Fort Sill, Okla.

A group of U.S. Army Anti-Aircraft Service Soldiers demonstrate their weapon system on the National Mall, Washington, D.C., 1918. (Harris and Ewing/Library of Congress)

Patriot battalion achieves 'first' in deployment exercise

By 1st Lt. Sallena Samuel

Third Battalion, 2nd Air Defense Artillery became the first Patriot battalion to employ the Dismounted Patriot Information Coordination Central (DPICC) during a mission rehearsal exercise.

Just 12 months after their most recent redeployment from the U.S. Central Command area of operations, the Soldiers in 3rd Battalion, 2nd Air Defense Artillery Regiment, *Lethal Strike*, are once again preparing to deploy. The *Lethal Strike Battalion* Soldiers concluded their rigorous six-month training strategy, achieving excellence during their culminating training event while integrating future planned Patriot modernization capabilities into the fight. The battalion executed its mission rehearsal exercise (MRE) Nov. 28 through Dec. 13, which certified the battalion's ability to activate its rear detachment, exercise it's prepare to deploy order short notice Patriot battery, and execute deployed split-based mission command, engagement operations, and force operations from within the Fort Sill Mission Training Complex and training areas.

The exercise replicated every aspect of their planned real-world deployment to the CENTCOM area of operations. The battalion coordinated with the Capabilities Development and Integration Directorate and Raytheon to use the new DPICC capability. In doing so, 3-2nd ADA became the first Patriot battalion to employ the DPICC during a mission rehearsal exercise. The DPICC relocates the battalion's Information Coordination Central (ICC) tactical weapons control system from a vehicle into an external shelter. This provides the same capabilities as the original tactically mounted system, but enables flexibility for battalions with geographically separated missions. The system serves as the battalion-level tactical command and control center that directs identification and engagement orders to subordinate Patriot batteries.

Testing a new system can be challenging, however, 3-2nd ADA proved to be up to this task.

"Using the Dismounted Patriot Information Coordination Central during 3-2nd ADA mission rehearsal event accomplished three things. It validated Raytheon's approach, it proved the technology works in a real-world setting and it allowed the user community to share lessons learned," said retired Chief Warrant Officer Nate Jones, Raytheon senior manager for Integrated Air and Missile Defense Product Support and Mission Support Systems. "This will ensure the technology is mission-ready as each Army Air and Missile Defense Command considers employing the capability within their respective areas of responsibility."

The current forward deployed 1st Battalion, 7th Air Defense Artillery Patriot Battalion supported the MRE providing observer controllers and trainers to assist with mission planning and execution. The forward team provided quality feedback to leadership, staff and engagement crews on current theater tactics, techniques and procedures to help visualize and understand the environment. Their constructive feedback increased the confidence of the Soldiers for their upcoming mission.

"The Patriot weapon system is an invaluable asset not only to the U.S. Army, but to the joint force," said Maj. Michael Woodhouse, 3-2nd ADA S3 operations officer. "An opportunity to have external evaluators validate all the hard work and training the leaders and Soldiers have gone through is worthwhile. This exercise proved to be no exception."

The battery conducted an emergency deployment readiness exercise initiated by an alert and recall and mission brief. They exercised its deployment sequence to validate actions and reporting procedures associated with the first 96

Soldiers from the Information and Coordination Center, 3rd Battalion, 2nd Air Defense Artillery, man their stations during training Dec. 9, 2017. (Sgt. 1st Class Gordon Une/U.S. Army)

Soldiers from B Battery, 3rd Battalion, 2nd Air Defense Artillery, prepare the Guided Missile Transporter for reload training. (1st Sgt. Chris Cooper/U.S. Army)

hours of deployment preparations. The coordination and networking during this 96-hour sequence prepared Soldiers who have not experienced a rapid deployment. It also built leadership and Soldier confidence with understanding the critical support relationship provided by the Fort Sill installation support agencies. The civilian team at the Logistics Readiness Center instilled confidence with supporting the deployment exercise while also conducting a real world strategic air deployment. The LRC provided realistic training using their weigh-in motion system, which greatly expedites requirements for deploying vehicles. Following the completed 96-hour actions, the battery staged at the headquarters motor pool on a short tether to deploy to the local training area in order to replicate a real world deployment. The battery later deployed to the field and maximized the training opportunity for real-world operations, which challenged the Soldiers. They had to maintain continuous air defense operations based off a modified eight-hour shift timeline.

"The battalion commander and I could not be more proud of the collective effort of every one of our *Lethal Strike* Soldiers who have been training over the last six months to reach this milestone in anticipation for the upcoming mission," said Command Sgt. Maj. Tammy Coleman, 3-2nd ADA command sergeant major. "*Lethal Strike* Soldiers continue to amaze me daily with their work ethic, their ingenuity, their motivation and their desire to be better than they were previously. They always make me proud to be their command sergeant major."

Also evaluated during the MRE was the unit rear detachment. The mission of the rear detachment is to provide home-station support for the deployed unit while assuming

Soldiers from B Battery, 3rd Battalion, 2nd Air Defense Artillery, conduct missile reload training. (1st Sgt. Chris Cooper/U.S. Army)

the unit's garrison duties and requirements. They also serve as a communications link and means of support between the deployed unit and family members. During the MRE, the rear detachment worked through complex scenarios, including the death of a service member. The battalion family readiness advisor hosted a meeting with the battery spouse leaders to discuss current family readiness topics and share local Fort Sill and Lawton community updates.

"A solid, professionally involved rear detachment can make any deployment easier for the deployed Soldiers and their families. Just knowing that a valid support system exists relieves a lot of the stress," said Master Sgt. Douglas Middleton, 3-2nd ADA rear detachment non-commissioned officer in charge.

The culminating success of the battalion is the direct result of engaged leaders at every level, the resiliency of the *Lethal Strike* Soldiers and the support of family members. The battalion redeployed in December 2016, turned in their Patriot equipment to depot level reset from January through August 2017, and then did a rapid gunnery train-up on equipment with new leaders and Soldiers.

"This was no easy accomplishment, but this outfit of highly motivated professionals made it happen because they are committed and it is expected of them. You can honestly feel and see it. Our Soldiers are more lethal, better trained and families are better prepared as we move into our upcoming deployment," said Lt. Col. Pedro Camacho III, 3-2nd ADA commander. "Our motto of *Lethal Strike* means more potent or effective, devastating, battle ready and that is what molds our *Lethal Strike* Soldier and family member to be the best above all others."

The completion of the MRE signifies that the battalion is prepared and ready to deploy. With a vision of the future still in mind, the Soldiers from the *Lethal Strike Battalion* will continue to train in order to sustain the readiness that is paramount to mission success.

First Lt. Sallena Samuel is currently a tactical director with the 3rd Battalion, 2nd Air Defense Artillery Regiment in support of Operation Enduring Freedom.

BRIGADE-LEVEL AIR DEFENSE IN SUPPORT OF CORPS, DIVISION

By Lt. Col. James Reese

An AN/TWQ-1 Avenger air defense system fires a missile over the Black Sea at Capu Midia Training Area, Romania, July 19, 2017. The drill allowed gunners to fire live missiles as part of Tobruq Legacy, an air defense exercise where the U.S. and its NATO allies and partners share new knowledge, techniques and strategies to enhance air defense capabilities in Eastern Europe. (Pfc. Nicholas Vidro/U.S. Army)

The operating environment for our Army has recently reached a transition point that is forcing us to address and update the facts and assumptions driving our doctrine, training and force structure. The realities of anti-access/area denial capabilities, lessons learned from the Russian-Ukrainian conflict, and the escalation of peer/near-peer capabilities from known adversaries such as North Korea have forced this relook of the assumptions we have been using for planning. The article is focused on how our air defense community can utilize decisive action corps and division-level training exercises to continue to analyze the assumptions made regarding doctrine and force structure, create opportunities and close known gaps in our training and integration.

The arrival of the new 3-0 doctrinal series in concert with our developing understanding of Russian New Generation Warfare (RNGW) has served as the first step in regenerating a doctrinal capability for large-scale ground combat. Key to this developing understanding, the greater Army enterprise has acknowledged the requirement to renew our readiness to fight and win in a decisive action environment at the corps and division levels. For the Fires community in general and the air defense artillery community in particular, the re-emergence of "large-scale conflict" doctrine has exposed a gap in our ability to integrate at the corps and division levels.

Currently, the air defense community does an exceptional job of integrating and exercising our capabilities at joint/combined theater level exercises supporting such events as United States Forces – Korea's Key Resolve and Ulchi Freedom's Guardian or Central Command's sponsored air and missile defense exercises. Similarly, our battery commanders within Avenger Short Range Air Defense (SHORAD) units are representing our capabilities at the brigade combat team (BCT) and below level. Between these two levels however, a significant gap exists in the air defense community's training; our ability to integrate air defense battalions and brigades with divisions and corps executing large-scale decisive action operations.

As we continue to gain a deeper understanding of Russian New Generation Warfare, the implications for the air defense community are becoming more apparent. Since 2003, static defense of large assets (i.e. air and sea ports of debarkation, key political and strategic assets) has been the driving force of the development of our air defense capabilities, training and certification of units. High and medium altitude air defense (HIMAD) units certify to deploy to static assets and our Patriot battalion and brigade staffs exercise capabilities within the context of supporting joint and combined staffs with no significant focus on the tactical and operational fights of corps or divisions. The emergence of RNGW has exposed the vulnerabilities of this mindset both in terms of training and capabilities.

In terms of active defense capabilities, adversary use of small scale unmanned aircraft systems (UASs) to conduct reconnaissance, intelligence, surveillance and target acquisition (RISTA) operations continuously exposes gaps in our ability to detect and defeat such threats. The air defense enterprise is currently focused on reconstituting both a credible kinetic as well as multi-domain/functional response to this threat. The Fires Center of Excellence has resourced trainers to certify Stinger teams within maneuver BCT formations, providing commanders an immediate capability within their battlespace. Additionally, cross-functional teams from multiple directorates within FCoE are working toward long-term solutions to these problems. Air Defense/Airspace Management (ADAM) cells continue to maintain our footprint within the maneuver formation to de-conflict airspace for Fires, advise the commander on air defense matters, and provide early warning; giving the best short-term capability to enable protection against aerial attack.

As lessons learned from the training centers continue to spread amongst the force, passive defense measures and what maneuver units can do to protect themselves has also gained momentum. What used to be second nature in terms of camouflage, concealment, dispersal and cover for larger footprints such as tactical operations centers, assembly areas, etc., atrophied in the face of less capable adversaries. With the emergence of extended range sensors and UAS to acquire targets, adjust Fires, and then assess battle damage assessment; survivability moves, dispersal, positioning and electromagnetic emission control are gaining new prominence in view of the fact that a formation may have limited ADA protection.

As laid out in the recent article by Lt. Gen. Michael Lundy and Col. Richard Creed in the November-December 2017 edition of Military Review titled, The Return of U.S. Army Field Manual 3-0, Operations, "Since 2003, seldom have units larger than a platoon been at risk of destruction by enemy forces, and no units faced enemy forces able to mass Fires or maneuver large-scale forces effectively." Within this context, the air defense community can begin to address the key question of what we as air defense professionals bring to the fight for corps and division-level training and operations.

FM 3-0 and its accompanying doctrinal publications strive to develop and re-energize our understanding of fighting against a peer and near-peer threat across all phases of the joint phasing construct.

When looking at our contributions through the lens of the Army's four strategic roles of shaping the operational environment, preventing conflict, conducting large scale ground combat and consolidating gains, three things become apparent. First, depending upon the phase of operation and regardless of enemy, we will not have an overwhelming advantage in every area. Leading to the second point, that during every phase of an operation, certain warfighting functions or domains will become the supported main effort in regaining, retaining or exploiting a position of relative advantage over an enemy. Lastly, in order to better arm commanders at all levels, it is important that we recognize through vignette driven training exercises what combinations of multi and cross domain warfare best impact given situations. For the air defense community, participation adds to our ability to first, get "left of launch" at the tactical and operational level as well as educating ourselves on the best way to defend non-static assets; i.e., breach sites, points of penetration or lines of passage.

Air defense remains amongst the highest deployed branches in the U.S. Army. Of its 15 Patriot battalions, seven are either deployed or forward stationed at any given time with another three battalions in some form of preparation. Our two current SHORAD battalions are consumed with supporting the counter-rocket, artillery and mortar as well as more traditional SHORAD missions to defeat low altitude aircraft and UAS. As such, there is a constant focus on phase 0 (shape) and phase 1 (deter) presence of ADA resources in peer/near-peer locations throughout the world. The presence of US HIMAD clearly signals U.S. commitment to allies and partners. Additionally, our unique capabilities allow for strategic decision space by creating doubt in adversary options to employ strategic surface-to-surface Fires and protection of strategic military and geo-political assets vital to maintaining relations and building combat power. The joint and theater level exercises discussed earlier clearly link to this type of theater level support through the start of phase 2 (seize the initiative) operations.

If deterrence fails, there is a shift in ADA efforts from a very HIMAD and strategic viewpoint to an operational and tactical focus coupled with the additional capabilities against lower altitude aerial and rocket, artillery, mortar threat (SHORAD). Phase 2 (seize initiative) and phase 3 (dominate) phases of operations lead by the corps and divisional headquarters is where we stand to gain the most benefit in the training environment.

Area denial capabilities from the operational through tactical levels utilizing aerial-based RISTA capabilities, coupled with the use of long range surface-to-surface Fires, are the specific threats that our air defense brigades and battalions uniquely address in support of corps and divisions. Our corps and division air defense staff officers (i.e. ADAM and Army Airspace Command and Control cells) are more than capable of articulating air defense contributions to reconnaissance and security, shaping, decisive operations and condition setting, and recommended acceptable levels of risk to sustain momentum. However, air defense brigade and battalion staffs are uniquely suited to provide specific, detailed analysis and recommended solutions to the supported corps and division. In addition, the commanders of these air defense formations serve as credible training aids to corps and division commanders on the best use of air defense formations and staffs in their three key roles at the corps and division level. The senior ADA commander responsible for all assigned and attached air defense resources, senior Army air defense coordinator for all active defense and early warning within a designated battlespace, and supporting the Army Air and Missile Defense Command role as Theater Army Air and Missile Defense coordinator in support of the theater land component and deputy area air defense commander to the theater air component commander.

Friendly maneuver and Fires enabled by multi-domain capabilities to destroy, dislocate, disintegrate or isolate enemy long-range Fires in the dominate phase of operations coupled with the expenditure and degradation of enemy aerial and tactical ballistic missile capabilities inherent to high tempo operations leads to a natural declination of air defense HIMAD and SHORAD efforts earlier in phasing than, for example, maneuver units. Integration with corps and division-level training events will help condition their staffs to understand and develop better conditions based operations in this high threat environment and help set realistic expectations of effective "mixes" of active and passive defense measures. At the operational and strategic level, ADA brigade commanders can provide the vital "sanity check" to a supported maneuver commander for the development

of decision points driving the shifting of resources to sustain air defense units and allow for the refocus of sustainment efforts to higher priority activities (enable, stabilize, dominate, deter, shaping). Strategically, corps and division commander's knowledge of shifting of these resources facilitates decisions to redeploy, reset and prepare ADA units for follow-on deployments. The unique requirements, capabilities and limitations of air defense systems and units limits their utility in Phase 4 (stabilize) and Phase 5 (enable civil authority) operations and serves as the main driving efforts for

More than 17,000 U.S. service members participated with South Korean counterparts in exercise Ulchi Freedom Guardian, an annual exercise designed to promote defense partnerships between the U.S. and South Korea. (Senior Airman Michael Hunsaker/U.S. Air Force)

redeployment and employment in other theaters.

In conclusion, as then Maj. Gen. H.R. McMaster said in May of 2012, "We have a perfect record in predicting future wars — right? … And that record is zero percent." Presupposing the emergence of peer and near-peer adversaries such as North Korea and Russia, it is critical that we begin to integrate our air defense brigade staffs into corps and division-level training exercises. The clear, overarching objective of this integration is to retrain our operational level maneuver leaders on successful integration critical air defense capabilities and regaining the skill sets within our branch to link operational and strategic air defense assets to tactical success in decisive action. Secondary to readiness, participation in corps and division-level warfighters will also validate or expose gaps in our doctrine and force structure to maximize limited resources. Given the expected operational tempo of operations at all levels, participation in these exercises reduces the discovery learning that contributes to the normal fog and friction inherent to combat operations and only enhances Air Defense branch readiness, as well as that of the greater Army.

Lt. Col. Reese is currently serving as the Human Resources Command Air Defense Officer Professional Management Division branch chief. Prior to that, he served as the 2nd Battalion, 44th Air Defense Artillery (C-RAM/Avenger) battalion comander.

In their words

Missile defense crew recounts intercontinental ballistic missile target flight test intercept

By Sgt. Zach Sheely

The Ground-based Midcourse Defense element of the Ballistic Missile Defense System has been operational since 2004. It is the United States' anti-ballistic missile safeguard, and is designed to intercept incoming enemy warheads in space. In May of 2017, it achieved perhaps its greatest success to date in its toughest test yet.

A ground-based interceptor is launched by the Ground-Based Midcourse Defense System at Vandenberg Air Force Base, Calif., May 30, 2017. Soldiers of the 100th Missile Defense Brigade (Ground-based Midcourse Defense) executed the launch, the first successful intercept of an intercontinental ballistic missile, from inside a secure node at Schriever Air Force Base, Colo. (Senior Airman Robert Volio/U.S. Air Force)

Flight Test Ground-based Interceptor (FTG)-15 showcased the system's capabilities, as it was the first successful interception of a simulated intercontinental ballistic missile target by a ground-based interceptor launched by the (GMD) system.

The test, which took place May 30, was the culmination of complex integrated planning by a number of military agencies and materiel developers. At its heart were the warfighters – five 100th Missile Defense Brigade Soldiers operating the system inside a secure "node" at Schriever Air Force Base, Colo.

The 100th Missile Defense Brigade, which is a multi-component brigade consisting of active-component U.S. Army and U.S. Army National Guard Soldiers in Colorado, California and Alaska, is the only military unit with a 24/7/365 mission of defending the homeland from intercontinental ballistic missile (ICBM) attacks with ground-based interceptors.

Ground-based interceptors – solid-fuel, three-stage rockets tipped with a kinetic Exoatmospheric Kill Vehicle (EKV) – are emplaced at Fort Greely, Alaska, and Vandenberg Air Force Base, Calif.

Once a GBI is launched, it boosts the kill vehicle outside of the earth's atmosphere to hit and destroy an enemy ICBM in the midcourse of its flight. This highly technical and precise process has often been compared to hitting a bullet with another bullet.

Redundant crews of five Soldiers with 100th Missile Defense Brigade at Schriever and the 49th Missile Defense Battalion at Fort Greely, Ala., control the system. The unofficial motto of 100th MDB is "The 300 (Soldiers) protecting 300 million (Americans)."

In no particular order, this is the story of FTG-15 from the perspective of the five crew members who executed the launch.

(Their last names have been withheld for security purposes.)

Staff Sgt. Daniel, readiness officer

"We got it!" said Staff Sgt. Daniel

While his initial reaction was that of excitement, once the crew realized they had

authored the successful intercept, their overall response was subdued.

"For us, it was just another day at the office," said Daniel, who has served in multiple roles within the air defense artillery enterprise. "Being in a Patriot unit, you get live fire opportunities. Being a joint tactical ground station operator, you're constantly seeing missiles launched and intercepts from other countries.

"This is what I'm trained to do, this is my job. My job is to defend the homeland. I've had 100 percent confidence in the (GMD) system since even before coming out here."

Skeptics have knocked the "lack of realism" of FTG-15. However, Daniel said while the crew was aware there would be a test launch, they were not privy to the exact nature of what they would face and when.

"For us it was completely realistic because while we knew the day it was going to happen, we didn't know anything else," he said.

The missile defense crew Soldiers are the products of a rigorous training course led by instructors from the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command's Directorate of Training and Doctrine. They must achieve 90 percent just to be qualified to join a missile crew. Once assigned to a crew, they are immersed in an environment where daily training runs and no-notice evaluations to maintain gunnery-table certification from higher headquarters are the norm.

Daniel said that the crew on FTG-15 relied on their training and tactics, techniques and procedures. He said his crew performed flawlessly and any of the other missile defense crews would have achieved a similar result.

"The system that we have to ensure that we're proficient works because I was able to do it, so I know that anybody else here would be able to do it," Daniel said. "I've got 100 percent confidence in the system and all of our operators."

Daniel said the achievement does not belong exclusively to the crewmembers on shift that day.

"This was a great success for this unit on so many levels," he said. "You've got the fact that it was active-duty and National Guard Soldiers together. You've got the achievement of the first ICBM target successfully engaged. You've got warfighters on the console actually performing their wartime mission.

"We at the brigade can do this in our multiple training runs every single shift, but also when the homeland is affected."

1st Lt. Alberto, current operations officer

1st Lt. Alberto has spent the entirety of his post-West Point Army career with the 100th Missile Defense Brigade and named his role in FTG-15 as the highlight of his career, thus far.

"I feel extremely fortunate to be part of this unit, to be part of that crew," said Alberto. "It was a quiet confirmation of what we already knew to be true. The system works, our operators are trained and proficient. It was exciting. We were proud of ourselves, the crew, the system and the developers.

"The reason that it's exciting is not because we doubted it would work," Alberto said. "The reason it's exciting is because it's not something that happens every day. It was a unique opportunity to test the system in a real way that validated what we knew it was going to do."

Alberto described ground-based midcourse defense as a "system of systems," which comprises a global network of space-, ground- and sea-based sensors. His role as the current operations officer is to communicate with and monitor the various GMD system sensors.

"Those sensors are feeding information to us," said Alberto. "As (the threat) reaches each new sensor, we're gathering more refined data, so we're tracking where the threat missile is travelling and where it's predicted impact location is. On test-launch day, I actually spoke with (Sea-based X-band Radar) and had (the crew) initiate their procedures for the launch."

Alberto said there was never any doubt the system would work.

"We don't want to overemphasize it because this is the expectation," Alberto said. "This is a no-fail mission. The unit was supposed to do this, and we did it. We look forward to doing more tests with more complex scenarios.

"This test put the 100th Missile Defense Brigade on the map," he added. "We were more under the radar before, but this reassures the rest of the military community, the nation, and world that we have this ability and this ability works. The American people can count on us."

Staff Sgt. John, future operations officer

Staff Sgt. John served as a combat engineer for five years, including multiple deployments, and also served on the Patriot system. He said when he was assigned to the 100th Missile Defense Brigade, neither he nor his air defense artillery brethren had heard of the unit.

"When I got orders to this unit, nobody knew what it was," said John. "I got here and in-processed at Fort Carson. I had to ask around for about a week before I found out where this unit was and what it did."

John echoed the sentiments of Alberto, and said that the test – coupled with increased ICBM testing by North Korea – has helped to boost awareness of the GMD mission and the 100th Missile Defense Brigade.

John described a large group of people in the room for the flight test May 30, including materiel developers and Missile Defense Agency personnel, but the crew remained solely focused.

"For the crew, we saw it and we engaged the threat," said John. "We got to watch the intercept and see it was successful. It was pretty cool.

"I guess I had never really thought about what an actual intercept would look like," he said. "It was really cool to see just a huge ball of infrared fire. I expected it to work. I guess I never really questioned if it would work or not. I just expected it to work and it worked. The technology is constantly improving."

Maj. Jeremy, deputy director

"This is the best version of the system ever in place to meet the current threats," said Jeremy. "We're always upgrading not only the software and hardware, but also the tactics."

Jeremy, a former Paladin cannon crewmember, first joined the 100th Missile Defense Brigade in 2006 at Fort Greely, Alaska, as part of the 49th Missile Defense Battalion.

"It's been very rewarding to see how the system and the organization has changed," said Jeremy.

The total number of emplaced ground-based interceptors increased to 44 in 2017, due in part to the success of FTG-15, Jeremy said.

"We've gone from a limited number of GBIs at the onset of the program to now having 44," said Jeremy. "That was a big thing about FTG-15 – to validate that the interceptors could destroy a target. Because of the success of that intercept, we went from 36 to 44 this year."

Jeremy said that May 30 was special because of the rarity of the opportunity for the GMD system to launch a GBI.

"It was an exciting day," said Jeremy.

"Just like any other Soldier, you train, train, train, and some Soldiers never get the chance to actually do their job. For us it was a chance to actually engage and destroy an ICBM. It was very rewarding and we felt honored to be able to do that. Because we train so much, we weren't worried. It wasn't a stressful situation. It was second nature."

Although the 100th Missile Defense Brigade is a National Guard unit, Jeremy was the only Guardsman on the crew during FTG-15.

"We are standing watch 24/7 to protect the homeland," said Jeremy. "It doesn't get any more 'National Guard' than that."

Lt. Col. Jeffrey, director

Lt. Col. Jeffrey, executive officer of the 100th Missile Defense Brigade, is a U.S. Army veteran of 24 years, most of which he has spent as an air defense artillery officer.

On May 30 he was the director of the crew during the launch.

The Missile Defense Element conducts the operational piece of the GMD mission for U.S. Northern Command. The MDE crew director has direct communication with higher headquarters and is entirely responsible for the actions of the crew.

While that may seem like a heavy responsibility, Jeffrey said it's a part of the job.

"It's expected," said Jeffrey. "It's something I can handle. It's something I feel comfortable with. With the amount of training and preparation that we do, we build that faith and confidence in each other and build that relationship with (higher headquarters).

"We know how to do it. Based on the crew and our training, I have a lot of faith in the system."

Jeffrey said that the overall test record of the GMD is not a fair judgment of the system's current capabilities, and FTG-15 proved that.

"Look at the most recent test," he said. "Look at the threat that we put this last one up against. Now we have a more advanced GBI and EKV. The basic construct is the same. The concept is the same, but the equipment and details are much more advanced.

"Testing is important, I'm glad we do test," Jeffrey continued. "It helps build faith and confidence. It's only going to help improve the system. As we see more complex threats, we need to create more complex tests. It would be a mistake to not continue testing, developing, and refining our system."

Sgt. Zach Sheely, 100th Missile Defense Brigade Public Affairs noncommissioned officer in charge, has served in the National Guard for nine years, both in Colorado and Kansas. He has enjoyed covering High Mobility Artillery Rocket Systems, Paladin, and the Ground-based Midcourse Defense missions, among others. Sheely activated on state emergency service in Colorado and Kansas for wildfires. He's served on multiple overseas assignments in Korea, Zambia, Slovenia and Armenia.

The five 100th Missile Defense Brigade (Ground-based Midcourse Defense) Soldiers who executed the intercept of a test intercontinental ballistic missile target May 30, 2017, receive coins of excellence from Lt. Gen. James Dickinson, left, U.S. Army Space and Missile Defense Command/Army Forces Strategic Command commanding general, June 2, 2017, at SMDC headquarters in Colorado Springs. Flight Test Ground-based Interceptor 15, was the first successful intercept of an ICBM target by the GMD system. (Courtesy photo)

Countering air and missile threats

A combination of counter air and integrated air and missile defense in Joint Publication 3-01

By Don Baker and Michael Wiant

The recently published revision to Joint Publication (JP) 3-01, "Countering Air and Missile Threats," dated April 21, 2017, updates joint doctrine in an area of increased vital interest to the United States. Doctrine for countering air and missile threats is a complex combination of many elements throughout the planning and execution phases including the air defense and ballistic missile defense (BMD) mission areas; tactical, operational and strategic levels of warfare; and offensive and defensive mission aspects. When an increasing number of countries can threaten the U.S. and its allies with air and missile capabilities, effective integration of our resources becomes more important than ever. The following contextual description is extracted from JP 3-01:

"The strategic environment is uncertain, complex and changes rapidly. While the basic character of war has not changed, the character of conflict has evolved. The military environment and the threats it presents are increasingly trans-regional, multi-domain and multi-functional (TMM) in nature. TMM will cut across multiple combatant commands (CCMDs), across land, sea, air, space and cyberspace. The strategic environment is fluid, with changing alliances, partnerships and national and transnational threats that rapidly emerge, disaggregate and reemerge. These factors will significantly affect how the joint force conducts counter air and missile threat operations. Despite our best planning and the application of sound intelligence combined with the other joint functions, we can expect uncertainty and ambiguity to exist in strategic and operational environments … The proliferation of weapons of mass destruction, coupled with means of delivery, greatly increases the potential lethality of any adversary and elevates the importance of maintaining robust capabilities to protect U.S. and friendly forces and areas."

This article summarizes the history, evolution, basic elements and implications of JP 3-01 while focusing on its two central frameworks: Counter-air and integrated air and missile defense (IAMD).

In reference to JP 3-01, Brig. Gen. Clement Coward, Joint Staff J8 deputy director for force protection and Joint Integrated Air and Missile Defense Organization director stated, "The release of JP 3-01 represents a major step forward in articulation of joint doctrine for air and missile defense. The days of stove piped air and missile defense capabilities and procedures within services, individual combatant commands, regions and phases are over. In this era of increased attention on air and missile threats, it's crucial that U.S. forces be integrated for maximum effectiveness. JP 3-01's expanded articulation of counter-air, which has been a foundational doctrine for many years, and IAMD, which is a new approach, clarifies confusion that has existed for years."

A Standard Missile-3 (SM-3) Block 1B interceptor missile is launched from the guided-missile cruiser USS Lake Erie (CG 70) during a Missile Defense Agency and U.S. Navy test in the mid-Pacific. The SM-3 Block 1B successfully intercepted a target missile that had been launched from the Pacific Missile Range Facility at Barking Sands in Kauai, Hawaii. Lake Erie detected and tracked the target with its onboard AN/SPY-1 radar. The event was the third consecutive successful intercept test of the SM-3 Block IB missile. (U.S. Navy)

Counter-air

Counter-air has long been a foundational part of joint doctrine. The 1999 edition of JP 3-01 addressed doctrine for countering air and missile threats primarily within the context of air superiority against fixed-wing (e.g., fighters) and aerodynamic missile threats (e.g., cruise missiles). Ballistic missiles (BM), while addressed, were clearly

not the focus. These and other details were more specifically addressed in four associated, supporting JP 3-01.2, "Offensive Operations;" JP 3-01.3, "Defensive Operations;" JP 3-01.4, "Joint Suppression of Enemy Air Defense (J-SEAD);" and JP 3-01.5, "Theater Air and Missile Defense."

In the 2007 revision, the four supporting joint publications were merged into an all-encompassing JP 3-01. This consolidated version of JP 3-01 included a revised counter-air framework. The framework and supporting text addressed the two primary pillars, offensive and defensive counter-air (OCA and DCA), and their associated elements. OCA was defined as "offensive operations to destroy or neutralize enemy aircraft, missiles, launch platforms and their supporting systems both before and after launch and as close to the source as possible." OCA consists of attack operations, suppression of enemy air defenses (SEAD), fighter escort and fighter sweep. DCA is defined as "all defensive measures designed to neutralize or destroy enemy forces attempting to penetrate or attack through enemy airspace." Further description tells us DCA consists of two major subcategories: active and passive air and missile defense.

The 2012 revision to JP 3-01 made changes to the counter-air definition and framework to better enable them to encompass the full scope of countering air and missile threats and to support IAMD, which will be discussed later. In the first change, the term "protection" was added in the definition to clarify the fact that counter-air addressed all categories of theater air and missile threats, including ballistic missiles, viewed by many as not ade-

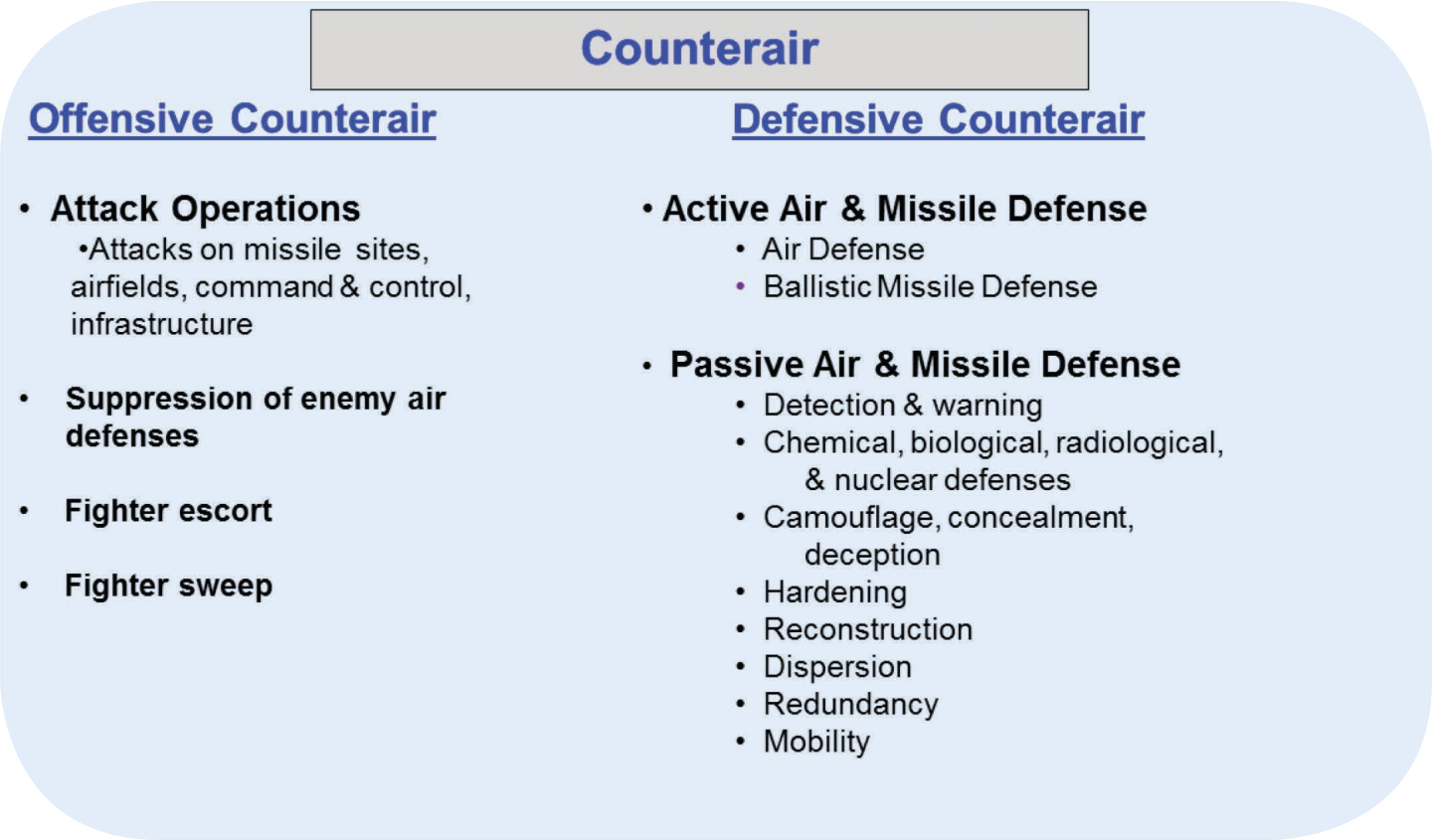


Figure 1. The counter-air framework. (Courtesy illustration)

quately countered by air superiority alone.

The second change in 2012 replaced missile defense (MD) with BMD as one of the two components of active air and missile defense (AMD) within the counter-air framework as shown in Figure 1. This change eliminated the previous duplication between the AD and MD subcategories, both of which included aerodynamic missiles. Explicitly separating ballistic missiles from all other air threats enabled better recognition of the many clear operational differences between the two. Also, in conjunction with the addition of protection to the definition of counter-air, this change emphasized that counter-air doctrine encompassed the full theater threat spectrum including the ballistic threat. This was also important in the greater context of IAMD because it made clear that counter-air required no augmentation within the theater. The counter-air framework has remained unchanged since 2012.

In 2017, the term "control of the air" replaced "air superiority" within the counter-air definition, the latter being redefined as a degree of control. In most cases air superiority, which permits the conduct of operations at a given point in time and place without prohibitive interference from air and missile threats, remains the goal. However, the degrees can range from no control to parity, local air superiority and air supremacy. This change was consistent with previous changes to JP 3-52 "Joint Airspace Control," and when added to the previously mentioned inclusion of "protection," resulted in the following updated definition of counter-air, "A mission that integrates offensive and defensive operations to attain and maintain a desired degree of control of the air and protection by neutralizing or destroying enemy aircraft and missiles, both before and after launch."

Within that definition, it is important to recognize the significance of both the defensive and offensive dimensions. In what is commonly referred to as the "Eight-Star Memo" to the secretary of defense (dated Nov. 5, 2014), the chief of staff of the Army and chief of naval operations stress the fact that "playing catch" is not enough and there must be a strong offensive element in support of the defense. Counter-air is the foundational structure at the theater level for both. Its joint and interdependent nature enables each component of the joint force to contribute capabilities necessary for mission success. In addition, counter-air's vital tenets of centralized planning and direction and decentralized execution optimize offensive and defensive capabilities.

Integrated air and missile defense

The notion of integrated air and missile defense first came into existence in the 2001 timeframe with the secretary of defense's decision to merge theater and national missile defense (NMD) into a single missile defense entity. While this decision helped enable withdrawal from the Anti-Ballistic Missile Treaty, it also complicated the air and missile defense architecture. In 1996, the Joint Theater Air and Missile Defense Organization was created as a chairman's controlled activity under the joint staff J-8 to manage the theater piece, while the North American Aerospace Defense Command retained responsibility for homeland AD. NMD was still in its developmental stages. Following the merger of missions, what had been rather clean lines of separation between theater and homeland air and missile defense disappeared and the missions were now one. The question was how to effect the merger.

To address this broader focus, JTAMDO was renamed the Joint Integrated Air and Missile Defense Organization. In 2004,

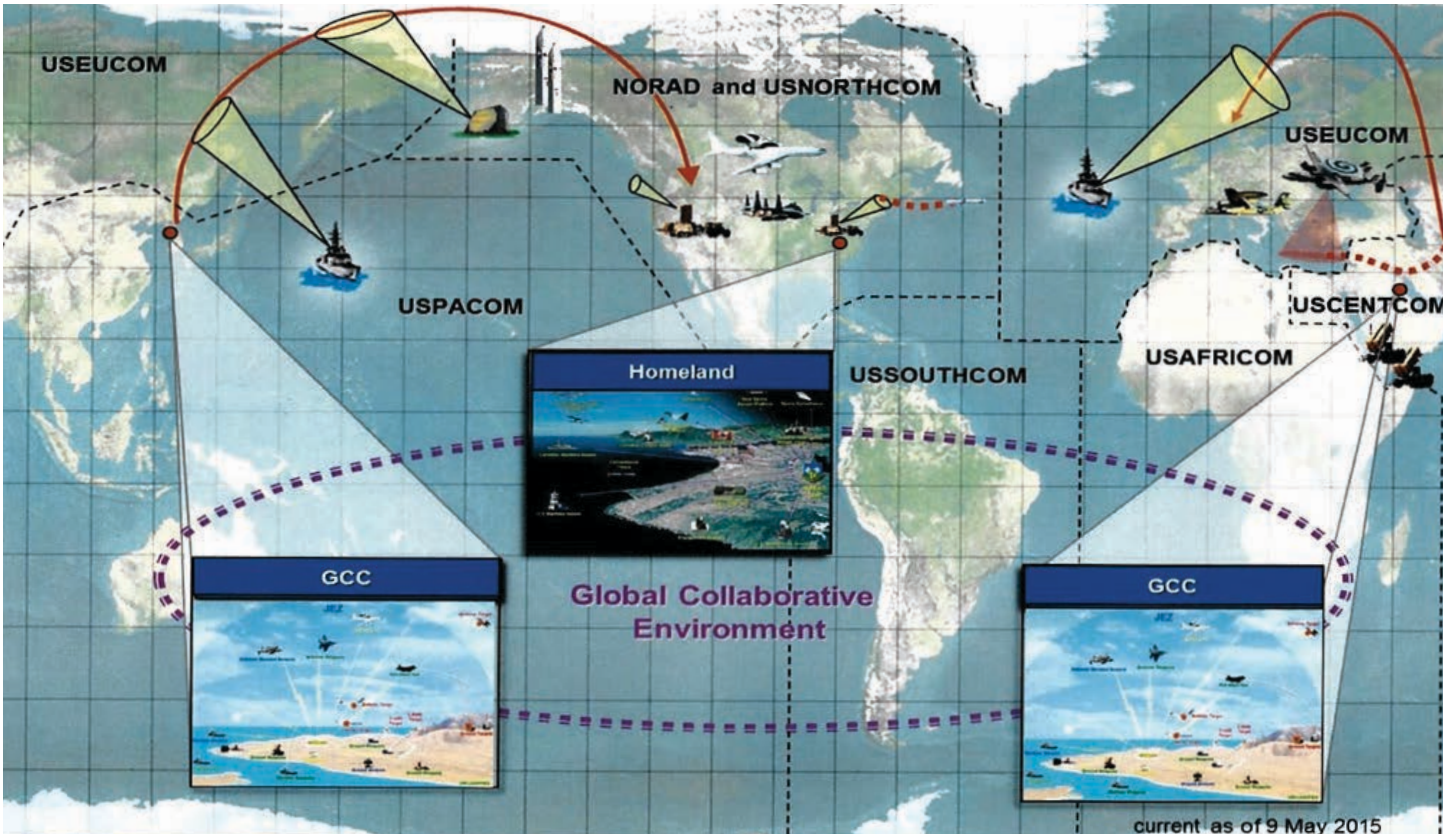


Figure 2. The integrated air and missile defense operational view one. (Courtesy illustration)

IAMD was officially defined in the IAMD Joint Integrating Concept as follows, "The [integration of] capabilities and overlapping operations to defend the homeland and U.S. national interests, protect the Joint Force, and enable freedom of action by negating an adversary's ability to achieve adverse effects from their air and missile capabilities."

The definition of IAMD included both capability and operational dimensions. While much attention has been given to the acquisition of needed capabilities, it is also important to develop concepts, architecture and doctrine for the operational aspects as embodied in, for example, concepts of operations (CONOPS) and joint publications. This remains the Department of Defense dictionary definition to this day.

The first attempt at defining the MD aspects of IAMD was the Integrated Missile Defense (IMD) CONOPS Baseline 2004. Developed by JIAMDO, this document emphasized the need for continued decentralized execution of MD at the theater level and below while also advocating for a centralized global MD planning role for United States Strategic Communications. This role was later codified in Unified Command Plan (UCP) 2002 Change 2 and has remained relatively unchanged through the current UCP.

JIAMDO subsequently developed the 2008 IAMD Operational Concept, approved by the Joint Requirements Oversight Council, to address the full scope of IAMD operationally, including theater, cross-areas of responsibility (AOR), and homeland perspectives (see Figure 2). This concept focused on three basic tenets: prevent, defeat and minimize. These essentially equated to offensive attack operations, active defense and passive defense. This concept was further elaborated upon in the adoption of the counter-air framework at the theater level; specifically focusing on active and passive DCA and OCA attack operations. The concept also reaffirmed the role for a synchronizer for the global (cross area of responsibility) planning environment. It should be noted that 10 years later, the basic IAMD tenets espoused in this operational concept are now what are largely reflected in the 2017 edition of JP 3-01.

In the 2009-2012 timeframe, initial steps were taken to incorporate IAMD into joint doctrine, starting with JP 3-01. Using principles espoused in the IAMD Operational Concept and resultant extant practices subsequently adopted by the CCMDs, JP 3-01 codified the original IAMD definition and elaborated upon it with the following descriptive text, "IAMD is an evolving approach that uses the counter-air framework at the theater level ... [and] emphasizes the integration of offensive counter-air attack operations, DCA operations, and other capabilities as required to create the joint force commander's desired effects."

Note that IAMD was couched as an "evolving approach" and not a mission similar to counter-air. As an approach, IAMD was regarded as a generalized, overarching umbrella structure integrating both capabilities and overlapping operations or missions including counter-air, global missile defense, homeland defense (HD) and global strike. The details of this were not addressed in any detail until 2017.

In the 2012 edition, JP 3-01 also elaborated on the global and homeland dimensions of IAMD. Specifically, it stated, "The IAMD approach encompasses global strike and global missile defense beyond the theater level … [with USSTRATCOM] … responsible for synchronizing planning for global missile defense."

This wording reflected the UCP, which, as mentioned, designated USSTRATCOM as the global synchronizer for global

MD planning. While the UCP did not specify global MD as being exclusively BMD, the 2012 edition of JP 3-01 specifically articulated the understanding that BMD was the extant focus of USSTRATCOM's global synchronizer role. This was consistent with USSTRATCOM's 2010 Global Missile Defense CONOPS, the charter for USSTRATCOM's Joint Functional Component Command for Integrated Missile Defense (JFCC IMD), and Chairman Joint Chiefs of Staff Instructions 3295.01, "Policy Guidance for Global Ballistic Missile Defense."

2017 edition of JP 3-01

While the 2012 revision of JP 3-01 made some important inroads for IAMD, it quickly became apparent that IAMD needed additional elaboration in several areas. Most important was the need to clarify IAMD's relationship with counter-air. Other related areas needing clarification included the meaning of IAMD as an approach; how IAMD used the counter-air framework; IAMD's relationship to global MD; HD, global strike and counter-rocket, artillery and mortar (C-RAM); and conflicting terminology. Questions concerning these issues caused many erroneous interpretations over the years, including the erroneous view that counter-air and IAMD were somehow each subsets of the other.

The core principles related to countering air and missile threats remain unchanged across the many editions of JP 3-01. These principles include unity of command, centralized planning and direction and decentralized execution. Clear command and support relationships and assigned responsibilities remain central to conducting effective and efficient operations within and across theater boundaries.

While the 2017 edition of JP 3-01 reaffirmed the original approved definition of IAMD as previously discussed, it modified the IAMD description as follows, "IAMD is an approach that synchronizes aspects of counter-air with global missile defense: homeland defense; global strike; and counter rocket, artillery and mortar."

This text reaffirmed IAMD as an approach and not a mission. It also introduced some needed specificity concerning the breadth and focus of IAMD. Note the following text that addresses the overlapping and distinct elements of counter-air and IAMD:

- Areas of counter-air / IAMD overlap
  - "Within a theater, IAMD is primarily focused on DCA. IAMD is also directly supported by OCA attack operations missions providing protection for U.S. and allied forces/assets (e.g., attacks against enemy BMs and their associated infrastructure)."
- Areas unique to counter-air
  - "OCA attack operations also include missions contributing to air superiority (e.g., attacks against enemy fighter airfields) which are outside of IAMD."
  - "While OCA attack operations against IAMD-related targets may require

A long-range ground-based interceptor is launched from Vandenberg Air Force Base, Calif., and performs as planned, successfully demonstrating performance of alternate divert thrusters for the system's Exo-atmospheric Kill Vehicle. This test, designated as Ground-based Midcourse Defense Controlled Test Vehicle-02+, was a planned non-intercept flight test. Data from this test will be used to improve the Ground-based Midcourse Defense element of the nation's Ballistic Missile Defense System. (U.S. Dept. of Defense)

the support provided by SEAD, fighter escort and fighter sweep, these elements of OCA are considered outside of IAMD."

- Areas unique to IAMD
  - "Beyond the theater level IAMD emphasizes the integration of these counter-air operations [DCA and OCA attack operations] with global MD, homeland defense and global strike."
  - "IAMD also includes counter-rocket, artillery and mortar."

Summarizing these quotes, the common elements of counter-air and IAMD, generally speaking, are those actions that directly support the area air defense commander's (AADC's) objectives at theater level. DCA fits this criterion, as do aspects of OCA attack operations (e.g., attacks against enemy transporter erector launchers, which would most likely be nominated as targets by the AADC). On the other hand, unique elements of counter-air are offensive actions that do not directly support or involve the AADC. These could include actions such as engagements of aerial targets of opportunity over enemy territory, suppression of enemy air defense units, fighter escort missions, or as cited in the text, attack operations against enemy fighter airfields. While arguments can be made that these sorts of actions indirectly support the AADC, JP 3-01 considers them tangential and therefore unique to counter-air and not within the IAMD umbrella. Related to this idea, it is important to understand that not every engagement against an air and missile threat falls under the category of IAMD.

IAMD focuses on the integration of IAMD-related counter-air operations with elements outside the normal theater level, including global MD, homeland defense, global strike and C-RAM. These are discussed in the following paragraphs.

Global MD is described in JP 3-01 as, "MD operations, activities and actions that affect more than one GCC and require planning synchronization among the affected commands …"

This text is consistent with the global MD CONOPS published by USSTRATCOM in 2016. Of note in this description is the expansion of global MD's scope to include essentially all MD actions requiring synchronization. This aspect expands the previous BMD focus espoused in 2012 to include threats such as long-range cruise missiles crossing AOR boundaries. However, while expanding global MD beyond BMD, the 2017 JP 3-01 reflects the fact that extant practice of USSTRATCOM's planning synchronization role is still primarily BMD-focused.

In the context of IAMD, the focus of global MD remains planning, not execution. Note the following, "IAMD uses the global MD planning construct to balance the MD needs at the CCDR level with the broader global MD needs including homeland defense. Global MD focuses on a collaborative planning process among CCDRs orchestrated/synchronized by [commander of] USSTRATCOM."

USSTRATCOM, in synchronizing global MD planning, executes the following core responsibilities:

- Chairs the Missile Defense Global Synchronization Board. This board is "chartered to resolve issues related to global MD plans, operational planning guidance or policy, plans assessment and global force management (GFM)."
- Assists in the global synchronization of MD plans. In doing so, USSTRATCOM "maintains global situational awareness, performs globally-focused cross-AOR analysis, and develops inputs, recommendations and assessments."
- Conducts missile defense global force management. USSTRATCOM, acting as the MD joint functional manager, "identifies, develops and recommends globally optimized sourcing solutions …"

Support for homeland defense is another critical aspect of countering air and missile threats. Defense of the homeland, while using counter-air, is recognized in JP 3-01 as also encompassing aspects that are distinct from standard counter-air doctrine. These include the unique NORAD/NORTHCOM missions, Operation Noble Eagle and defense against the long-range ballistic missile threat including missile warning and attack assessment. JP 3-01 specifies that, while not a foundational part of counter-air, these unique aspects are incorporated under the IAMD umbrella. Details of these aspects are further addressed in JP 3-27, "Homeland Defense."

Global strike is described consistent with the definition in JP 3-0, "Joint Operations" as, "The capability to rapidly plan and deliver extended-range attacks, limited in duration and scope, to create precision effects against enemy assets in support of national and theater commander objectives"

The responsibility for planning global strike belongs to the commander of USSTRATCOM, who executes this task in full coordination with affected combatant commanders. JP 3-01 further emphasizes the integration of counter-air with aspects of global strike that are beyond the theater level.

JP 3-01 clarifies that global strike is not "encompassed" by IAMD as was previously described in the 2012 JP 3-01. Rather, IAMD only includes aspects of global strike that support air and missile related target sets. This recognizes that the bulk of global strike missions, which support such actions as OCA attack operations and interdiction missions, are outside of IAMD.

C-RAM is the last element integrated within IAMD and is described by the following extracts:

- "C-RAM is a tactical mission that provides detection, warning, C2 and intercept of RAM in flight and engagement of enemy sources of IDF [indirect fire]. C-RAM is generally the responsibility of the ground commander to plan and execute."
- "C2 for C-RAM operations is normally the responsibility of the local base defense operations center or the tactical operations center. C-RAM units receive and provide situational awareness to and from airspace users to ensure friendly protection. Units that perform the C-RAM mission are normally air defense units, but are not generally considered part of the centralized joint AMD network."
- Following are some terminology clarifications in the 2017 edition of JP 3-01 worth noting:
- AD: "Defensive measures designed to destroy attacking enemy aircraft or aerodynamic missiles, or to nullify or reduce the effectiveness of such attack." It is important to note that AD does not include BMD but does include defense against aerodynamic missiles (e.g., cruise missiles).
- MD: Defensive measures designed to destroy attacking enemy missiles, or to nullify or reduce effectiveness of such attack." MD includes defense against all types of missiles (aerodynamic and ballistic). However MD is not limited to defense using missiles.
- Air and missile defense, "Di-

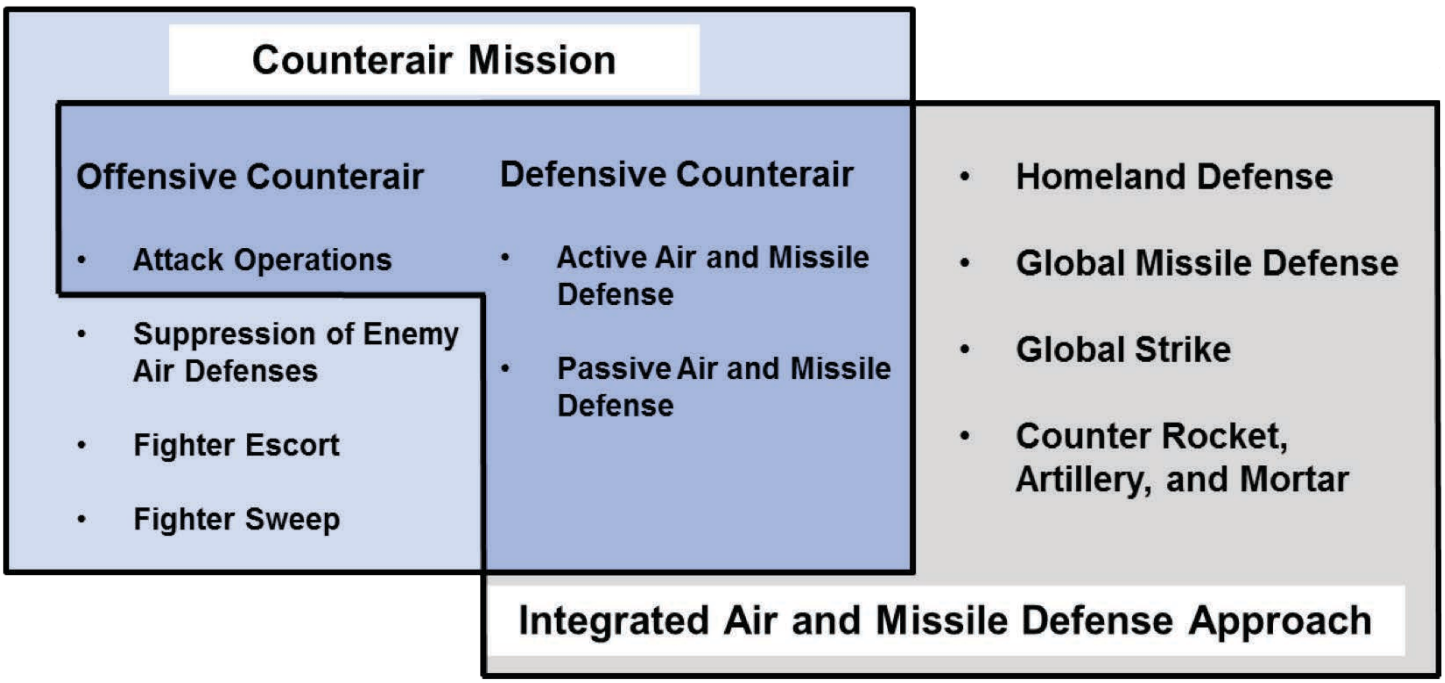


Figure 3. The relationship between the counter-air mission and the integrated air and missile defense approach. (Courtesy illustration)

rect [active and passive] defensive actions taken to destroy, nullify or reduce the effectiveness of hostile air and ballistic missile threats against friendly forces and assets." AMD is differentiated from IAMD in that it focuses on theater and does not include any offensive dimensions.

- Weapons engagement zones, specifically missile engagement zones and joint engagement zones, are expanded to include provisions for ballistic missiles.

An important supporting document to JP 3-01 is the AMD multi-service tactics, techniques and procedures (AMD MTTP) developed by the Air, Land and Sea Applications Center. The AMD MTTP, which is currently under revision, augments and provides details to JP 3-01 in several important areas. The most significant ones are briefly listed as follows:

- Counter unmanned aircraft systems (UAS) including low, slow and small (LSS) unmanned aircraft.
- Cyberspace operations.
- Identification.
- AMD planning to include cross AOR.
- AMD execution.

Counter-air / IAMD relationship

The 2017 edition of JP 3-01 specifically states, "Countering air and missile threats consists of a combination of counter-air and IAMD." JP 3-01 further portrays the relationship between counter-air and IAMD via Figure 3, which represents the previously addressed counter-air framework within the blue (dark and light) shaded areas. Aspects of counter-air overlapping with or supporting IAMD (i.e., OCA attack operations and all of DCA) are shown as dark blue. OCA elements unique to counter-air and separate from IAMD (SEAD, fighter escort and fighter sweep) are represented in light blue. IAMD includes the previously mentioned dark blue areas overlapping with counter-air, and the grey areas consisting of homeland defense, global MD, global strike and C-RAM, all of which are unique to IAMD. It is important to note that neither IAMD nor counter-air are subsets of the other. Rather, they complement one another and only together do they address the totality of countering the air and missile threat at all levels.

Implications

IAMD is not a homogeneous entity. Rather it is a combination of interconnected piece parts that include service, theater, global, air, ballistic, offensive, defensive , operational and planning elements. The implications of the 2017 revision of JP 3-01 are many. A few of the more significant ones follow:

- Counter-air remains foundational at the theater level in terms of both offense and defense. The basic tenets remain unchanged.
- IAMD is now an accepted approach for integrating both capabilities and overlapping operations including aspects of counter-air, global MD, homeland defense, global strike and C-RAM.
- Counter-air and IAMD coexist. They complement each other and together encompass the full spectrum of countering air and missile threats.
- IAMD, while supported by missions such as AD, BMD, counter-air, global MD, HD, global strike and C-RAM, is not a mission. Rather, it is an integration approach. This distinction is important in terms of lexicon and use of the term IAMD.
- Execution of all aspects of countering air and missile threat missions remains at the GCC level and below. Execution above this level (i.e., at the global level) is not advocated.
- The need remains for a synchronizer or commander with coordinating authority for global missile defense planning. This need was reaffirmed in a recent joint staff review of IAMD governing documents. Regardless whether this role remains tasked to USSTRATCOM, cross-AOR planning involving multiple CCDRs requires third party involvement for maximum effectiveness.
- IAMD is not synonymous with global planning. Global planning, while being an important aspect of IAMD, only applies to a subset of threats generally focusing on longer-range BMD. Planning against the preponderance of the threat spectrum

is still decentralized to GCC level and below.

- Offensive counter-air attack operations remain critical to IAMD. Efforts to improve the integration of them with the defensive elements should be a high priority.
- Ballistic missiles remain a special threat category, particularly at the global level. While there are ongoing efforts to merge more aspects of air defense and missile defense, extant practice and capabilities still demand a focused BMD effort both in terms of planning and execution.
- Air and missile defense terminology remains, in some cases, imprecise. While JP 3-01 makes a concerted effort to clarify the term "air" as being separate and distinct from "ballistic," air is still used in a broader sense (i.e., inclusive of ballistic) within counter-air doctrine (e.g., counter-air, DCA, integrated air defense system (IADS)).
- Joint staff advocacy for IAMD in joint doctrine needs to remain strong. Without such advocacy, AMD integration amongst services, CCMDs and mission areas will neither achieve the levels necessary nor mature with degrees of urgency that are required. Unfortunately, recently imposed significant cuts to JIAMDO's budget and manpower have significantly weakened this advocacy. These cuts should and must be revisited.

Step forward

The 2017 edition of JP 3-01 represents a major step forward in articulation of joint operational doctrine for countering air and missile threats. In addition to reaffirming key foundational elements, the publication clarifies the relationship between counter-air and IAMD in a way that shows their important complementary nature. It further supports the chairman's joint IAMD Vision 2020 which advocates for joint integrated forces "where all capabilities—offensive, passive, kinetic, non-kinetic (e.g., cyber warfare, directed energy, and electronic attack) are melded into a comprehensive joint and combined force capable of preventing an adversary from effectively employing any of its offensive and defensive weapons and capabilities."

What future versions of JP 3-01 will look like cannot be foreseen. The emergence of long-range air-to-air and surface-to-air weapons, rapidly evolving capabilities of small UAS and hypersonic weapons, and the need to incorporate non-kinetic effects will challenge the existing norms, therefore portending continued conceptual and doctrinal development efforts in these areas. The new edition of JP 3-01, in addition to establishing and greatly clarifying current doctrine, also provides a strong foundation for the development of future operational concepts and doctrine.

Don Baker was the program manager for the Engility Corps sub-contractor team supporting the Joint Air and Missile Defense Organization (JIAMDO). He was JIAMDO's lead doctrine analyst and lead-agent POC for JP 3-01 (2017). He also co-authored the Integrated Air and Missile Defense Operational Concept published in 2008, and the "Integrated Missile Defense (iMD) Concept of Operations Baseline 2004" published in 2002.

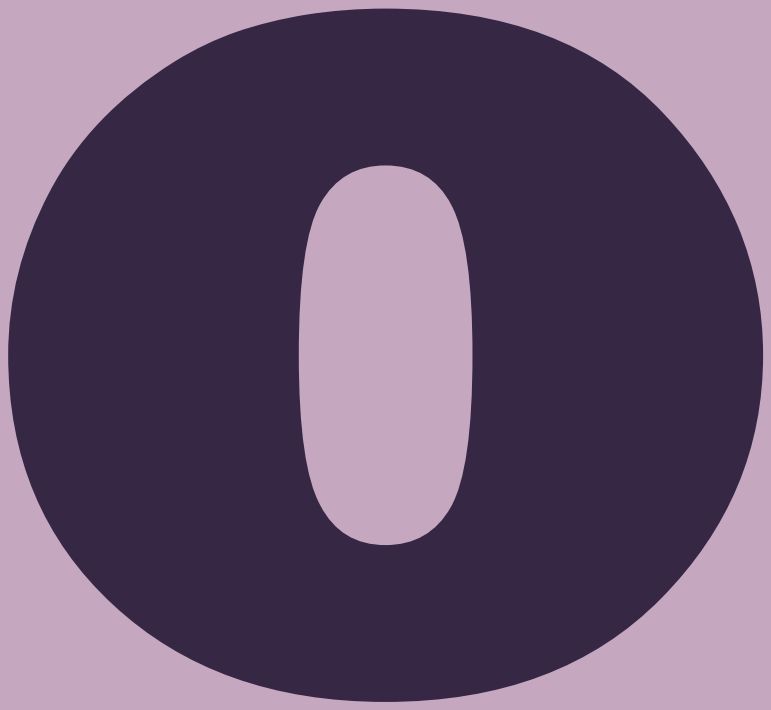
Michael Wiant is CSRA's Systems engineer principal. Wiant has 31 years of experience in integrated air and missile defense; more than 21 years of experience performing system engineering and architecture analysis in the IAMD domain; and 31 years of experience on Combatant Command and Joint Staffs.

Crew Chief Airman 1st Class Raul Guzman prepares to launch an F-35A Lightning II aircraft piloted by Lt. Col. Yosef Morris, 388th Fighter Wing, during Red Flag 17-1, Nellis Air Force Base, Nev., Feb. 3, 2017. While deployed, the F-35 will fly alongside fourth- and fifth-generation platforms providing offensive and defensive counter air, suppression of enemy air defenses and limited close air support. (R. Nial Bradshaw/ U.S. Air Force)

No time for EG

Perfection is key in field artillery

By Command Sgt. Maj. Dwalyn Dasher



Have you ever felt the exhilarating rush of a stone whizzing by your ear during a childhood rock fight? The location of the target, wind and velocity are some of the key components that allow kids to bring an onslaught of pain on their friends. Of course, no child is really trying to hurt the other, but it does take skill to hit a hidden or moving target across a room or open field.

If they were alive today, stone hurlers and archers from battles long ago could attest to the deadly force they could achieve from great distances. The sheer will and strength it took to thrust a projectile into action had to be violent.

Soldiers render honors during a change-of-command ceremony at Wheeler Army Airfield in Wahiawa, Hawaii, Oct. 15, 2017. The Soldiers are assigned to the Hawaii Army National Guard. Army National Guard. (Sgt. Amanda H. Gerlach/U.S. Army)

Strength, will and violence of action are keys to any lethal movement, but what about accuracy? During every ancestral skirmish, there was some form of archery, which was not an easy task; standing at a great distance and hitting a target with a bow or sling. Fast forward a few 100 years, we are still using projectile weapons, commanding lives on the battlefield, ensuring certain victory for our armed forces. The military profession that gets to be a part of this offensive, is field artillery. Unlike other positions in the armed forces, field artillery falls between combat support and combat arms.

Artillery has been out front as an integral part of combat. When the mission changes, an artillery Soldier can be called upon to perform a myriad of duties. Because of their constant pursuit of perfection, versatility and austere nature, an artillery Soldier is capable of performing any job in the armed forces. Letting go of egos and any other distractor of the profession, they understand their existence is to supply violent destruction to the enemy at a moment's notice no matter what role they are filling. This can be done behind a computer-generated fire mission or patrolling in foreign lands. The artilleryman knows and understands, they are a servant of the people.

What is it about an artillery Soldiers that makes them focus on perfection? Is it the constant gunnery and certification tables or the constant quest for everything to be "zero mils?" For an FA Soldier they know it comes down to accuracy. This is the number one key to everything they do. Accuracy, because someone is counting on them to get it right. If ammunition falls short or goes long, someone or something other than the enemy can sustain catastrophic damage. There are no do-overs, or take-backs in the FA world. Either it's done right or it's not done at all. Unpredicted damage to per-

sonnel, property and an uncompleted mission destroys the trust others have in a field artillery unit.

In a constant pursuit of excellence, artillery set themselves apart from every other military occupational specialty. There is no time to debate whether this makes them a better branch. The fact is, no mistakes can be made in this profession. The constant pursuit of excellence is the cornerstone of why an artillery unit consistently undergoes qualifications and certifications to stay on the cusp of their profession. To deliver timely, accurate and lethal Fires to the enemy, artillery Soldiers perform specific artillery tables to validate and hone their craft. The goal of artillery tables are to set and enforce tough, but achievable standards. Do them early, be thorough, be flexible and do them on a consistent basis. Evaluations can either be informal or formal and done by internal or external evaluators. Assessments are performed at the individual, section and collective levels. The first two levels can be done at the battery level, supervised by the commander, master gunner and other individuals internal to the organization. To achieve the highest results and get an accurate assessment, commanders should choose a formal evaluation, conducted by external evaluators or observer controllers (OCs). An external OC can give an honest assessment without the apprehension of backlash. Brigade combat team (BCT) commanders can expect the greatest results when the artillery units are given the opportunity to train on a consistent basis.

The process needed for an artilleryman to maintain their proficiency has three major areas: training, qualifying/certifying and OCing. It is done in this order to preserve the necessary proficiency of any FA unit. Bypassing any stage of the process is detrimental to readiness. Before a unit can be placed in an OC position, they need to have undergone the first two steps of the process. In order to complete any portion of the process, an artillery unit needs support from other agencies organic to their organizations. Depending on the qualification/certification, the process can be part of a cycle that lasts anywhere from three months to a year. During these stages all commanders must ensure the interference of distractors is kept to a minimum, i.e., red cycle tasking.

These taskings are a major part of any division-level organization, however, there are specific units that cannot afford to be pulled away for sake of mission failure. If a group of Soldiers were pulled away from the dining facility or finance operations to perform a necessary task, a problematic cycle would occur: Soldiers pay and class I operations would be thrown into turmoil. For instance, when a BCT is "green" and in its training cycle, the FA unit is expected to provide timely and accurate Fires, supporting combined arms live-fire exercises and other missions. When a BCT is "red" and in its tasking cycle they are expected to return to a green cycle and start the training rotation again. If FA units are taken out of any of the three phases of training during the red cycle, how can they be fully functional and ready to support the BCTs? During a BCTs red cycle, the supporting artillery unit can only be ready to support if they are given the training days and necessary resources. The Army already provides enough instability, section turbulence, PCS moves and available training days are reoccurring distractors that cause training to regenerate training requirements.

Artillery tables done on a consistent basis promise to give the commanders, and anyone else who calls on help from FA, the most proficient and lethal fire possible. The only way the Army can ensure the training is done correctly is to give the training certification oversight to the senior FA commander. Fires is a warfighting function that cannot be reimagined or overlooked. There has to be a close look at all levels of an FA unit from the subject matter experts or specified task will be missed. Imagine administering an Army physical fitness test to yourself. Human error would get in the way and the same goes for an FA units training. Nonstandard missions and counter-insurgency have allowed the necessary skills of field artillery Soldiers at all levels to atrophy.

Giving the higher FA headquarters the necessary personnel, budget, equipment and oversight can ensure the future success of the Army and its Fires warfighter function intact and ready to take on any enemy foreign or domestic.

Command Sgt. Maj. Dwalyn Dasher is the 10th Mountain Division Artillery command sergeant major. Dasher has worked on the M109A6 Paladin, M119A2, M119A3, M142 High Mobility Artillery Rocket System and the newest addition to field artillery, the M777A2.

Attacking ISIS by, with, through

Perspectives on coalition Fires in Operation Inherent Resolve

By Col. Patrick Work, co-authored by Lt. Col. Daniel Gibson

Soldiers, deployed in support of Combined Joint Task Force - Operation Inherent Resolve and assigned to 2nd Brigade Combat Team, 82nd Airborne Division, enable their Iraqi Security Forces partners through the advise and assist mission, contributing planning, intelligence collection and analysis, force protection, and precision Fires to achieve the military defeat of ISIS. CJTF-OIR is the global coalition to defeat ISIS in Iraq and Syria. (Staff Sgt. Jason Hull/U.S. Army)

In January of 2017, 2nd Brigade Combat Team, 82nd Airborne Division deployed to bolster the Iraqi Security Forces (ISF) in the campaign to annihilate the Islamic State of Iraq and Syria (ISIS) and its so-called Caliphate. "Task Force Falcon" joined the coalition advise and assist (A&A) effort with two weeks remaining during the 100-day offensive to retake east Mosul, and for the next eight months, we wrestled a complex environment with a simple framework: help the ISF and hurt ISIS every day.

Naturally, we had missteps, but our team also served ISF and coalition commanders well on some terribly uncertain days. We mixed innovative concepts and straightforward tactics to attack ISIS by, with and through the ISF, yet the entire effort always centered on our partners' leadership and ownership of exceptionally nasty ground combat operations. Some of our perspectives on the planning and execution of coalition Fires may be specific to Operation Inherent Resolve's (OIR) context, but others are broadly useful for leaders as we consider future excursions with this style of high intensity security force assistance.[1]

Lethal OC/T network: An imperfect analogy

Anyone who has experienced a combat training center (CTC) rotation has a useful model for comprehending Task Force Falcon's core organizational and operational concepts. Fundamentally, the CTC's observer controller/trainer (OC/T) network wraps itself around a rotational unit with a parallel structure connected by dependable communications and disciplined information flows. The OC/T network's goal is to help unit commanders improve their warfighting craft, largely by helping them see the opposing force (OPFOR), see the ill-structured environment, and see themselves. The OC/T network may even feel intrusive at times as its nodes maintain contact with the rotational unit at every echelon. Finally, assuming competence is the OC/T network's anchor point. Many of the same traits that make A&A teams effective also distinguish the most useful OC/T's. Empathy, humility and patience truly matter.

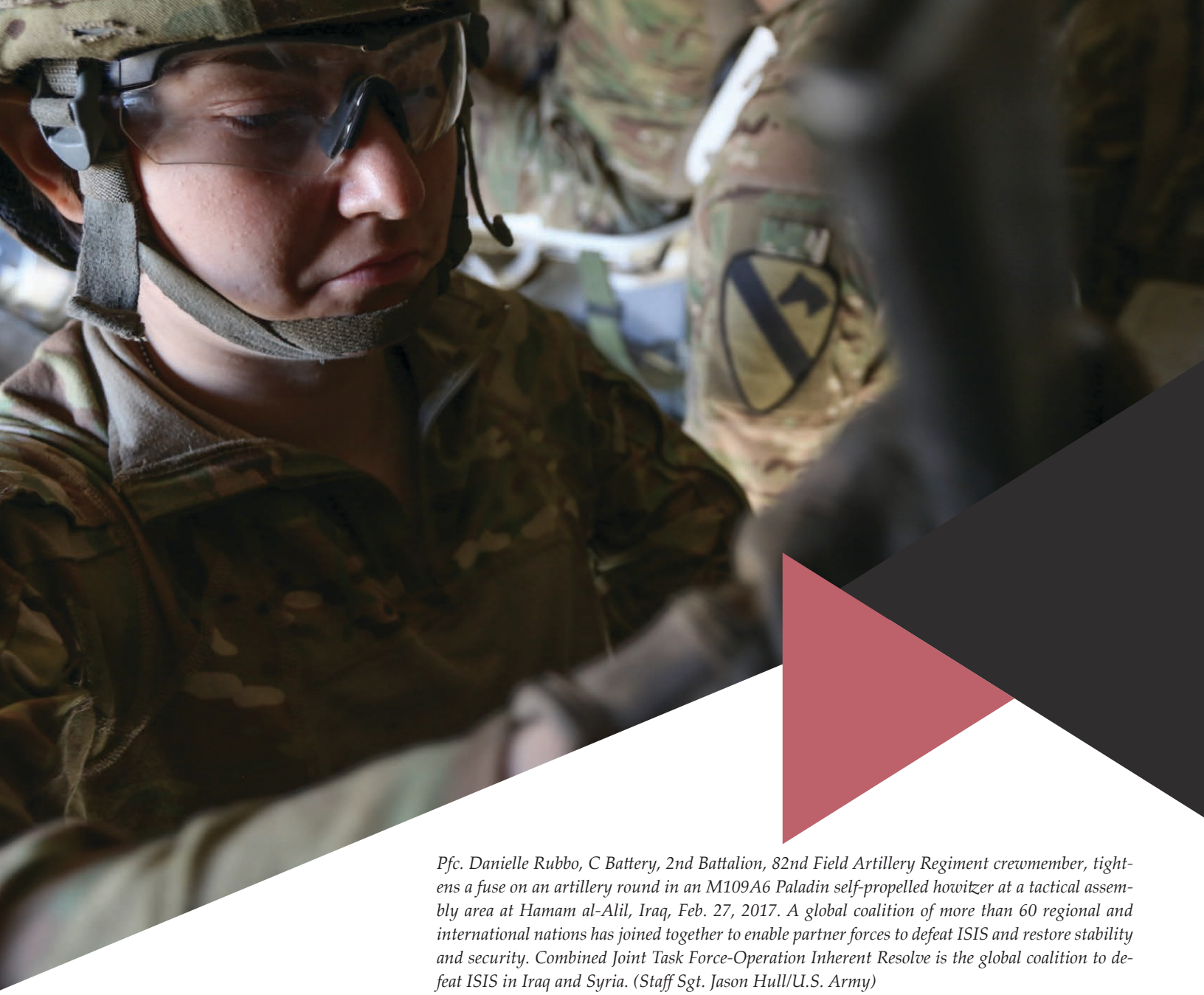
Perhaps most importantly, the OC/T network is not embroiled in "fighting" the OPFOR nor the burden of external evaluation. Therefore, OC/T's routinely achieve a level of shared understanding that outstrips the rotational units'. Of course, they are not all-knowing. Plenty of conversations occur without OC/T oversight and they periodically misread events, personalities or trends. Still, the OC/T network is well-postured to provide vertically aligned insights, perspectives and ideas that help the rotational unit advance against the OPFOR in an uncertain environment. An imperfect analogy, for sure, but thus far we have only discussed similarities that attend to the advice side of A&A operations.

As for the assist aspects of A&A, start by picturing the same OC/Ts armed with enormous amounts of secure bandwidth, intelligence capacity and strike capabilities. Moreover, imagine this lethal OC/T network's mission, or moral obligation, also includes attacking the OPFOR relentlessly to ensure the rotational unit wins. Now visualize this lethal OC/T network as only one among equals in an aggressive ecosystem that includes special operations, joint and other coalition stakeholders who are also united in their desire to thrash the OPFOR. As inadequate as this comparison may be, we all reason by analogy. Task Force Falcon operated like this fictional, lethal OC/T network, only the stakes were infinitely more deadly and complex. Our field grade commanders wore two hats, advising ISF corps or division commanders in addition to their traditional responsibilities. Likewise, our company-grade commanders advised Iraqi Army (IA) or Federal Police (FEDPOL) brigades. Combat advising at these echelons maintained a natural distance between our teams and the savagery of close combat, and this space probably reinforced our focus on helping our partners see the enemy, the environment and themselves rather than doing the fighting for them.

All 'Six A's' of A&A operations

Through the "lethal OC/T network" analogy, we introduced a handful of the concepts inherent to A&A operations. A3E, or advise, assist, accompany and enable, entered the coalition lexicon before Task Force Falcon arrived to Iraq. The third A of A3E, accompany, ostensibly delineated the riskier forward posturing of combat advisers to help accelerate the counter-ISIS campaign. For Task Force Falcon, we never knew the difference — there was no before-and-after "accompany" perspective for us to have.

1 *Joint Publication 3-20: Security Cooperation, dated May 23, 2017, cites Department of Defense Instruction 5000.68 while describing Security Force Assistance: "With, through and by. Describes the process of interaction with Foreign Security Forces (FSF) that initially involves training and assisting…The next step in the process is advising which may include advising in combat situations (acting "through" the forces)."*



Pfc. Danielle Rubbo, C Battery, 2nd Battalion, 82nd Field Artillery Regiment crewmember, tightens a fuse on an artillery round in an M109A6 Paladin self-propelled howitzer at a tactical assembly area at Hamam al-Alil, Iraq, Feb. 27, 2017. A global coalition of more than 60 regional and international nations has joined together to enable partner forces to defeat ISIS and restore stability and security. Combined Joint Task Force-Operation Inherent Resolve is the global coalition to defeat ISIS in Iraq and Syria. (Staff Sgt. Jason Hull/U.S. Army)

Because we transitioned while the ISF were still fighting in east Mosul, our combat advisers had to cultivate relations with ISF generals while "in contact." Thus, close proximity to ISF commanders on the battlefield was always a signature component of our mission. So, we may have intuitively leaned toward a handful of A's other than advise, assist and accompany as we honed our A&A mindset and skill set in Mosul's cauldron of violence.

All "Six A's," and the nuanced concepts and challenges they represent, are security force assistance lessons that we learned fighting by, with and through the ISF.

Advise. Our teams helped ISF commanders think through their tactical and logistics problems with an eye toward exploiting opportunities, assessing risk and making sober decisions on how to apply their finite resources. Through nested multi-echelon engagement, Task Force Falcon pressed consistent messages at every echelon. In fact, we frequently helped the Combined Joint Task Force-OIR or Combined Joint Force Land Component Command-OIR commanders be our "finishers." Both of them were key drivers of coalition combat advising as they engaged at the executive levels to influence ISF activities, all the while reinforcing our nested message from the top down. Importantly as well, our predecessors from 2nd Brigade Comabat Team, 101st Airborne Division (Air Assault) wisely coached us to prepare for an assist in order to advise paradigm. "Money talks" in combat advising too.

Assist. Our partners rarely used the "red pen" before designing a scheme of maneuver. Therefore, some of our most important assistance to them was coaching intelligence-driven operations. First, our A&A network shared intelligence information and products to the extent that we were allowed. As we helped the ISF prepare to attack Tal Afar in August 2017, we actually arranged the entire brigade intelligence enterprise to help them understand which attack axis exploited ISIS's most vulnerable defenses. The value of our advice was found in their execution: our partners dominated ISIS in a 12-day blitz to retake the city. More on military intelligence later, but I often employed our talented S2, Maj. Kevin Ryan, as a finisher for our best military advice. Staff Lt. Gen. Abdul Amir Yarallah Amir, the overall ISF operational commander, always had time for Ryan's insights. Even more telling, the FEDPOL Corps commander, a three-star in charge of more than 60,000 troops, frequently sought 2nd Lt. Dave Moehling's perspectives on ISIS. Moehling,

the assistant S2 for 1st Squadron, 73rd Cavalry Regiment and a tremendous military intelligence mind, always gave informed advice. This consistent, intelligence-driven A&A gave our teams a sharper, more credible edge.

Assist's lethal expression was obviously precision Fires. After ISIS conquered Mosul, it prepared a formidable defense for more than two years before the ISF launched the counterattack in October of 2016. The defense involved a monstrous mortar capacity, a legion of suicide car bombers whose high-payoff target list was topped by ISF tanks and engineering assets, and droves of ISIS infantry. The ISF stubbornly moved through this medley of violence for nine months, reinforced by coalition strikes from artillery, attack helicopters, jets and bombers. Meeting the ISF requirement for responsive and precise Fires, more so than other form of assistance, gave our partners confidence on the hardest days. Simply put, our targeteers, cannoneers and radar specialists of 2nd Battalion, 319th Airborne Field Artillery Regiment, led by Lt. Col. Dan Gibson and Command Sgt. Maj. Omari Ballou, helped devastate ISIS's centrally controlled batteries in Mosul and Tal Afar. Our company and troop commanders, backed by Air Force joint terminal attack controllers (JTACs) and sufficient bandwidth, frequently observed and directed these attacks from within ISF command posts.

Accompany. As discussed previously, our task force was operating forward with ISF brigade, division and corps commanders upon arrival in January. Predictable and persistent contact with ISF commanders was crucial to building relationships of trust and accountability, but accompanying them also fed our efforts to assure, anticipate and be agile. Accompanying the ISF gave our combat advisers a fingertips sense for the combat's direction and intensity. This helped our "lethal OC/T network" provide timely and useful assistance at the point of decision while also pumping perspective to promote shared understanding and unity of effort.

Assure. During my last battlefield circulation with Maj. Gen. Joe Martin before he departed in July, I offered my observation that the "third A" in A3E should stand for assure not accompany. We have countless examples of how our physical presence, ideas or Fires — or a confluence of these inputs — gave ISF commanders the confidence to keep attacking. In fact, I now have a new paradigm for what non-lethal contact can mean. In OIR, when I was not with Staff Lt. Gen. Abdul Amir, we maintained contact. For the very reason of assurance, quality translators mattered immensely to us. During frequent times of crisis, we encouraged all of our advisers to continually remind the ISF they could count on us and their success was our success.

As Mosul's ferocious drama neared its end in July, ISIS attempted to break out of a troubled triangle called the Hawijah Pocket when it seized the historically vulnerable village of Imam Gharbi along the Tigris River. The Battle of Mosul churned, but we quickly repositioned a platoon of M777 Howitzers and deployed Capt. Mike Beum's A&A team from A Company, 2nd Battalion, 325th Airborne Infantry Regiment. We also put our artillery battalion executive officer, Maj. Steve Ackerson, in charge of a JTAC-enabled strike cell at the Salah ad Din Operations Command's (SADOC) forward command post. After witnessing the following demonstration of coalition leverage, Capt. Zach Beecher, one of 407th Brigade Support Battalion's most cerebral leaders, coined the phrase "targeted assurance."

Targeted assurance described an adviser's subtle choice between competing ISF partners or agendas, always keeping CJFLCC's and Staff Lt. Gen. Abdul Amir's goals front of mind. During the ISIS incursion to Imam Gharbi, I chose to publically critique an IA general who was underperforming and embolden the SADOC commander who was serious about attacking. It worked. Together, the SADOC's ad hoc team of ministry of interior forces, supported by a small Task Force Falcon strike cell, took charge of the unraveling situation, and applied an A&A mainstay: "stimulate and exploit." Our A&A network's commitment of less than 50 coalition troops, a 24-hour orbit of unblinking full-motion video (FMV) collection with solid analytics, and some vicious precision Fires were enough to help the ISF retake the village from the desperate enemy just five days after the targeted assurance episode.

Anticipate. As we discussed the A3E profile previously, I mentioned my proposal for a more relevant "third A," but there is more to the story. Martin actually countered with another insightful candidate, "anticipate." To be clear, the ISF we enabled during OIR did not issue combat orders nor rehearse operations. In fact, senior commanders normally returned from Baghdad just in time for the start of another bloody phase of the attack. When our partners departed northern Iraq during the transitions, we continued to over-communicate and maintain a disciplined battle rhythm to ensure our A&A network's shared understanding in spite of lapsed Iraqi communications. In fact, during these periods, our partners only occasionally felt compelled to call us with essential updates, so we relied heavily on the CJFLCC commander and senior staff in Baghdad to help us posture our A&A capabilities.

Even as we transitioned the A&A mission to 3rd Brigade Combat Team, 10th Mountain Division, the ISF plan was evolving daily as the start of the Hawijah offensive approached. As we departed, CJFLCC was organizing a medical evacuation architecture without absolute certainty of ISF intentions. The incoming team was arranging its Fires architecture and basing posture with an eye toward maximum flexibility in order to absorb late change. Nothing was first order in Iraq's political-military environment. As we alluded to previously, Task Force Falcon could never fall in love with a plan, and we continuously challenged our own assumptions. Our A&A network had to always listen, maintain contact with our counterparts, and apply the fundamentals of mission command in order to make the best decisions we could. However, when we sensed increased risk, the commanding general or I would direct clarifying questions to Staff Lt. Gen. Abdul Amir, discussing resource trade-offs with him in a very transparent manner.

Agility. One of Task Force Falcon's guiding ideas was that ISF should never have to wait for us, and coalition Fires played a starring role. Our commanders and teams nimbly changed directions in response to updated government of Iraq decisions or emergent opportunities to damage ISIS. In fact, 2-325th AIR's support to 15th IA Division near Badush is a superbly illustrative example. While the Battle of Mosul still raged, Staff Lt. Gen. Abdul Amir decided to press the ISIS disruption zone to the east of Tal Afar. He shared his thinking with us during a routine key leader engagement on a Monday evening, and by Friday morning, Task Force White Falcon, led by Lt. Col. James Downing and Command Sgt. Maj. Santos Cavazos, was on the move. In a matter of four days, we synchronized logistics as Downing's team met its new partner, displaced nearly 30 kilometers, began building a new assembly area, and integrated a platoon of 155 mm Paladin Howitzers

from C Battery, 2nd Battalion, 82nd Field Artillery that were previously based with our Cavalry squadron. We kept it simple during these frequent jumps. There were no "routine" patrols, and teams lived out of rucksacks initially. The priorities were always establishing the defense and long-range communications.

Supporting ISF decisive action required Task Force Falcon to synchronize effects across the warfighting functions in order to create advantageous situations for their ground combat operations. Thus, I viewed our headquarters' chief responsibility as organizing the key capabilities resident in the brigade's artillery, support and engineer battalions, the half of the brigade combat team that does not ordinarily maneuver against the enemy. In addition to our usual obligations to prioritize, resource, synchronize, inform, empower and manage risk, myself and our Task Force Falcon staff also had "four fights" to continually synchronize: sustainment, intelligence-driven A&A, lethal targeting with precision Fires and counter-fire, and as always, risk management. We will focus on intelligence and coalition Fires here.

Therefore, another way to look at fighting by, with and through in this context is that we did for ISF commanders what we should normally do for our own maneuver battalions. We synchronized materiel, intelligence collection and analysis, and strike support around the ISF's attack against its own near-peer competitor, ISIS. Not only did the ISF commanders embrace their spearhead roles in the fight, but their maneuver drove the virtuous circle of "stimulate and exploit" moves that ultimately allowed them to advance, seize ground and liberate their countrymen. Most missions that we prepared for in training were transferable to this OIR context. Rather than synchronizing the combat potential of the BCT's Fires to provide our battalions with tactical overmatch, we massed effects for ISF brigades. Thus, our training doctrine, an approach that builds trust through realistic mission essential task list-driven work and prepares BCTs for decisive action wartime requirements, also developed the essential skill sets needed for this muscular style of security force assistance.

Intelligence-driven A&A. When people have asked me what the hardest aspect of our A&A mission was, I have never hesitated nor overthought my response: it was ISIS. As stated previously, the ISF very rarely ran intel-driven operations of their

U.S. Army Paratroopers, deployed in support of Combined Joint Task Force – Operation Inherent Resolve and assigned to 2nd Battalion, 319th Airborne Field Artillery Regiment, 2nd Brigade Combat Team, 82nd Airborne Division, fire an M777 towed 155 mm howitzer in support of Iraqi security forces in northern Iraq, Aug. 15, 2017. The 2nd BCT, 82nd Abn. Div., enables Iraqi security force partners through the advise and assist mission, contributing planning, intelligence collection and analysis, force protection and precision Fires to achieve the military defeat of ISIS. CJTF-OIR is the global coalition to defeat ISIS in Iraq and Syria. (Cpl. Rachel Diehm/U.S.Army)

Pfc. James Schultz, C Battery, 2nd Battalion, 319th Airborne Field Artillery Regiment, 82nd Airborne Division cannon crewmember, stabilizes a M777 towed 155 mm howitzer during a fire mission near Mosul, Iraq, Feb. 2017. C Battery is supporting Combined Joint Task Force-Operation Inherent Resolve, the global coalition to defeat ISIL in Iraq and Syria. (Spc. Craig Jensen/U.S. Army)

own, so we drove a regime of intel-driven A&A. The partners certainly understood ISIS tactics, the broad anti-government and sectarian underpinnings of ISIS, etc. They also proved to be capable collectors. For example, much of the 92nd Brigade, 15th IA Division, was comprised of Tal Afar natives who were also based at Tal Afar Airfield as the ISF attack approached in August of 2017. Many of the ISF's tips and atmospherics were immediately helpful, but they struggled with assessment.

By March 2017, we had seen enough in Mosul to begin arranging a useful threat model for ISIS's complex and layered defense. The model generally held for Tal Afar as well. It became apparent that ISIS's defense depended on four critical factors: 1) suicide vehicle-borne improvised explosive devices (SVBIEDs); 2) scores of five-man infantry fighting squads; 3) centralized command and control (C2); and 4) ISF inactivity. Our understanding of how ISIS fought also reveals insights to our contextualized targeting process. Because of the "stimulate and exploit" interplay of current operations in Mosul, a majority of our collection and analytic capacities focused on finding and fixing ISIS within several city blocks of the ISF forward line of troops (FLOT).

In Mosul, enemy indirect Fires also gave deeper insights to ISIS thinking and capacity. ISIS tended to mass mortars against the perceived greatest threats and the enemy's loosening control over its mortars was a tangible indication that its' centralized C2 was beginning to wobble. Moreover, dynamic targeting to protect ISF units against ISIS SVBIEDs, infantry ambushes or mortar batteries along the FLOT was crucial for assistance and assurance. Then again, as the ISF transitioned from Mosul to Tal Afar in July, we adjusted the task force's reconnaissance and thinking to feed a deliberate targeting process. We also pursued a methodical intelligence preparation of the battlefield (IPB) unlike anything we could have achieved in Mosul's ever-shifting slugfest.

ISIS tactics typically came to life in a disruption zone marked by loosely coordinated indirect Fires (IDF); roads pocked with dirt berm, ditch, derelict vehicle or static VBIED obstacles; and limited commercial, off-the-shelf unmanned aerial system (UAS) reconnaissance. The battle zone may have been organized into multiple defensive belts or sub-battle zones where ISIS infantry units shouldered a heavy burden, producing "sniper-like effects" even if they were poorly skilled. ISIS also learned to compress its exposure to coalition detection, shrinking the distance from SVBIED

staging bases to strike zones, an innovation that Les Grau and Timothy Thomas referred to as "hugging" in their analysis of Chechen fighters during Grozny.[2] Additionally, fighting in support zones could be vicious. ISIS senior commanders clearly inspired their charges with their physical presence as evidenced by the ISF's month-long brawl to take al Juhmuri Medical Complex, the "ISIS Pentagon" of Mosul.

In its military prime during the Battle of Mosul, SVBIEDs intimidated even the fastest and nastiest of the ISF fighters, the Counterterrorism Services. ISIS appeared to pursue a high-payoff target list topped by ISF tanks and engineer blade assets with furious agility. ISIS commanders also frequently guided their SVBIEDs with small UAS, another manifestation of centralized C2. By tunneling through the internal walls of large structures, ISIS was able to make a handful of trained or untrained fighters appear as "snipers everywhere," a somewhat common report by the ISF on the most violent days. In July's closing days in West Mosul, we had to attack ISIS infantry small units with the same intensity as we had previously unleashed against SVBIEDs. Furthermore, ISIS was more or less an Arab-styled army like our partners; it fought with remarkably centralized C2 at times. Along these lines, when senior commanders were present on the battlefield, they made a difference. ISIS mortar battery commanders also seemed to exercise strict control over target selection as well as ammunition breaks. Finally, ISIS took full advantage when the ISF did not press the attack. Staff Lt. Gen. Abdul Amir agreed that after fighting each other for several months, ISIS knew every signal that ISF troops were inadvertently sending when their attacks had stalled.

Our contributions to coalition IPB were important, but not because our analysis was exact or we had an innate understanding of ISIS's military capabilities, capacity or intentions. In fact, there was always much more that we did not know than we did know. During the fight for West Mosul, every 25-30 days we released a one-page set of intelligence judgments that described how we evaluated ISIS tactics, capabilities, capacity and intentions in the changing environment. My hidden agenda with these projects was training while we fought, specifically pressing our talented analysts to report evidence-based arguments concisely and precisely. These IPB efforts spurred coalition dialogue — it helped get commanders and staffs talking. If we put our assessment out there, at least it caused other coalition stakeholders to critique it. These stakeholders included the ISF. Our IPB stirred their "red pen" too.

We periodically used a method that we dubbed "Intel Armageddon" to energize our thinking. This approach played to our battalions' inherent competitive nature, and the brigade intelligence support element (BISE) was always one of the contestants. "Intel Armageddon" was simple: when our analytics had lost altitude or needed a jump start, I sought three independent assessments of the same tactical problem. For instance, as we began our focused IPB of Tal Afar while the fighting in Mosul wound down, we had two of the battalions and the BISE compete. We actually invited Maj. Gen. Pat White, our CJFLCC-OIR commander, to participate in this session, and these three assessments fed our overall Task Force IPB that we shared up-and-out, particularly with the ISF.

Our parent division at Fort Bragg, N.C., also ensured our tactical UAS (TUAS) platoon's full manning with operators, and CJFLCC-OIR weighted the ISF fight in Ninewah Province with plenty of unarmed FMV capability. Foremost, we did not spend energy lamenting gaps in FMV coverage, but rather focused on avoiding redundancies and fusing the available intelligence overlays that we had. For perspective, these FMV assets provide commanders and analysts with a "soda straw" perspective of the battlefield. They are not magic. They do not find the enemy — humans do. The most critical aspects of FMV collection are the thinking behind where and when to place a sensor in order to increase odds of detection, as well as an analyst's ability to recognize the signatures that answer IRs. In fact, these airborne military robots can create a counterproductive illusion of understanding, so we always drove to emphasize the analyst over the asset.

Over the course of nine months, we generated more than 5,000 hours of TUAS FMV collection for the counter-fire fight, dynamic and deliberate targeting, IPB and ISF security operations to consolidate gains. With so much information coming in, we obviously had to meticulously prioritize analytic efforts to discern the answers to IRs. Because of the brutality along the FLOT, dynamic targeting consumed over half of our FMV collection and analytics during the Battle of Mosul, and I typically approved our brigade combat team S3's proposal or gave direction for the next day's intelligence collection plan as late as our rhythmic *Operations, Intelligence, Fires, Adviser* video teleconferences each evening. For dynamic targeting, TUAS was typically our "fixing tool," cross-queued off of another intelligence source, whether an ISF unit in contact, a radar acquisition or an ISF human intelligence tip. Moreover, TF Falcon's signaleers played a crucial role in connecting this intricate network, but so did a bevy of other players. Behind the scenes, a host of mechanics, logisticians, engineers and tactical controllers fought to keep precious TUAS sorties in the fight.

We actually employed multiple government and contracted sensors based from several locations, allocating FMV reconnaissance to A&A teams by using hours

2 *Timothy L. Thomas and Lester W. Grau, "Russian Lessons Learned from the Battles for Grozny," Marine Corps Gazette 84, no. 4 (April 2000), https://www.mca-marines.org/gazette/2000/04/ russian-lessons-learned-battles-grozny.*

as our unit of measure. Our message was, "hurry to think, not to plan," as we considered how to optimize and prioritize our finite collection assets. We never accepted the harmful egalitarianism of the proverbial "peanut butter spread" when prioritizing sensors, connectors and analysts. Staff Lt. Gen. Abdul Amir's main effort attack axis always mattered, because "stimulate and exploit" was the backbone of dynamic targeting during current operations. Philosophically, we also erred on the side of driving an aggressive strike tempo, directing sensors and analytics toward ISIS patterns that we could take advantage of in order to maximize the lethal return on our investment. Whenever practical, our targeting also integrated our Task Force's Persistent Threat Detection System (PTDS) based at the coalition's largest base in Ninewah. Thirty-seventh Brigade Engineer Battalion once memorably used the PTDS to find and fix an ISIS small unit crossing the Tigris River, setting up Lt. Col.Pastor to approve a fixed-wing strike that finished the startled enemy.

TUAS collection and analytics also contributed hugely to deliberate targeting. For example, our task force targeteers developed 30 deliberate strike nominations leading up to the ISF attack on Tal Afar alone. Unlike our dynamic process, the TUAS served more as the "finishing tool" for our deliberate targeting, confirming or denying our assumptions about civilian presence prior to coalition strikes on ISIS sanctuaries, lines of communication, C2 nodes or caches. Our deliberate process complemented the special operations and CJFLCC-OIR efforts, and perhaps predictably, the coalition's intelligence sharing and shared understanding improved as we transitioned from Mosul's dynamism to the deliberate isolation of Tal Afar.

Across the task force, A&A teams thickened the larger collection plan with their own organic fleets of small UAS, and the IA did similarly with off-the-shelf quadcopter drones. For example, 2-325nd AIR's layered FMV reconnaissance for the ISF attack on Tal Afar was a framework employed similarly by all of our field grade A&A teams during the operation. First, company-level advisers used Raven and Puma small systems, complemented by IA quadcopters and queued by IA human intelligence, to protect 15th IA's units from close-in threats. Meanwhile, Shadow TUAS helped Task Force White Falcon's analysts identify ISIS fighting positions, obstacles, and engagement areas near South Tal Afar's outer crust. Finally, the advisers may have also had operational control of long dwell, armed assets in order to hunt ISIS SVBIEDs staged within several blocks of the city's outer obstacle belts. All the while, signal bandwidth and power generation were in high demand.

Two of our goals were to keep every MI Soldier and every sensor in the fight. As I stated previously, our BCT S2, like several of his battalion-level counterparts, was also a valued finisher with military advice for us. Moreover, we have already described several examples of how we rolled our intelligence enterprise into multi-echelon engagement. Across the task force, we expected young MI talent to simplify the complex, communicate with clarity, and give potent advice to highly educated and experienced generals … all through an Arabic translator.

Lethal targeting with precision Fires and counter-fire. Coalition targeting devastated the enemy's IDF capacity in northern Iraq while maintaining strict standards that protected civilians and critical infrastructure. Unsurprisingly, surface-to-surface lethality also depended on superb long-range communications and sound ammunition supply practices. As importantly, our IPB was entirely contextual. For example, Mosul required dynamic IPB, targeting, and decision-making processes suited to the violent slog in dense urban terrain. ISIS seemingly turned most homes, schools, and religious sites into fighting positions or caches, and perniciously coerced civilians into action as human shields. It was a grinding, 150-day test of wills and uncomfortably close combat. On the other hand, the ISF attack on Tal Afar offered the coalition over 30 days to focus IPB on identifying most obstacle belts, conduct precision shaping and preparatory Fires, and reposition assets that helped whittle down the ISIS disruption zone well before the ground attack began on August 20, 2017.

Implications of urban terrain. With years to prepare the defense of Mosul, ISIS commonly buttressed its cover and concealment by using firing positions in sensitive sites or the upper stories of tall structures. As just one prominent example, days before ISIS regrettably destroyed the al-Nuri Grand Mosque in the Old City district, it began firing mortars from the grounds' courtyard. Such recklessness was the norm for ISIS, so our team relied on precision munitions and high angle attacks that could overcome the Mosul's jumble of intervening urban crests. Also, Task Force Falcon leaned on sensible weapons solutions such as Excalibur, fired at very high angles and set to delay, or M1156 Precision Guided Kits for urban counter-fire missions. In retrospect however, we consistently struggled to adequately arrange our sensors to exploit strikes, and assessing battle damage in complex urban terrain was always a challenge as ISIS continually adjusted its tactics frequently.

Counter-fire. The Fires fight in Mosul taught us that Q-53 radar acquisitions provide a critical overlay. ISIS fought its mortar platoons in a remarkably centralized manner, noticeably changing priorities or shifting ammunition around as the fight progressed. Over time, radar acquisitions fed our running estimates of ISIS's eroding capabilities and morphing intentions. We also saw patterns that we could exploit. Still, our radar acquisitions provided just one overlay, and we only detected a fraction of the shots fired in Mosul's dense urban terrain. Finally, ISIS was a thinking enemy, bent on survival: it adjusted its tactics frequently.

Our counter-fire fight aimed to assure the partner. This challenge required us to threat model ISIS artillery and mortar teams, burning a number of intellectual calories to understand how they moved, commanded and supplied their teams. We used Q-53 Radar acquisitions as a baseline overlay, but added ISF reporting, FMV analysis, and the Q-50 Radars that our A&A teams often employed. Additionally, we frequently fought multiple FMV assets simultaneously under the task force counter-fire cell. Integrated and predictive analysis set us up to focus the team's FMV "soda straws," the handful of fixed-wing reconnaissance robots we controlled, in predicted positions of advantage to find and fix the enemy's IDF assets. Meanwhile, we used everything from coalition jets to rockets to attack ISIS as we worked with and through the one-star airspace and strike coordination teams at Combined Joint Operations Centers in Erbil and Baghdad. Indeed, we even counter-fired with M142 High Mobility Artillery Rocket Systems at times.

Artillery fire support to ISF operations. As revealed previously, senior ISF commanders did not do detailed planning, and there were no ISF combined arms rehearsals of any sort. Going back to the "Six A's," we assured them with our detailed Fires planning, anticipated their schemes of maneuver by leveraging the "lethal OC/T network" and our A&A battle rhythm, and we remained agile by shifting artillery and

Second Battalion, 82nd Field Artillery Regiment Soldiers fire an M109A6 Paladin self-propelled howitzer from near Hamam al-Alil, Iraq, Feb. 27, 2017. The strikes were conducted to support the Iraqi security forces' operation to liberate West Mosul from ISIS. A global coalition of more than 60 regional and international nations has joined together to enable partner forces to defeat ISIS and restore stability and security. Combined Joint Task Force-Operation Inherent Resolve is the global coalition to defeat ISIS in Iraq and Syria. (Staff Sgt. Jason Hull/U.S. Army)

radar positions and priorities on imperfect information. I suspect that only very senior ISF generals ever really had a surface-level understanding of our Fires plans, and they never shared these details down-and-in. However, Staff Lt. Gen. Abdul Amir was counting on Lt. Col. Gibson's Black Falcons to synchronize the French contingent's 155 mm Caesar cannons, other coalition strike assets, and American howitzers through exhaustive coalition rehearsals. Moreover, there was always some level of "assist in order to advise" as we previously mentioned. Staff Lt. Gen. Abdul Amir valued Gibson's detailed briefings, making our BCT fire support coordinator another prominent finisher at times. In fact, we used "pre-assault" artillery Fires to suppress enemy fighting positions, but because the ISF rarely started attacks at planned times, we learned to use another round of "with assault Fires" that were synchronized with the ISF's actual crossing of the line of departure. We applied similar thinking for the employment of rotary-wing, rocket and fixed-wing assets. It was a privilege to represent our Army and our storied division with the coalition during OIR. We are also honored to have served under two tremendous divisions during the drive to help the ISF dominate our nations' shared enemy. We could not have been prouder of our partners as we departed Iraq in September; the ISF had liberated well over four million people and 40,000 kilometers of terrain, and more than a quarter million people had returned to their homes in Mosul. Perhaps the most heartening aspect was that Staff Lt. Gen. Abdul Amir and the ISF accelerated the campaign against ISIS following their victorious Battle of Mosul.

On our mission to help ISF and hurt ISIS every day, we never lost sight of the coalition's interests. We kept a consistent azimuth guided by understanding our senior commanders' intent and a disciplined battle rhythm. We had to produce results to retain the ISF's trust, and our senior leaders are immensely proud of our teams for balancing grit with empathy, humility and patience. There was always much more to serving the ISF and coalition well than merely advising and assisting. A learning organization, Task Force Falcon tinkered with our approach over time, eventually interpreting a formula that practiced all "Six A's" of A&A: advise, assist, accompany, assure, anticipate and agility. Still, the campaign was incurably human, and naturally, relationships mattered. Solid relationships kept everyone goal-oriented on frustrating days, and our connections introduced a deeper accountability to the partnership.

By breaking down ISIS in their own way, the ISF's leadership and ownership of the Battle of Mosul embodied the essence of warfare by, with and through a partner whose success was the very measure of our success. I still clearly remember the day I sensed the ISF's mass was finally toppling the enemy's Juhmuri hospital fortress in West Mosul. It was the visible beginning of the end for ISIS, and our partners were still leading the day's deadly work. They continue to do so today.

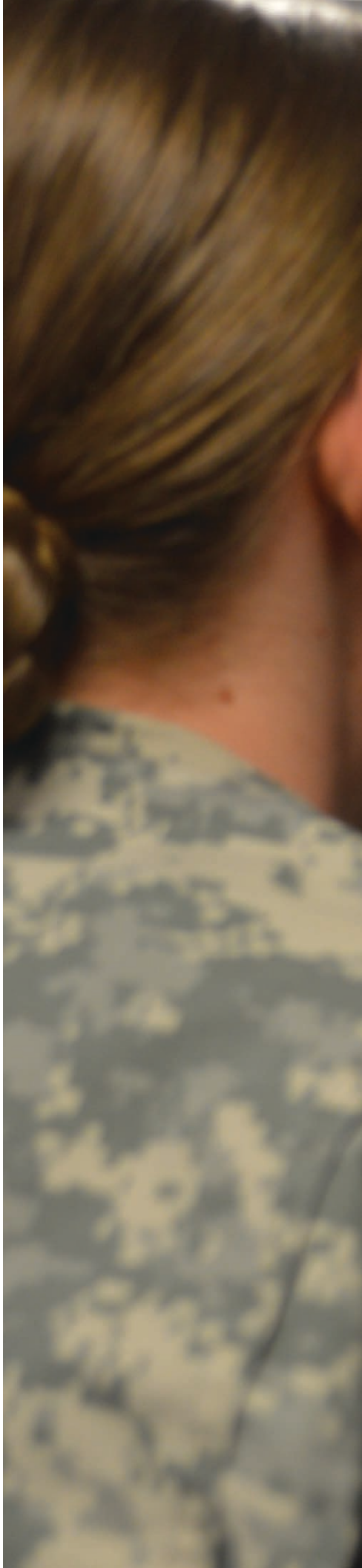
Col. Patrick Work is the 2nd Brigade Combat Team, 82nd Airborne Division commander.

Lt. Col. Daniel Gibson is the 2nd Battalion, 319th Airborne Field Artillery Regiment commander

The value of counseling

How leaders can leave an indelible mark on their profession

By Maj. Brett Lea



We have seen the statement about a leader's impact on innumerable Officer Evaluation Reports (OERs) and awards citations.

"Capt. Smith left an indelible mark on the unit which will be felt for many years" or "Sgt. 1st Class Johnson's tireless efforts will leave a lasting impact on the unit."

While this sounds great and may be a true feeling, what does it mean to make a lasting impact on any unit? In truth, for the vast majority of leaders, unless your picture is hanging in the command hallway, it is unlikely your countless hours of work will be remembered even three years after you leave. The nature of the Army management system is such that most of us remain in a regular transition from one unit and/or post to another, making a "lasting" impact difficult to achieve.

This fact may prove dispiriting to many. Most of us truly want to make a lasting impact, otherwise why would we choose such a demanding profession? But do not despair, for there actually is a way to leave a lasting legacy that transcends not just your unit, but your entire profession. You make your difference through your influence not on the unit, but on those you interact with during your time in the unit. They too will transition to other units and the lessons and interactions you had with them will shape their style of leadership and create an exponential ripple effect that will far outreach your individual interactions.

We all hope those effects are positive and will make the Army better for us having served in uniform. The most effective method to create those positive effects is through developmental counseling. It is an essential means to have an out-sized influence on this generation's leaders. Sadly, it is an opportunity many leaders forego or sub-optimize. It really does not matter whether you are a new Soldier arriving to a unit or a four-star combatant commander, we all benefit when counseling is done right. Counseling is where we as leaders have the opportunity to leave a lasting impression on those with whom we serve.

The significance of counseling is ingrained into Army culture. The secret we do not like to talk about is how rare it is for a leader to conduct counseling within the prescribed Army standard. This poorly guarded secret was brought to light in "Lying to Ourselves: Dishonesty in the Army Profession," a provocative essay published last year by the Strategic Studies Institute.

> *"IT IS THE EXCEPTION, NOT THE RULE, THAT THE FACE-TO-FACE COUNSELING MANDATED BY THE REGULATION AND VERIFIED BY THREE MEMBERS OF THE CHAIN OF COMMAND EVER OCCURS."*
>
> *DOCTORS LEONARD WONG AND STEPHEN GERRAS WONG*

First Sgt. Hunter Hilten counsels a Soldier about new career opportunities available to her in previously all-male units at the St. Paul Armory, Minn. (Minnesota National Guard)

Brig. Gen. Tammy Maas speaks with Sgt. Carolyn Galvan during the 'Guard Wyoming's Future' event. The event, which focused on the retention of Soldiers, took place at the Joint Force Headquarters in Cheyenne Wyoming. (Sgt. Justin Gosling/U.S. Army National Guard)

The authors, Doctors Leonard Wong and Stephen Gerras, highlighted how often leaders lied about counseling:

"It is the exception, not the rule, that the face-to-face counseling mandated by the regulation and verified by three members of the chain of command ever occurs. While initial counseling sessions may have a chance of being accomplished, compliance with the quarterly counseling requirement is extremely rare. Yet each year, tens of thousands of support forms are submitted with untruthful information. Interestingly, fabricating dates that the directed counseling supposedly took place is both expected and unremarkable (as long as the contrived dates do not fall on a weekend). To the average officer, it is the way business is done in the Army.

Wong and Garras refer here to the developmental counseling dictated by regulations covering the Officer and Noncommissioned Officers Evaluation System. Sadly, most Soldiers and noncommissioned officers identify counseling with the proverbial "negative" counselings they do when a Soldier "screws up." Overlooking developmental counseling has a lasting negative impact on the Army. Army Techniques Publication (ATP) 6-22.1, "The Counseling Process" states it unequivocally, "The Army's future and the legacy of today's Army leaders rests on the shoulders of those they help prepare for greater responsibility."

Understanding counseling's significance is only the first part. We must also understand the "how" of effective developmental counseling.

Leaders, at times, argue, "I talk with you all the time, you know how I feel about your work."

This is inadequate. Proper counseling using successful, documented techniques can far out-reach the impact of day-to-day interactions, allowing your subordinate to better perform in his or her job and, thus, make the unit better.

ATP 6-22.1 identifies three categories of counseling: event counseling, performance counseling and professional growth counseling. Any counseling session can contain one or all elements of each category. In practice, event counselings most often take the form of "negative" counseling. There are many other forms of event counselings, to include specific instances of superior performance, reception and integration counseling, crisis counseling, referral counseling, promotion counseling, transition counseling and adverse separation counseling. Performance counselings are associated with the quarterly counselings mandated by Army Regulation 623-3, "Evaluation Reporting System," which Wong and Garras highlighted as often being fictitiously annotated on OERs and NCOERs. Last of these, professional growth counseling, "appears" self-explanatory, but proves a rarity in the Army.

Counseling should follow the guidelines outlined in ATP 6-22.1, which direct the counselor and the counseled individual to prepare prior to the counseling session.

There is no "one" way to prepare a counseling session, but the foundational document should be a Department of the Army Form 4856, "Developmental Counseling Form," which facilitates a properly organized session. However, the counselor should not feel restricted to the format of the form. An initial counseling session will serve the purpose of illustrating a properly prepared session. Following the dictates of Mission Command (as defined in Army Doctrine Reference Publication 6-0), it is prudent to provide the commander's vision statement, a specific duties and responsibilities document, and an action plan which clearly defines the objectives and end-state of the specific section in which the individual will work. This is essential to creating a shared understanding from which the subordinate can exercise disciplined initiative to meet the commander's intent.

The last document, a personal and professional career plan, is filled out by the counseled individual prior to the counseling session. In it, the individual is asked to provide their family information, previous educational and work experience, significant achievements, as well as their goals and plans in the next year, five years, and

Sgt. First Class Terry Quail counsels a Soldier during the inaugural Wyoming Army National Guard's 'Guard Wyoming's Future' event. (Staff Sgt. Eric Moore/U.S. Army National Guard)

then beyond. With each subsequent counseling, this document should be updated by the individual and be a point of discussion during the session.

To be an effective leader, and certainly an effective mentor, you need to truly know your subordinate beyond just what they do day-to-day in the unit. This last document can be a vital tool to better understanding your subordinates' motivations, capabilities, strengths and weaknesses. At a minimum, it certainly opens up a dialogue for how you can help your subordinate attain his or her short and long term goals, an inherent task of any leader and mentor.

All of these documents only make counseling successful if the counselor employs three basic skills as defined by ATP 6-22.1: active listening, responding and appropriate questioning. The best means to exercise these skills requires approaching counseling like a discussion. To have an effective discussion, the counselor must truly listen and respond to the input being provided by their subordinate and tailor his or her questions accordingly. Sitting while you pontificate endlessly about any and all topics without affording your subordinate the opportunity to participate in a free flow of ideas has an obvious negative impact. It is equally important that the counselor listen as much as he or she speaks during a counseling, for that is when you truly get to know the subordinate.

As mentioned, there is no "one" way to do counselings, but counselors should avoid several pitfalls. There is certainly nothing wrong with the proverbial "under the oak tree" style of counseling. Subordinates can often glean many valuable life and career lessons from these impromptu sessions. Rigidly stating that counseling, or mentorship in general, must be done in a sterilized office environment only encourages fewer people to do it. Our day-to-day interactions with people certainly have a great impact. In addition, as leaders become more senior in rank, interactions and discussions with their raters will evolve. There is a definite message sent to a subordinate, however, when a leader clears his or her schedule for a counseling session and commits to a one-on-one discussion in an uninterrupted and private setting. Allowing a counseling session to be frequently interrupted reinforces they are only counseling to "check the block." Another tell-

Brig. Gen. Tammy Smith, U.S. Army Reserve deputy chief of staff, takes a moment when visiting the Army Reserve Career Counseling Center, Fort Hood, Texas. (Capt. Xeriqua Garfinkel/U.S. Army)

tale sign of an uncommitted counselor is when a subordinate is presented with a photocopied counseling form with generic verbiage designed for a broad audience. Tailoring a counseling session for the individual communicates the importance of the endeavor to the subordinate, because it requires forethought and a sacrifice of time on the part of the counselor.

The reason most forego their responsibility to counsel is because it is hard work, which takes time. Many late nights at work writing up counselings, or blocking out 30-60 minutes for several counseling sessions during a busy time of year can be a challenge. In the short term, however, it will enhance the work your subordinates produce, because they will better understand your expectations. Secondly, it provides the subordinate an accurate picture of the quality of their work. A true counseling session provides an honest evaluation of their work with a plan of action covering sustains and improves. Lastly, it is an opportunity to truly get to know your subordinates and for them to know you better. These sessions, done correctly, open up areas of discussion on the subordinate's job satisfaction, personal interests or issues and future goals. While not all leaders choose to be mentors, they do hold professional authority to act as such. By learning of your subordinate's goals, you can find ways to help them achieve them. For just these three reasons, the value of effective counseling should be readily apparent.

ATP 6-22.1 states that counseling is, "one of the most important leadership and professional development responsibilities, [which] enables Army leaders to help Soldiers and Army civilians become more capable, resilient, satisfied and better prepared for current and future responsibilities."

As leaders we all know this, yet we have a mountain of anecdotal evidence which tells us that leaders do not follow through with the counseling process. Serious long-term damage is done when we as an organization hand-wave counseling. We need only look at the innumerable accounts of tragic losses of Soldiers to suicide or malfeasance by leaders to know that just working with an individual every day does not mean you truly know your subordinate. If that is not enough, you also damage your subordinate's development, your development as a leader, and, most likely, the development of those who serve under your subordinates. You also throw away an opportunity to make your unit better. Individuals who feel like their leadership truly listens to them work more effectively and harder to attain the unit's success. It is not a stretch to say that failing to properly counsel has an exponential effect on the force, and the longer leaders fail in this endeavor the greater the damage.

The exponential consequence of properly counseling, though, has an equal and opposite positive effect on the force. Therefore, it must never be a requirement we push off to when we have more time. We all want to believe when we take off this uniform that all the endless time away from our families made a difference. You truly can make a difference, it just takes one person at a time.

Maj. Brett Lea is the U.S. Army Joint Modernization Command chief of effects at Fort Bliss, Texas. Lea served as the battalion S-3, detachment commander and battalion executive officer for 2nd Battalion, 44th Air Defense Artillery Regiment; company commander and battalion S-3 for 3rd Battalion, 34th Infantry Regiment; assistant team chief for the 1st Battalion, 6th Brigade , 2nd Division National Police Transition Team in Iraq; and rear detachment commander, platoon leader, battery executive officer and battalion S-1 for 3rd Battalion, 4th Air Defense Artillery Regiment (Airborne).

Enhancing muzzle velocity management

By Gunnery Department, Field Artillery Basic Officer Leader Course

Contributing writers: Capt. Michael Wish (USMC), Capt. Andrew Guglielmo (U.S. Army), Capt. Isaac Williams (USMC), Capt. Paul Kilgore (U.S. Army), Capt. Corey Muma (USMC), Capt. Carter Dunham (USMC), and CPT Michael Leija (U.S. Army). All are Field Artillery Basic Officer Leader Course or Marine Officer Basic Course Gunnery instructors.

Soldiers of 3rd Armored Brigade Combat Team, 4th Infantry Division fire an M109A6 Paladin howitzer during Exercise Combined Resolve IX at the Grafenwoehr Training Area, Germany, Aug. 21 2017. Exercise Combine Resolve IX is designed to train the Army's Regionally Allocated Forces to the U.S. European Command. The goal of the exercise is to prepare forces in Europe to operate together to promote stability and security in the region. (Sgt. Matthew Hulett/ U.S. Army)

The Paladin Digital Fire Control System (PDFCS) has been able to track and manage muzzle velocities for a decade. Many units are just starting to understand what capability it creates with the implementation of the "enhanced" mode of tracking muzzle velocity variations in the Advanced Field Artillery Tactical Data System (AFATDS) for M777 units.

Soldiers with B Battery, 3rd Battalion, 29th Field Artillery, 3rd Armored Brigade Combat Team, 4th Infantry Division, provide security while they wait for the beginning of a fire coordination exercise with M109A6 Paladins at the 7th Army Training Command's Grafenwoehr Training Area, Germany, Aug. 21, 2017. (Gertrud Zach/U.S. Army)

This status allows the use of the Enhanced Muzzle Velocity System. This capability has eliminated the need for the firing battery to conduct calibrations, saving time and ammunition and reducing exposure to counter-fire threats. The AFATDS and the Digital Fire Control System (DFCS) work in concert with the integrated Muzzle Velocity System (MVS) to measure and calibrate every round fired, constantly updating the howitzer's shooting strength (SS), propellant efficiencies (*PE*), and changes in muzzle velocity due to tube variability. Recent reports from the Army's National Training Center and from the Fleet Marine Force indicate that batteries are not using the enhanced muzzle velocity system as designed and instead use legacy calibrations.

National Training Center observer/coach trainers (O/CTs) note that artillery units should better understand muzzle velocity variation (MVV) and ammunition management. Calibration is the first operation a unit conducts when heading into "the box" at NTC. Pressed for time, units often oversimplify calibration requirements at all levels and do not fully understand what it truly means to calibrate all the guns before a live-fire execution. Many fire direction centers (FDCs) do not understand how to properly fill out Department of the Army (DA) Form 4982-1-R, "M90 Velocimeter Work Sheet," or DA Form 4982-R, "Muzzle Velocity Record[1]," and manage the information to complete calibration successfully. Additionally, if gun sections do not maintain logbooks to standard, units are challenged when determining the gun's shooting strength to conduct second-lot inferences or to determine the predictive *MVVs* of non-calibrated propellant lots.

While it is troubling that units are still struggling with basic MVV management, the emphasis should not be on legacy techniques. Calibrations are not an efficient use of time or resources and units should only perform them when the enhanced mode is unavailable. The system is designed to provide units the most accurate and updated muzzle velocity data, which only improves as a unit fires. Legacy calibrations determine data accurate for that time and accuracy degrades with every round fired. The field artillery community needs to understand how to employ the enhanced MVV mode in order to maximize efficiency in meeting the third requirement for accurate fire: accurate weapon and ammunition information. The force and the fleet must place emphasis on the enhanced MVV mode during external evaluations and unit training.

To understand the benefits of enhanced MVV mode, one must understand the difference between an MVV determined using a calibration, and an MVV determined using the enhanced mode. The MVV determined by the calibration process is comprised of several factors: shooting strength, ammunition effi-

1 *NTC made the observation prior TRADOC re-numbering the DA Forms. The new form numbers are DA From 4982-1, M90 Velocimeter Work Sheet and DA Form 4982 Muzzle Velocity Record.*

ciency and round-to-round variation. Ammunition efficiency is further broken down to projectile efficiency and propellant efficiency.

$$MVV = SHOOTING\ STRENGTH + (PROJECTILE\ EFFICIENCY + PROJECTILE\ EFFIENCY) + ROUND\ TO\ ROUND\ VARIATION$$

Average readouts during the calibration reduce the effect of round-to-round variations and the remaining variation is a cause of dispersion and therefore ignored. Projectile efficiency is accounted for by projectile square weight during concurrent and subsequent met techniques.[2] Therefore, the remaining factors in the form of the equation are the following:

$$MVV = SS + PE$$

SS is the shooting strength, or muzzle velocity loss due to tube wear, PE is the propellant efficiency, the effect a propellant has, in meters per second (m/s), on the MVV of an individual propellant lot.

This is an effective equation to predict a *MVV*, and common logical applications of this equation allow a FDC to isolate a *PE* and transfer that to another howitzer. This logic leads to a high degree of accuracy, but the *PE* captures effects unique to the calibrating howitzer. The shooting strength found in the above equation is only based off the interpolated data found in the Tabular Firing Tables (TFTs) of the respective charge. The TFTs are assuming that all howitzers "wear" the same along a "standard wear curve." Due to the manufacturing process of cast molding of a howitzer tube, there are slight differences in the howitzers internal components (i.e. powder chamber, forcing cone and the rifling itself). These slight differences will cause an individual howitzer's tube to wear differently from standard. The slight differences that the "standard wear curve" does not capture, are trapped in calibrated howitzers' MVVs, which can lead to inaccuracy when transferring MVVs or PEs.

DFCS addresses these equations and issues in a slightly different language from terminology found in Training Circular 3.09.81. We understand shooting strength through the number of equivalent full charges (EFCs) and their effect on MV (MVV_{EFC}). The DFCS is able to calculate MVV_{WEAR}, which is the difference between the "standard wear curve" and the "actual wear curve." DFCS determines MVV_{WEAR} after firing six different propellant lots to ensure validity and then applies it to all projectile families. MVV_{WEAR} takes the remaining 10 factors that affect muzzle velocity into account and updates automatically over time. FDCs may not transfer this MVV_{WEAR} to another howitzer as it is only true to that howitzer. Therefore, by using MVV_{WEAR} and the new naming convention, DFCS and AFATDS understand MVVs by the following formula:

$$MVV = MVV_{EFC} + MVV_{LOT} + MVV_{WEAR}$$

The above equation redefined PE as MVV_{LOT}, which is another advantage of the enhanced MV system and its ability

2 TC 3-09.98, paragraph 4-39

Soldiers with B Battery, 3rd Battalion, 29th Field Artillery Regiment, 3rd Armored Brigade Combat Team, 4th Infantry Division, conduct a fire coordination exercise with M109A6 Paladins at the 7th Army Training Command's Grafenwoehr Training Area, Germany, Aug. 21, 2017. (Gertrud Zach/U.S. Army)

The field artillery community needs to understand how to employ the enhanced MVV mode in order to maximize efficiency in meeting the third requirement for accurate fire ...

to update the elements that comprise an MVV with every round fired. In the basic manual methods of MVV, PE is not given as much attention as it deserves. Propellants are made by different manufactures in different locations of the world, meaning the conditions associated with that manufactures location affect the efficiency of that propellant. A single propellant lot, made by the same manufacture, may contain up to 18,000 – 30,000 individual propellants. Those propellants have an 82 percent probability that their MV will not vary more than 1.5 m/s. Due to this variation, Firing Tables and Ballistic Division (FTaB) have energetic engineers who are responsible for determining the efficiency. The initial PE given to a propellant lot assumes the propellant is straight from the manufacture and does not take into account the degradation of efficiency over time due to environmental exposure. Over time, the *PE* of an individual propellant will be updated due to units sending back PE data to the FTaB. This method takes a long time to gather data and can include computational errors.

When the weapon system DFCS calculates MVV lot and transmits it to AFATDS, it is effectively conducting a calibration with every round fired. Each time the howitzer fires a round or mission, the DFCS measures the muzzle velocity, extracts out the *ΔMVs* due to propellant temperature and projectile square weight, its MVV_{WEAR}' and its EFCs. What is left is a new value for the MVV_{LOT}. The DFCS averages the MVV_{LOT} with the previous MVV_{LOT} measurement, providing a running average *PE* for that lot of propellant, modelled by the following equation:

$$New\ MVV_{LOT} = \frac{MVV_{LOT} + MVV_{MEASURED}}{2}$$

This automatic determination of *PEs* (MVV_{LOT}) relieves the fire direction center from conducting calibrations and tracking *MVVs*. As the battery fires, each howitzer automatically tracks its own EFCs and *PEs* and, when digitally connected, updates the primary AFATDS with that data after each mission. If digital communications are not available, the updated data can be easily transmitted via voice and manually entered into the AFATDS.

Even if the unit has never fired a particular propellant lot, they still do not need to calibrate. The unit must simply, determine their total EFCs from a pull over gauge reading and/or the howitzer's Weapon Record Data Card and input that information at the DFCS. Then the data must be transmitted to AFATDS. Next, input the *PE* from the FTaB PE Tables as MVV_{LOT} and send the PE to the DFCS. This data is used for the initial fire mission. Upon firing of this initial mission, DFCS automatically calculates the new MVV_{LOT}.

Finally, the AFATDS can calculate the estimated MV, by adding the standard MV and changes in MV due to propellant temperature (ΔMV_{PT}) and projectile square weight (ΔMV_{WT}) in order to determine the actual MV that will occur when a round is fired.

$$MV = MV_{STD} + MVV_{EFC} + MVV_{LOT} + MVV_{WEAR} + \Delta MV_{PT} + \Delta MV_{WT}$$

This formula affects how AFATDS predicts an aim point, and therefore an adjusted quadrant elevation, required to engage a target. This method is more accurate and allows batteries to achieve accurate first-round fire for effect.

Two important factors are required for reaping the full benefits of enhanced mode. First, units must train and maintain the full digital loop in the "ready" status within the

Soldiers with Battery C, 4th Battalion, 1st Field Artillery Regiment, 1st Armored Division, Task Force Al Taqaddum, fire an M109A6 Paladin howitzer during a fire mission at Al Taqaddum Air Base, Iraq,. The strikes were conducted in support of Operation Inherent Resolve, the operation aimed at eliminating the Islamic State of Iraq and the Levant and the threat they pose to Iraq, Syria and the wider international community. (Sgt. Donald Holbert/U.S. Marine Corps)

AFATDS database. Though units can still use the Enhanced *MVV* mode while communications are degraded, merely using an AFATDS or DFCS does not allow for the designed integration of the systems. If a unit finds itself without digital communications established, units should manually enter the rounds fired into the DFCS weapon record data section and MVV_{LOT}, MVV_{WEAR}, and EFCs in AFATDS.[3] Second and even more importantly, howitzer section chiefs must properly enter the propellant long lot codes into the DFCS and maintain those digital records so that anytime that howitzer fires that propellant lot it can apply and update the *PEs*.[4] Fire direction officers should keep *MVV* logbooks, containing entries for MVVLOT, MVVWEAR and copies of howitzer gun cards as a secondary reference.

Understanding the concepts of manual calibration are highly necessary, as they are the only way for the artillery community to understand the math the AFATDS and DFCS performs. However, when batteries understand and employ the enhanced *MVV* mode, they eliminate the need to calibrate with the old procedures. Remaining arguments for the continuance of the old calibration procedures within the force and fleet relate to maintaining those skills in the event of a catastrophic failure of equipment. Since batteries effectively calibrate after they fire their shaping or preparatory fire missions, units should focus on the use of enhanced *MVV* mode within the full digital loop while delivering Fires.

3 *It is paramount that section chiefs manually input any rounds fired during digitally degraded operations into their display unit. Once digital communications is re-established, any rounds not input by the chief will cause errors in MVV_{WEAR} and MVV_{LOT}.*

4 *Muzzle velocity management is especially challenging for 105 mm Howitzers using M67 propellant. If the propellant was produced May 2012 or later, the propellant lot number is listed on all seven bags within the cannister. If the propellant is older, the propellant lot number is listed on the Ammo Data Card under the cartridge lot number on the shipping container.*

Soldiers prepare to occupy an observation post as part of the 25th Infantry Division's Best Fire Support Team certification. (Courtesy photo)

Addressing negative trends through certification

By Maj. John Poore and Chief Warrant Officer 3 Glenn Butler

In the July 2017 compilation of lessons learned and best practices from the Joint Readiness Training Center, there were several key observations identified for the field artillery community. One of the most significant trends observed was that field artillery units conduct ineffective rehearsals that lead to weak execution.[1]

The 25th Division Artillery views fire support team (FiST) certifications as an opportunity to reverse this trend by leveraging lessons learned from the Joint Readiness Training Center and by integrating the Army Associated Units Program.[2]

FiST certifications are semi-annual events that happen across the Army to ensure the readiness of artillerymen across the force. In the 25th Infantry Division, the brigades conduct their individual FiST certifications twice a year and the DIVARTY commander oversees an annual consolidated FiST certification. This ensures certified fire supporters are prepared to provide maneuver commanders continuous and responsive indirect Fires during combat operations.

The 25th DIVARTY commander requires that an assessment of the certification process is done quarterly to ensure the evaluated tasks are effectively assessing the selected focus areas.[3] This assessment is then integrated into training glide paths that culminate with the FiST certification process.

"The FiST certification is a great opportunity to reverse fire support trends that have atrophied over time and increase the overall lethality of fire supporters from both active and National Guard Soldiers," said Col. Matthew Stader, 25th DIVARTY commander.

To maximize the training opportunity, the 25th DIVARTY included all available fire supporters rather than conduct separate iterations for each brigade.

The most recent 25th DIVARTY FiST certification consisted of more than 120 Soldiers, including those from 1st Battalion, 151st Infantry Regiment, 76th Brigade Combat Team, Indiana National Guard.[4] The addition of the fire supporters from 1-151st Infantry gave the division the opportunity to integrate its partner unit from the Army Associated Units Program. The Army established this program to formalize the relationship between partnered active Army, Army Reserve, and Army National Guard units. The Chief of Staff of the U.S. Army, Gen. Mark Milley, explained that the complex nature of the global demands the Army faces requires the force to leverage its full capabilities and capacities.[5]

The Army Associated Units Program allows organizations to establish a training

1 *Center for Army Lessons Learned, Decisive Action Training Environment at the Joint Readiness Training Center. Vol. XV, Number 17-18, June 2017.*
2 *Field Manual 3-09 notes this as part of the role of the field artillery.*
3 *This assessment is led by the deputy fire support coordinator and the G3 Fires staff. Those recommendations are then briefed to the fire support coordinator for approval.*
4 *1st Battalion, 151 Infantry Regiment is partnered with 2nd Brigade 25th ID as part of the Army Associated Units Program.*
5 *Gen. Milley speaking about the implementation of the Associated Units Program on March 21, 2016 article "Department of the Army Announces Associated Units Pilot."*

Soldiers conduct a map reconnaissance as part of the 25th Infantry Division's Best Fire Support Team certification. (Courtesy photo)

relationship and build rapport long before they deploy together for combat operations.

"The training opportunities we have been given as a battalion FiST section because of our participation in the Army Associated Units Program have been tremendous" explained 1st Lt. Justin Emmett, 1-151st Infantry Regiment fire support officer. "I feel that because of this training and our partnership with 2nd Brigade, 25th Infantry Brigade Combat Team, that there has been more planning considerations for integration of Fires at all levels, from the platoons all the way up to the battalion, than ever before."

As explained by Emmet, 25th ID's integration of associated units has improved readiness and established relationships across the Army and is worth the cost. The FiST certification also gave the Army Associated Units Program a focus on improving trends observed at JRTC.

The trends from JRTC centered on ineffective rehearsals and echoed the experience of the senior artillerymen in the division. To solve this, each team participated in a battalion-level fire support rehearsal.

"We wanted this training event to inspire professionals and give them honest feedback, so they knew what they need to work on. While serving at JRTC, I observed that the fire support rehearsal is one of the key catalysts for growth of artillerymen and staffs. It forces them to communicate detailed integration in a clear and concise manner," said Lt. Col. Loreto Borce Jr., 25th ID deputy fire support coordinator.[6]

This observation led to the integration of a battalion-level fire support rehearsal into the FiST certification.

The fire support officers and their teams briefed the commanders from 2nd Battalion, 11th Field Artillery Regiment; the 3rd Battalion, 7th Field Artillery Regiment, division deputy fire support coordinator and the 25th DIVARTY commander, on the detailed integration of the fire support plans they composed in support of a maneuver element. The 25th DIVARTY commander additionally leveraged the senior 131A targeting officers in the division as observer-controller-trainers (OC/Ts) to provide specialized feedback to each team. Junior leaders received direct feedback from the senior artillerymen in 25th Inf. Div. on their respective plans and their ability to provide shared understanding across a staff.

This was the first time the 25th DIVARTY had integrated this task into its certification process. The inclusion of the JRTC trends provided an orienting metric for the 25th DIVARTY to use as a training objective for its artillerymen. By leveraging certifications as a touchpoint to address the deficiencies surrounding fire support rehearsals, the 25th DIVARTY was able to take a deliberate approach to correcting a negative trend that has been identified within the artillery community.

Additionally, the integration of 1-151st Inf. Reg. into the certification has strengthened the combat readiness of both organizations and validated the training model for the Army Associated Units Program. The 25th DIVARTY certification provided these partner units the opportunity to "train as we fight." To reinforce the importance of the certification process, Maj. Gen. Ronald P. Clark, 25th Inf. Div. commanding general, recognized the top-performing Soldiers. Soldiers from Battery C Charlie Rock, 2nd Battalion, 35th Inf. Reg., 3rd Brigade Combat Team, earned the Best FiST title. The importance of maximizing certifications is an overarching lesson the 25th DIVARTY provides to its fire supporters year round.

Tropic lightning.

6 *Lt. Col. Loreto Borce served as the senior brigade fire support observer-controller-trainer at the Joint Readiness Training Center prior to serving as the 25th Infantry Division deputy fire support coordinator.*

Shoffner talks Army modernization with industry leaders

By Monica Wood

Maj. Gen. Wilson A. Shoffner, Fires Center of Excellence and Fort Sill commanding general, addressed more than 180 defense contractors on the challenges the Fires force face in preparing for future multi-domain battle. Shoffner spoke at an Industrial Breakfast at Cameron University Jan. 31.

According to Shoffner, there are two key issues to preparing the Army for a near-peer battle. The first issue is identifying and acquiring the right weapons to put in the hands of the Fires force and its allies in a timely manner. The second is mitigating identified Fires gaps to conduct large-scale combat operations against a near-peer competitor. FCoE leaders are looking to the industry as a think tank to assist in addressing these capabilities gaps.

"It is so important for us to work with you, for us to learn lessons and have a dialogue about how we need to operate and survive in the current operational conditions," Shoffner said to industry vendors. "We talk about outreach a lot and working with industry, but the reality is that over the last 15 or 16 years the Army's focus has been on the current fight and resources follow the current fight."

In an effort to modernize, the Army must adapt to the battlefield of the future. Shoffner said greater lethality is about capabilities, not platforms.

"The Army must innovate and adapt concepts, equipment and training to be ready for the next war. We face multiple challenges in defining force structure, doctrine and implementing training. Army leadership is establishing strategic partnerships with industry to cultivate innovative technologies to accelerate delivery of 10 times capabilities to the force," Shoffner said.

The Army has six modernization priorities with the first being long-range precision missiles and the fifth air and missile defense. Army senior leadership initiated two directives to prioritize resources and efforts to accomplish these priorities: cross-functional teams (CFTs) and refocused talent management.

In October 2017, the Army released a directive outlining the pilot program of the cross-functional team. It included who would comprise the team (members with expertise in science and technology, logistics, contracting, and more) and what the team would set out to accomplish, ultimately "to develop capabilities faster and in a less costly manner to enable our Soldiers to fight and win."

"The challenges we face because we have so much capability and so much force structure, it's going to take a long time to crawl out of that hole and it's hard to do when the resources are uncertain," said Shoffner.

Shoffner posed the question "What kind of organizations are needed for the force of the future?"

He discussed three of the organizations developed by the FCoE: Division Fires Command to support division operations; the Operational Fires Command to support corps operations; and the Theater Fires Command to support a theater Army/Joint Force land component command.

"The idea is to converge the field artillery and air defense capabilities with cyber-electromagnetic activities, information operations and space-based capabilities into integrating headquarters with the authorization to coordinate and employ cross-domain Fires at every echelon," he said.

Multi-domain

One of the initiatives for the Army is the Multi-Domain Task Force. The primary mission of the MDTF is to protect the joint force by applying long-range artillery and air and missile defense capabilities. It is also designed to provide long-range precision Fires to target critical enemy assets such as integrated air defense systems, cruise and ballistic missiles, aerial attack capabilities and surveillance capabilities.

"The biggest lesson learned in order to decisively affect the fight was that we needed long-range Fires to break through the [anti-access area denial] bubble to allow their attacking agent to get in there," said Shoffner.

Long-range Fires and field artillery

Long-range precision Fires is the number one priority on the Army's list. Fires provides the ability to destroy, neutralize or suppress artillery targets at extended ranges, thereby shaping the close fight to a time and place of our choosing.

Brig. Gen. Stephen Maranian, Field Artillery School commandant, said the FA is working hard to educate the force.

"Our main focus is to enhance readiness in the operational force," said Maranian.

Maranian described a ready Fires force as manned, trained, equipped and well-led to conduct joint missions and employ cross-domain Fires that enable unified land operations.

He said training will ensure dominance in range, munitions and target acquisition to ensure Fires has superior lethality and range against near-peer threats.

Air missile defense

Air and missile defense is one of the Army's top modernization priorities and it's critical to winning a fight against a "great power," or near-peer adversary. In order to achieve overmatch, the AMD force must retain the ability to defeat the full range of missile threats.

"The Army will achieve its objectives through its air and missile defense modernization strategy — to rapidly integrate and synchronize the requirements development process, acquisitions process and resources to deliver AMD capabilities to the warfighter faster," said Shoffner.

He said the idea is to have multiple ways

to deal with threats like unmanned aerial systems (UASs) including how to determine if it's a friendly UAS and how to deal with enemy UASs.

"It's a question of what sensors do we have and what ability do they have to feed the information into our systems? We're at a point now where our missiles outperform our sensors," said Shoffner.

"There's no one silver bullet, there's no one single system that's going to get this done. There are some healthy discussions going on and you guys can help us see what the options are and see what can help us with the counter UASs," he said.

"One of the things we can all agree upon is that it doesn't make any sense to fire a missile that costs $114,000 at a UAS that costs a thousand dollars. There are other ways to get at the UAS whether it's guns, or directed energy or a combination of those things. My point is to do what is sensible," he said.

Brig. Gen. Randall McIntire, Air Defense Artillery School commandant, emphasized the importance of air defense artillery to protect the maneuver force and for preservation of key combat power.

"The main priority for us is [maneuver short-range air defense]. The maneuver force lacks the ability to detect, identify and engage threat UAS, cruise missiles, rotary-wing and fixed-wing aircraft," said McIntire. "M-SHORAD will be employed as part of a tiered and layered approach to establish cross-domain dominance of tactical airspace."

M-SHORAD employs a mix of sensors and shooters. The directed requirement for an initial M-SHORAD capability is to address the urgency of need to provide air and missile defense protection of maneuvering forces. In the future, M-SHORAD will contribute to the maneuver force's employment of lethal and/or nonlethal capabilities to detect, track, identify and defeat the threat.

Monica Wood is the Fires Bulletin assistant editor. She has written for the Army at Fort Sill for more than 25 years.

Maj. Gen. Wilson A. Shoffner, Fires Center of Excellence and Fort Sill commander, speaks to more than 180 defense contractors at an Industrial Breakfast at Cameron University Jan. 31. The breakfast was hosted to give the industry an opportunity to address capability gaps and be a think tank for innovative and adaptable concepts and technologies for the battlefield of the future. (Monica Wood)

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Ada unit reorganizes for fires integrated mission

Soldiers in 2nd Battalion, 44th Air Defense Artillery are deploying to serve as a total Fires integrated package under a field artillery division, 101st Airborne Division, with a field artillery battery attached to them. Visit:

https://www.youtube.com/watch?v=ybF3nTG2C2Y

Synchronizing, simplicity

How joint Fires observers will cross domains

By Marie Berberea

Joint terminal attack controllers and joint Fires observer with the Michigan National Guard's C Company, 125th Infantry Regiment, perform tactical movements for a close air support training mission at Grayling Air Gunnery Range, Mich., during Northern Strike exercise. (Master Sgt. Scott Thompson/U.S. Air National Guard)

For joint Fires observers to be effective in the cross-domain fight, they must evolve sequencing processes, synchronize with maneuver and joint assets, and standardize training.

Lt. Col. Nick Sargent, Army Multi-Domain Targeting Center joint integration chief, saw a demonstration of the current Army process during Field Artillery Basic Officer Leaders Course and Joint Fires Observer Course simulation events. A surface-to-air threat was suppressed with artillery and then students brought in aircraft to accomplish air-to-surface Fires.

"That's inefficient. You've got to do it simultaneously to really get after what this is trying to say," said Sargent pointing to the definition of cross-domain Fires. "This is synchronizing effects in time and space and that's the next level from the JFO perspective. At the moment they're good at doing one or the other separated by time as opposed to massing and then doing things at the same time."

Massing effects

He presented the Marine Corps' tactics, techniques and procedures to the Directorate of Training and Doctrine as a lesson learned to improve JFO effectiveness.

"There's a transition that is occurring as large-scale combat operations become the norm. We still have a generation of people who are teaching at the school house here who only know stability ops and [counter insurgency operations]. Therefore it's kind of do one thing and then the other because they've been able to get away with it in a permissive environment. You won't be able to get away with that going forward when the environment is contested or highly contested. You have to synchronize and mass your effects to be successful."

Sargent said the Marine Corps as a service is more comfortable with cross-domain Fires because of their culture and command structure.

"They grow up in an environment where it's all about supporting the infantry with all the other toys they've got. With that said, the Army and Air Force have all these things, it's just trying to find not only joint training opportunities that exist at the [combat training centers], but it's use."

He said those who develop training need to have two things in mind: a maneuver plan to start with and integrate a Fires mission from, and Air Force objectives built in to make it a realistic cross-domain scenario.

Simplified terminology

The Marine Corps uses terms spelled out for suppression of enemy air defenses when calling for fire. Sargent recently implemented this method in Redleg War exercises because of its simplicity.

Sargent said what also works for the Marine Corps is its standardization.

"That basic SEAD fire mission is taught in their JFO course, their [joint terminal attack controller] course, all their [fire direction officers] get taught it — so across the system they all get educated on it at their schools. The Army doesn't have an equivalent."

Currently the Army has a call for fire mission for suppression and one for marking. A conversion must also be done when trying to synchronize with other assets. This means time.

"In order to synchronize Fires in time

and space, you have to have a common time reference," said Sargent.

JFOs can use Advanced Field Artillery Tactical Data System-time, but the pilot supporting that mission is not in the AFATDS network.

"So as part of your troop leading procedures, or your orders group, you have to do a time hack so everybody's got the same time," said Sargent.

He said GPS time can be used if there is no access to AFATDS, but warned that that is not a fail-safe when considering a GPS-denied environment may factor in.

"When it's not denied, put it on your watch. Then you can have GPS time on your watch so when you do get jammed at least you've got something you can refer to."

Synchronizing support

In past deployments, Sargent has had to remind maneuver of the utility of Fires support.

"You will have heard the previous [commanding generals] and indeed this one talk about trying to get the field artillery and the air defense artillery communities back into the fight," said Sargent. "If you look big picture, we went to a modular brigade where we gave field artillery units to brigades. And because of the operation they were re-rolled and employed in different ways. Therefore you have this generation of artillerymen who missed an opportunity to gain that experience, but equally their maneuver counterparts have been doing things without them."

He said the Fires force is trying to reset that balance.

Standardized training

JFO skills are now part of the 13F military occupational specialty and taught in BOLC. This increases the number of "eyes" on the battlefield, but the training standards to keep up certifications may still vary from unit to unit. Currently there are joint standards for JFOs, but no Army policy holding them to that standard. JFO tasks are included in the fire support chapter of the Training Circular 3-09.8 but this document is not a directive.

Sargent is working to close that gap.

"What I think is missing is something from the Army staff to the [Army Commands and Army Service Component Commands]."

He highlighted Col. Todd Wasmund, former 3rd Infantry Division commander, who held their 3rd ID JFOs to the joint standard. Wasmund put emphasis on this training and the command team at Fort Stewart, Ga., saw the utility in joint standards.

Sargent said it will take a full evolution of experience to close the knowledge gap.

"With all change management it's going to take a while to readjust. I would say it's going to take the first generation of BOLC graduates who went through this program to become O5s or thereabouts. It's going to take the first generation of 13F graduates to become E7, E8, E9 for it to all be normal. Then we'll look back and go 'What was all the fuss about?' But that's a 10-year cycle, so we have a period of 10 years where it's going to be more difficult than it will be in time when it's just this is the way we've always done it."

Marie Berberea is the Fires Bulletin editor. She has been an Army and civilian journalist for 13 years.

The 2017 Knox, Hamilton and Shipton Awards

The U.S. Army Air Defense Artillery School has announced the winners of the 2017 Knox, Hamilton and Shipton awards for excellence within the air defense artillery branch. These awards are presented annually and recognize excellence by unit (active and National Guard) and individual. Congratulations to the 2017 award winners.

AIR DEFENSE ARTILLERY HENRY A. KNOX AWARD

Headquarters Battery, 2nd Battalion, 1st Air Defense Artillery Regiment received the 2017 Henry Knox Award. (Courtesy photo)

The Henry A. Knox Award recognizes the outstanding active-duty Army Air and Missile Defense Battery of the Year for superior mission accomplishment and overall unit excellence within the air defense community.

Headquarters Battery, 2nd Battalion, 1st Air Defense Artillery Regiment received the Knox Award for achieving several notable accomplishments and demonstrating overall unit excellence. Headquarters Battery showed their competitive spirit in every undertaking. Battery leadership didn't back down from any task; especially during a time when all actions were under high visibility from leadership across all echelons of command. Headquarters Battery went above and beyond all expectations with resilience to ever-changing mission sets as part of the Global Response Force unit's deployment to the Republic of Korea.

Headquarters Battery's preparation, execution and integration of the first Global Response Force deployment of the Terminal High Altitude Area Defense (THAAD) system on the Republic of Korea was a major enterprise and a first in air defense history. The battery's fire direction center was instrumental in establishing interoperability between the Information Coordination Central (ICC)/Tactical Control System and THAAD to build a new defense design in Korea capable of addressing the significant tactical ballistic missile threat posed by North Korea. The battery executed this new mission operation seamlessly with no interruption to the theater-wide air defense protection coverage system.

In addition to the Headquarters Battery's aptitude to out-do the highest technical and tactical proficiency standards in achieving mission success, they led the way in accomplishing overall unit excellence at both battalion and brigade levels. The battery constantly surpassed readiness standards by never falling under 95 percent in equipment, personnel or medical readiness despite the extreme operation tempo and complexity of the unit mission sets. Headquarters Battery's driven spirit, concentrated motivation, and desire to win was displayed throughout the year. Members of Headquarters Battery were the winners of the esteemed Battalion's Best Warrior Competition in three out of four categories: officer, non-commissioned officer and Korean Augmentation to the U.S. Army. Their dominant performance continued at the brigade's combatives tournament, winning two divisions and having one officer earning runner-up in the Eighth Army's Tournament. Furthermore, the unit's multiple accolades include: Brigade NCO of the Quarter, Brigade Culinary Soldier of the Quarter, Distinguished Honor Graduate (BLC), and Eighth Army Administrator of the Year.

Headquarters Battery radiates superiority in all that they do. They have proven they can be called on to support any mission and will always answer the nation's call. They have demonstrated they are technically and tactically proficient at various levels of air defense operations, they maintain their equipment and themselves, keep safety awareness at the forefront of every operation and exude excellence in all areas. The unit's competency is beyond reproach and exemplifies the spirit and intent of the Henry A. Knox Award.

AIR DEFENSE ARTILLERY ALEXANDER HAMILTON AWARD

B Battery, 2nd Battalion, 174th Air Defense Artillery, Ohio Army National Guard is the recipient of the 2017 Alexander Hamilton Award. (Courtesy photo)

The Hamilton Award recognizes the outstanding Army National Guard Air and Missile Defense Battery of the Year for superb mission accomplishment and overall unit excellence. The 2017 Hamilton award goes to B Battery (*Vulcan*), 2nd Battalion, 174th Air Defense Artillery Regiment, Ohio Army National Guard. B Battery also won this award in 2012.

The applicants are judged in tactical proficiency, safety, operational readiness rating, and other indicators of excellence. Air defenders in A Battery also received overwhelming evaluations in all categories.

Vulcan Battery distinguished itself as a combat tested team that provided indirect fire protection capability (IFPC) and sense and warn capability at both Bagram Airfield and Camp Dahlke in the United States Forces – Afghanistan area of responsibility.

Vulcan Battery is organized under a modified table of organization and equipment (MTOE) designed Short Range Air Defense-Avenger battery resourced for a non-MTOE Counter-Rocket, Artillery and Mortar (C-RAM) mobilization in support of Operation Freedom Sentinel. During their deployment, *Vulcan Battery* provided sense and warn and intercept against more than 50 rocket attacks and protected the lives of over 18,000 military and civilian personnel. *Vulcan Battery* successfully intercepted a rocket fired at BAF from a point of origin less than 200 meters from the perimeter barriers, a first in C-RAM deployment history. In order to capitalize on an opportunity, battery leadership chose to relocate and enhance a battle lab that simulates engagement operations as well as concurrent training for engagement operations center crews. Their intent was to maintain training proficiency and mitigate complacency.

B Battery distinguished itself in all aspects of deployment preparation to include 100 percent pre- and post-mobilization training; a 93 percent average on C-RAM new equipment training; and they achieved 100 percent certification on IFPC Table XII during the capstone training event.

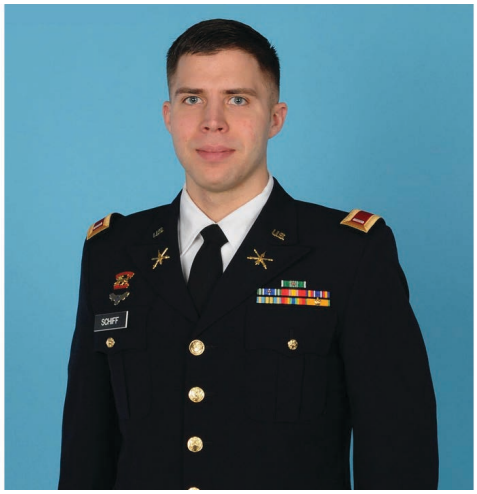
The battery received an operational readiness rate over 94 percent during certification and validation by incorporating preventative maintenance checks and services into their battle rhythm and utilizing assigned maintenance subject matter experts. Battery leadership also awarded the Army Achievement Medal to 10 Soldiers assigned to the battery for their actions preparing for combat.

Vulcan Battery implemented controlled inventiveness by continuously improving processes and procedures, setting conditions for continued successful C-RAM operations. The battery generated a better collective understanding by incorporating frequent maintenance meetings into their battle rhythm. These meetings incorporated both battery personnel and the civilian field service representatives to improve operational readiness rates. In addition, the battery established a primary and secondary building location for sense and warn assets which increased readiness and resulted in zero no-warn indirect fire events.

Sound character and discipline of the Soldiers resulted in zero negligent discharges, zero military vehicle accidents, and no company grade disciplinary actions throughout 2017. This set the standard for other battery-level organizations in the battalion to follow. Battery Soldiers demonstrated sound health, strength and endurance with a 100 percent pass rate for the Army body fat composition metric and a 99 percent pass rate for the Army Physical Fitness Test. Personal and professional development remained a priority during deployed operations and over 20 *Vulcan Battery* Soldiers initiated or completed advanced education courses. Additionally, more than five Soldiers volunteered at the Craig Joint Theater Hospital at BAF, assisting with urgent surgical care and sharpening their skill craft.

B Battery, 2nd Battalion, 174th Air Defense Artillery Regiment distinguished themselves and brought tremendous credit to the air defense community. They are proficient at countless levels of air defense operations, they maintain their equipment and themselves and keep safety at the forefront in all areas. The unit's competency is beyond reproach and exemplifies the spirit and intent of the Alexander Hamilton Award.

AIR DEFENSE ARTILLERY JAMES A. SHIPTON AWARD



First Lt. Benjamin Schiff, 5th Battalion, 7th Air Defense Artillery Regiment, winner of the 2017 James Shipton Award.(Courtesy photo)

The James A. Shipton Award recognizes an air defense artillery professional for outstanding performance and contributions that significantly enhanced the air defense mission.

The applicants for the Shipton Award are judged in leadership, technical and tactical knowledge, selflessness and community service, and commitment to excellence. The 2017 Shipton Award winner is 1st Lt. Benjamin Schiff, 5th Battalion, 7th Air Defense Artillery Regiment. Schiff currently serves as a tactical director and the fire direction center officer in charge for 5-7th ADA. He is a well-rounded leader whose presence and knowledge have greatly advanced the entire unit.

Schiff demonstrated his capacity for leadership when, as tactical director, he took initiative to personally train and prepare subordinate units for gunnery certifications. Schiff instructed 50 Soldiers from across the battalion on advanced Patriot and air defense tactics which enabled the unit's overwhelming accomplishments throughout the rest of the year. During Joint Project Optic Windmill 2017, he helped develop and codify updates to NATO air defense tactics, techniques and procedures in multiple supplementary plans with participants from 12 NATO allied and partner nations.

Schiff followed up with achievements during Tobruq Legacy 2017 when he implemented and further refined the improved TTPs by leading the set-up and operation of a multinational surface based air defense operation center (SBADOC). Prior to Tobruq Legacy, Schiff coordinated with the NATO Combined Air Operations Center to provide academic classes on NATO air defense operations to all U.S., Romanian and Slovenian air defense Soldiers and Airmen participating in the exercise. Additionally, during the midst of this challenging joint exercise, he coordinated directly with the NATO Airborne Early Warning Squadron to conduct Link 16 validation and familiarization training with the NATO Airborne Warning and Control System.

Schiff's tactical and technical expertise is second to none in the battalion. During Tobruq Legacy 2017, the SBADOC, led by Schiff, used a layered air defense concept with six different weapon systems to defend the commander's critical asset list and execute a live fire. He coordinated directly with the defense contractor to conduct the final testing and validation of the Dismounted Patriot Information and Coordination Central, a prototype of a new force multiplier undergoing procurement. Schiff worked directly with the Swedish Control Reporting Center to coordinate Fires while operating in a complex and dynamic joint engagement zone.

Schiff consistently demonstrates a strong commitment to excellence through his leadership, tactical expertise and selfless service. He was recognized as the Top Gun Distinguished Honor Graduate; was also recognized by the Romanian Air Force and Romanian Army for his leadership; trained fellow Soldiers for the Nijmegen 100 mile ruck march; and earned the Military Outstanding Volunteer Service Medal through his continuous and dedicated community service.

In summary, Schiff maximizes his impact on Soldiers by taking disciplined initiative and living the Army Values, epitomizing leadership qualities, commitment to excellence and innovative energy that has come to define the air defense artillery's founding father, Brig. Gen. James A. Shipton.

In the next issue of Fires

May-June 2018, Fires Conference. Fires in support of large-scale combat operations.

The deadline for submissions is April 1, 2018. This issue will have information and topics discussed at the 2018 Fires Conference. It will also discuss equipment upgrades and impacts, how to survive permanent change-of-station season, promotion tips and more. Send your submissions to usarmy.sill.fcoe.mbx.fires-bulletin-mailbox@mail.mil or call (580)442-5121 for more information.

Soldiers with 2nd Battalion, 300th Field Artillery, prepare for a night-fire exercise Sept. 7, 2017. This was the first time the unit had fired rockets during training at the Joint Training Center, Camp Guernsey, Wyo., in a few years. (Sgt. 1st Class Durward Jones/ Wyoming National Guard)