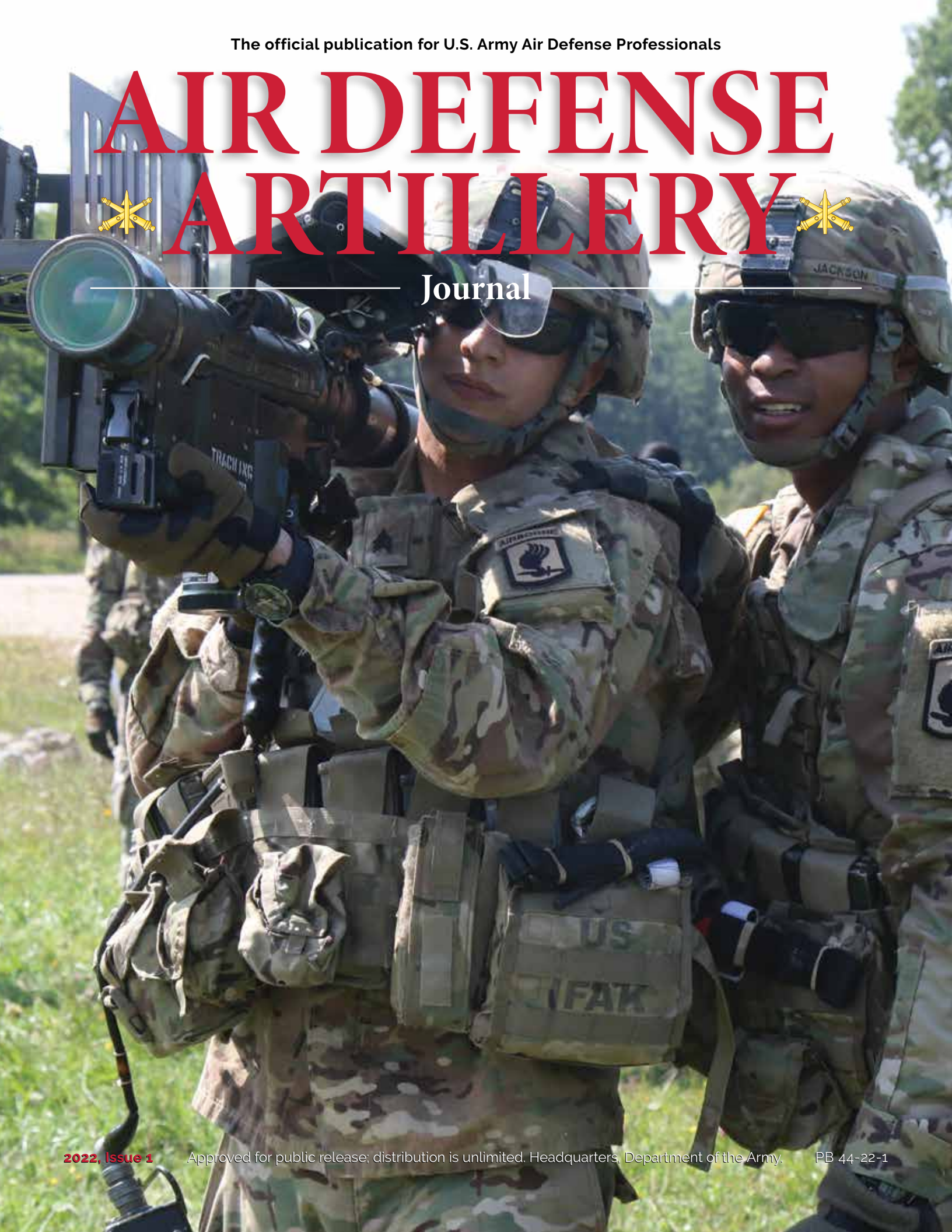
The official publication for U.S. Army Air Defense Professionals

AIR DEFENSE ARTILLERY

Journal



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Purpose

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

Cover

Soldiers from the 173rd Airborne Brigade practice target engagement with a Stinger Missile weapon system. Instructors from the Air Defense Artillery School at Fort Sill, Oklahoma, teach maneuver Soldiers how to conduct short-range Air Defense operations at the 7th Army Training Command's Grafenwoehr Training Area, from July 31 to Sept. 1, 2017. *(Photo by SSG Kathleen Polanco, 7th Army Training Command)*

Fort Sill welcomes 45th ADA commandant

By Chris Wilson

< MG Kenneth Kamper, commanding general, Fires Center of Excellence and Fort Sill, welcomed COL Curtis King as the 45th Commandant of the U.S. Army Air Defense Artillery School, Chief of Air Defense Artillery and Deputy Commanding Officer of the Fires Center of Excellence and Fort Sill during a ceremony July 7, 2022. *(Photo by Chris Wilson, Fort Sill Public Affairs Office)*

Fort Sill welcomed the 45th Commandant of the U.S. Army Air Defense Artillery School, during a ceremony July 7, 2022.

COL Curtis King assumed duties as not only the commandant, but also Chief of Air Defense Artillery and Deputy Commanding Officer of the Fires Center of Excellence and Fort Sill.

MG Kenneth Kamper, commanding general, Fires Center of Excellence (FCoE) and Fort Sill, welcomed King into his new roles with a speech on the Old Post Quadrangle where he talked about the future, importance and growth of the Air Defense Artillery. He then commended King's leadership.

"He's a leader that helps us drive culture around this place," said Kamper. "A culture of values, a culture of fitness and culture resiliency down to the lowest levels, and that's hard enough in itself, but we get it done with a smile on our face, in a community where people care for each other."

King joins the FCoE team from Headquarters Department of the Army's Management Office where he served as Director of FIRES G-3/5/7 at the Pentagon.

King's military education includes the Air Defense Artillery Basic and Captain's Courses, Command and General Staff College, U.S. Army War College and Airborne School. His awards and decorations include the Defense Superior Service Medal; Legion of Merit with 2 Oak Leaf Clusters; Bronze Star; Meritorious Service Medal with 4 Oak Leaf Clusters; Army Commendation Medal with 4 Oak Leaf Clusters; and the Joint Service Achievement Medal.

In his own speech, King reiterated Kamper's points on modernization and growth of the Air Defense Artillery branch and the role he, as commandant, would play in bringing those efforts to fruition. He went on to thank the Air Defenders themselves:

"To all our defenders — I am proud to serve with you, alongside you and your families. Thank you for what you do," King said. "Today's Air Defenders are the most deployed Soldiers in our Army. They're serving across the globe, defending our Soldiers, Sailors, Airman, Marines and Guardians against an ever-evolving threat, and they've been doing this for a number of years. They're true professionals and they represent our nation well. Thank you for all you do for Army and for our nation. Know that your Army is very proud of you and appreciates everything that you do."

Welcome, COL King!

2021 Air Defense Artillery Year in Review

NATIONAL GUARD EDITION

A two-person avenger crew with Alpha Battery, 1st Battalion, 265th Air Defense Artillery, Florida Army National Guard, provide Air Defense coverage of their defended asset in a camouflaged location on key terrain with clear views of enemy air avenues of approach. The Soldiers were participating in a rotation of the NTC at Fort Irwin, California. *(U.S. Army Photo by LTC Tina Madovoy)*

164th Air Defense Artillery Brigade, *Blazing Skies*, Florida Army National Guard

For the 164th Air Defense Artillery Brigade (ADA BDE), Florida Army National Guard, headquartered in Orlando, Florida, it was a year of duty and selfless service as Soldiers simultaneously supported numerous federal and state operations.

Commanded by COL Sean T. Boyette, the brigade achieved an unprecedented mobilization rate of over 40% of its personnel deployed either home or abroad. The 164th ADA BDE headquarters led the COVID-19 task force supporting vaccination efforts throughout the entire state of Florida in response to the pandemic. Soldiers worked alongside civilian partners at dozens of sites to provide administrative and logistical support.

While Soldiers continued to support response efforts, the brigade strove on increasing readiness and honing their warrior skills. Soldiers received new training, including the Army's updated marksmanship qualification, which simulates combat situations more effectively than the previous Individual Weapons Qualification. In addition, Soldiers have continued to prepare physically for the Army Combat Fitness Test (ACFT).

Currently, the brigade headquarters, continuing its fourth year of back-to-back mobilizations, is mobilized for their second deployment to Germany in support of the European Deterrence

Initiative (EDI). While deployed, Soldiers provide mission command of U.S. Air and Missile Defense forces spread out over four countries and two continents, train and participate in several multi-national joint exercises to build capability and capacity while enhancing the NATO alliance to deter aggression.

1st Battalion, 265th Air Defense Artillery, *Thunderbolt*

In April, A Battery, 1st Battalion 265th Air Defense Artillery Battalion (A/1-265th ADA BN) received the Hamilton Award in recognition for outstanding performance as an elite ADA battery. The Hamilton Award is awarded to ADA batteries in recognition of their outstanding technical skill and tactical prowess. The Air Defense Artillery Commandant and Regimental Command Sergeant Major presented the award at Camp Blanding Joint Training Center (CBJTC), Florida, during Annual Training.

In addition, four Soldiers from 1-265th ADA BN were presented the Honorable Order of Saint Barbara in recognition of their leadership, proficiency and contributions to the ADA branch.

Due to increasing demand requirements for Air Defense Artillery support, Soldiers from A/1-265th ADA BN supported a National Training Center (NTC) rotation in Fort Irwin, California, less than a year after demobilizing from the National Capital Region. A/1-265th ADA Soldiers joined nearly 3,000 Soldiers from the 155th Armored Brigade Combat Team (ABCT), Mississippi National Guard, for Decisive Action Rotation 21-08. Throughout the operation, 155th ABCT relied heavily on the ADA battery's ability to deter, detect and defeat aerial threats while protecting critical assets. They successfully engaged and destroyed a myriad of targets including fixed wing, rotary wing, and unmanned aerial systems (UAS) threats allowing the 155th ABCT freedom of maneuver in order to successfully accomplish their assigned objectives.

3rd Battalion, 265th Air Defense Artillery, *Lightning Battalion*

The 3rd Battalion, 265th Air Defense Artillery (3-265th ADA), supported simultaneous federal missions in support of the National Capital Region (NCR) and Operation Spartan Shield (OSS). In July, they welcomed home C Battery, 3-265th ADA, Cobra Battery, following an eight-month rotation to the NCR. This was the battalion's fifth rotation to the NCR since 9/11 in support of Operation Noble Eagle providing ground-based Air Defense.

While the NCR-Integrated Air Defense Systems (IADS) Mission has been in place for 20 years, it constantly presents new challenges and offers opportunities for improvement to provide the NCR with the "Zero-Defect" performance that is demanded and expected. During this rotation for *Cobra Battery*, the typical 12-months changed to an eight-month rotation, in order to extend the dwell time between deployments from the current 3.5-year to a 5-year dwell. This will significantly reduce ADA unit operational tempo across all seven ADA battalions in five states.

In those six months, *Cobra Battery* was instrumental to bring an additional center-point firing position into operation supporting the defense design to increase the probability of successful defense from a cruise missile threat. They also conducted a full replacement

Soldiers with Bravo Battery, 3rd Battalion, 265th Air Defense Artillery, based out of Fort Myers, Florida, conduct a patching ceremony on February 20, 2021. B\3-265th is the first Army National Guard ADA unit to deploy to USCENTCOM in support of Operation Spartan Shield. This is an Avenger-based organization conducting short-range Air Defense missions in the Kingdom of Saudi Arabia and the United Arab Emirates to protect critical assets and bases within the Arabian Peninsula. *(U.S. Army Photo by SPC Israel Dias)*

In June 2021, Soldiers with Bravo Battery, 3rd Battalion, 265th Air Defense Artillery deployed to the Kingdom of Saudi Arabia, certified a group of Soldiers to be able to set up and grade the new ACFT. The ACFT replaces the Army Physical Fitness Test (APFT). It has six different events that will test the Soldier's physical fitness level beyond what the previous three-event APFT used to. *(Courtesy Photo)*

of all FIM-92 Stinger Interceptors, as well as all AIM-120 Advanced Medium-Range Air-to-Air Missiles for the National Advanced Surface-to-Air Missile System in the NCR. Additionally, *Cobra Battery* completed a long-term effort (5+ years) of exercising a proof of concept for the Joint Air Defense Operation Center – Temporary (JADOC-T). This proof of concept provided concrete assurance to National Senior Leadership that the NCR-IADS could sustain Air Defense capabilities and provide active Air Defense in the event of an unexpected outage of the JADOC until the more permanent Continuity of Operations Plan is placed in operations. All of these significant accomplishments were achieved while battling through the restrictions, limitations, and obstacles that the COVID-19 pandemic had placed in their way. *Cobra Battery* Soldiers returned home to their families with a right to be proud of the service they had provided to their nation. *Cobra Battery* accomplished their mission, provided superior Air Defense coverage of the NCR, and made several significant long-lasting improvements to the ongoing NCR-IADS mission.

In November, B Battery, 3rd Battalion, 265th ADA returned from a year-long deployment to the Middle East in support of OSS. Although, Soldiers initially trained to deploy in support of the EDI maneuver mission in EUCOM, the command team was notified of a mission set and Combatant Command change to a static defense mission in CENTCOM.

Leaders of B/3-265th ADA received clarifying orders of their tasking to provide Short-Range Air Defense (SHORAD) in both the Kingdom of Saudi Arabia and the United Arab Emirates. The *Badger Battery's* leaders quickly identified their new equipment needs for CENTCOM, training focus changes for Static Defense, and began to reach across the world to other leaders and units for knowledge management.

The *Badger Battery* spent seven months providing SHORAD in both the Kingdom of Saudi Arabia and the United Arab Emirates before being re-tasked to provide SHORAD in Iraq under Operation Inherent Resolve (OIR). This would not be the only change to occur; as the battery commander also changed and 1LT Nicholas Capogna led the *Badger Battery* during its tenure in OIR. The Soldiers of B/3-265th ADA quickly accepted these changes and moved to assume the SHORAD mission from C Battery, 5-5th ADA. While in Iraq, some of the leaders of the *Badger Battery* built relationships with both Task Force 41 Special Operations Joint Task Force and 5th Group Special Forces operating in the Syrian portion of OIR. CW2 Jeremy Howard and 1SG Kurtis Hartley aided Task Force 41 with radar integration and maintenance while Howard and SSG Brian Samec, an Avenger Master Gunner, aided 5th Group Special Forces with FIM-92 Man-portable Air Defense operations and training.

As the first Army National Guard Avenger SHORAD deployment to CENTCOM, the Soldiers of B/3-265th ADA set various records and achieved multiple historic events while there. They were the first National Guard unit to fire FIM-92 Stinger interceptors at threat aircraft, the first unit to establish and perform SHORAD in Prince Sultan Air Base of Saudi Arabia, and they were an essential part of the Army's first historic Air Defense integration of all levels (SHORAD, Patriot, and Terminal High Altitude Area Defense) in this location.

A combined white paper authored by Howard with input and assistance from 2LT Anna Carpenter (B/3-265th ADA), 1LT David Lilley (USMC, Low Altitude Air Defense), and SSG George Schwender (C/5-5th ADA) was developed to highlight innovative and emergent tactics, techniques and procedures being used combining weapon systems capabilities to increase shot

potential of the FIM-92 interceptor. This white paper was submitted to the Pentagon and resulted in a Weapon System staying in theater. The *Badger Battery* also acted as a key node for a large portion of the OIR air picture in Iraq and Syria. Two of the *Badger Battery* Soldiers, SGT Jesse Krueger and SPC Bethany Bordner, were able to troubleshoot network-wide issues on two separate occasions that assured a clean and accurate air picture for operational awareness across the CENTCOM theater.

3rd Battalion, 116th Field Artillery, *Gator Thunder*

Operations continued stateside for the 164th Air Defense Artillery Brigade (ADA BDE) during the summer. After supporting COVID-19 operations for over four continuous months, Soldiers from the 3rd Battalion, 116th Field Artillery conducted annual training in August at CBJTC. The battalion conducted a High Mobility Artillery Rocket System (HIMARS) live-fire exercise with 66 rockets in order to sustain proficiency on section certification and mission essential tasks.

The 3rd Battalion, 116th Field Artillery, fires the HIMARS during Artillery Table VI (Section Qualification) Annual Training in August 2021.*(U.S. Army Photo by 1LT Gardner Lajoie)*

715th Military Police Company

In October, the 715th Military Police Company returned home from a short-notice, yearlong mobilization to support the Southwest Border Mission. While mobilized they monitored over 85 miles of international border spanning across two states.

Despite the high operational tempo of 2021, the Soldiers of the 164th Air Defense Artillery Brigade continue to remain technically, tactically and physically ready to support state and federal missions. The 164th ADA Brigade continues to focus on improving strength and overall unit readiness to posture for potential growth and modernization efforts.

263rd Army Air and Missile Defense Command

The 263rd Army Air and Missile Defense Command (AAMDC), South Carolina, National Guard, headquartered in Anderson, South Carolina, continued to work through a high operational tempo (OPTEMPO) in 2021.

Coming out of 2020 with a COVID-19 deployment, the 263rd AAMDC sent troops to Massachusetts and Connecticut. The deployment was a relief to focus not only on the continual adjustment on COVID-19 policies but to get back to "business as usual" with annual operations.

The first few months of the year, the unit focused on upcoming operations and continued to reset after the COVID-19 deployment. The unit held promotion ceremonies such as the one for LTC Vincent Patenaude, officer in charge of the G6 section, being promoted to colonel.

In February, several noncommissioned officers conducted Individual Weapons Qualifications (IWQ) table training, and the 263rd AAMDC prepared to participate in their first IWQ, adhering to current standards. This was the first iteration that the unit participated in with the new Army qualification table.

During April, the unit performed its annual training (AT). The AT was designed to validate Mission Essential Task List tasks for the unit. The unit fielded new individual weapons and participated in the updated IWQ, performed a diagnostic Army Combat Fitness Test, participated in off-road vehicle training, and successfully completed a tactical operations exercise simulating the 263rd AAMDC's ability to respond to threats. The 263rd AAMDC medics completed live simulations within the Tactical Combat Casualty Care (TCCC), which encompasses three phases of care: care under

fire, tactical field care, and tactical evacuation care. The cooking section demonstrated their readiness to provide a hot meal from a field environment.

The 1-178th Field Artillery Regiment, a subordinate unit to the 263rd AAMDC, conducted a live-fire exercise training during the last week of April and the first week of May. The annual training consisted of artillery firing tables and direct fire lanes. The unit is required to accomplish all tables to become fully mission capable and ready to deploy. Also occurring in May, the 678th Air Defense Artillery Brigade (ADA BDE) held an uncasing of the colors ceremony signifying the military tradition of relocating the command headquarters, in this case, with the unit's return from deployment. The deployment set the conditions for mission accomplishment in the European theater. This was the unit's second deployment of its kind since the post-cold war drawdown of U.S. Army forces in Europe. The brigade provided tactical mission command of the 5-7th ADA Battalion (BN) and the 5-4th ADA Regiment. The brigade oversaw strategic national assets, forward ballistic missile sites, and one U.S. Army element assigned to the U.S. Air Force Europe's Air Operations Center. Also, in April, the AAMDC proper sent troops to participate in Exercise America's Shield held in Devils Lake, North Dakota. Helping support the North Dakota Wing Guard with over 135 flight hours and utilizing the talents of 25 Combat Air Patrol members, who were also supporting the mission.

In June, the 263rd Army Air and Missile Defense Command (AADMC) participated in the Arctic Defense Exercise Amalgam Dart. This is the first time the AAMDC airlifted Air Defense assets into the Canadian Region for this exercise.

During July, COL Stephen Walker, commander of the 678th ADA BDE Task Force Veritas, transferred and assumed command from the outgoing 164th ADA BDE Task Force Anaconda Commander. This is the 678th ADA BDE's third rotation in support of Operation Noble Eagle since 2014. Operation Noble Eagle is an activity of the North American Aerospace Defense Command and the Joint Air Defense Operations

1-178th FA Regiment live-fire exercise.

Center, including the National Capitol Region – Integrated Air Defense Systems (NCR-IADS) operating and training throughout the NCR, protecting the NCR from air threats.

August showed continuing support from subordinate units, the 2-263rd ADA BN, B Battery, traveled to the National Training Center (NTC) where they participated in Air Defense maneuvers consisting of a platoon plus-sized element of five Avenger teams, two Sentinel Radars for the 45th Infantry Brigade Combat Team (IBCT) from Oklahoma National Guard during NTC rotations. This rotation was the first in 20 years where an IBCT operated at the NTC, and exercises focused on Air Defense operations (Sentinel Radars) facilitating offensive seizure

A Royal Canadian Air Force CF-18 arrives at Thule Air Base, Greenland, June 9, 2021 in support of North American Aerospace Defense Command's (NORAD) Arctic air defense exercise, Amalgam Dart 21-01. Exercise Amalgam Dart ran from June 10-19, 2021, with operations ranging across the Arctic from the Beaufort Sea to Thule, Greenland. Amalgam Dart 21-01 provides NORAD the opportunity to hone continental defense skills as Canadian and U.S. forces operate together in the Arctic. A bi-national Canadian and American command, NORAD employs a network of space-based, aerial and ground-based sensors, air-to-air refueling tankers, and fighter aircraft, controlled by a sophisticated command and control network to deter, deny and defeat aerospace threats that originate outside or within our borders. *(Photo by U.S. Air Force Master Sgt. Trevor J. Derr)*

and defense posturing. During the rotations, B Battery participated in short-range missile engagements of fixed and rotary-wing aircraft.

Continuing with a strong tradition, in September, the 263rd AAMDC continued its excellence by being awarded the U.S. Army's SGT Jasper Award for the seventh consecutive year. This award recognized the major subordinate command that attains the highest annual membership percentage within the South Carolina National Guard.

Clockwise from top left: 263rd AAMDC SGT Jasper award, September 2021; Family Day and Christmas Gathering, December 2021; Battery B, 2-263rd ADA BN NTC, August 2021; Patenaude promotion, January 2021.

After 43 years serving in the South Carolina National Guard, MG Timothy Sheriff, 263rd AAMDC commander, addressed the unit for the last time as the commander. During his address, Sheriff highlighted the historical components of the 263rd AAMDC, upcoming changes within the command structure, and his deep admiration for his time serving within the 263rd AAMDC.

All eyes in the Air Defense community turned to the 263rd AAMDC in November. The month was filled with ceremonies as BG Frank Rice was promoted to major general and assumed command of the 263rd AAMDC as Sheriff relinquished command. COL Richard A. Wholey Jr. was promoted to brigadier general and serves as the deputy commander. CSM Keith Phillips, 263rd AAMDC, relinquished responsibility to CSM Davin Powell. Phillips retired after 43 years of service.

Culminating a busy high OPTEMPO year, the 263rd AAMDC enjoyed their annual family day and Christmas gathering. This is a tradition where families of the Soldiers fellowship together, sharing Christmas cheer and reminiscing over the past year's activities. Also, in December, a Hail and Farwell was hosted, remembering those who may have retired and those new to the unit.

Training the Force at Florida's RTI

Located one hour southwest of Jacksonville, Florida, Camp Blanding Joint Training Center is home to 1st Battalion, 211th Regiment, Regional Training Institute (RTI), Florida Army National Guard (FLARNG), which serves as the only other Air Defense Artillery schoolhouse besides Fort Sill, Oklahoma. The battalion is tasked with training six different courses covering all aspects of short-range air defense (SHORAD) specific to 14G and 14S Military Occupation Specialties (MOS) from the transitional course through Senior Leaders Course (SLC). Professional Military Education (PME) is the cornerstone of the 211th Regiment, and the 1st Battalion trains more than 250 Air Defense warriors from all components annually.

As both a Fires Center of Excellence and Training and Doctrine Command (TRADOC) accredited school, prospective Air Defense students can be confident they will receive relevant and realistic training. The 1st Battalion's success is directly attributed to the quality of the cadre selected as instructors, coupled with receiving the latest program of instruction (POI) from Fort Sill. This active partnership ensures all courseware, instruction, and materials are the same, regardless of training location. The noncommissioned officers (NCO) selected to represent the 1st Battalion are hand-picked from across Air Defense formations within the FLARNG and represent the very best, most experienced, professional Soldiers from within their respective formations. Recently, the battalion completed its 2021 TRADOC accreditation. The accreditation process extensively reviews historical documentation, cadre interviews, and class observations over a lengthy three-year period. The Regiment scored an overall 96.9%, while 1st Battalion scored an impressive 99.1%, a significant achievement reflective of the cadre's hard work, dedication, and esprit de corps.

211th Infantry BLC Class 008-22 competed for the Golden Shoe/Iron Platoon award. 5th platoon took the honors this class. Their motto is "Strike First - Strike Hard!"

Courses taught

The 1st Battalion teaches the 14G Air Battle Management System Operators Transition Course, which lasts 10 weeks and runs five times a year. During this course, transition students train to become 14G's for nine and a half weeks and then move into a culminating 72-hour field training exercise (FTX) showcasing everything taught with the addition of broadcasting a live air picture over multiple radio systems to the Avenger weapon system. During the FTX, students are required to process and engage real-world scenarios based on simulations and cadre member experiences. Over the three-days, students validate their classroom instruction and exercise hands-on training in a field environment to understand better SHORAD tactics, techniques, and procedures in support of a more extensive Air Defense network.

Additionally, the battalion teaches the 14S MOS transition course. In this course, students are immersed in becoming an Avenger Crew Member and will spend four long weeks learning the basic operations of the Avenger weapon system. Much like the 14G MOS transition course, this class culminates with an FTX, and a familiarization live-fire of the M3P .50 caliber machine gun. Currently, this course is conducted three times per year.

Lastly, the 1st Battalion teaches the Advanced Leaders Course (ALC) and SLC for 14G and 14S MOS. Each course is four weeks long and runs multiple times each year. All PME begins with NCO common core competencies and then moves into Air and Missile Defense principles culminating with MOS-specific training. These courses present the most challenging material, realistic scenarios, and thought-provoking simulations centered on effectively implementing the different variables of the operational environment. Graduates are better aware of their responsibilities and ready to assume their duty of fostering the knowledge and growth of the ADA. Upon completing PME, students have an increased understanding of their respective roles in Air Defense operations, planning, and leadership in preparation for their new level of responsibility.

Training safely

There is an inherent risk in most training activities. In 1st Battalion, not only does cadre and leadership focus on training safety, but they also reinforce this mindset with the students. Each of our classes requires students to perform in a leadership role. Understanding risk assessments, risk mitigation measures, and completing a deliberate risk management worksheet are essential tasks incorporated into the courseware. As students progress through a course, they learn different techniques for facilitating training at their units and at a formal instructional level. Challenges such as the COVID-19 pandemic offer opportunities to explore a variety of mitigation measures while still completing resident training without sacrificing training tasks or objectives. Since March of 2020, the 1st Battalion has executed its entire course load, completing the training mission tasked to the Regiment. This has been accomplished to such a professional degree that in the 19 months since TRADOC resident training resumed, only one student has failed to complete a course due to a positive COVID-19 test. This

is impressive given the number of group work assignments and FTXs that require students to work in close proximity to their peers.

The way forward for the Force

Modernization and change continue to be a constant for the Army and, more recently, the FIRES profession. Notwithstanding both equipment fielding and funding constraints, 1st Battalion continues to excel at its training mission. Currently, new computer systems in support of the 14G course and VIC5 upgrades for the Avengers have been scheduled. Many other hardware and software enhancements, including Training Aids Device Simulators and Simulations tools such as the Stinger Troop Proficiency Trainer version 2, have been discussed. Also, 1st Battalion continues to monitor discussions regarding Maneuver Short-Range Air Defense (M-SHORAD). Our goal is to be positioned for any opportunity to receive M-SHORAD while sustaining current proficiencies. The 1st Battalion, 211th Regiment remains dedicated to becoming the premier Regional Training Institute for the National Guard and welcomes the opportunity to train a new generation of Air Defenders.

Points of contact for the schoolhouse

All students can reach back to the schoolhouse and are encouraged to share unclassified experiences with their instructors. This helps shape future assignments and training activities. For units that need to reach the schoolhouse, MSG Aaron Perez is the branch chief and can be reached at aaron.perez2.mil@army.mil. The National Guard Bureau's subject matter expert is SFC Patrick Sharp who can be contacted at patrick.r.sharp.mil@army.mil. Course and school-related questions can be directed to either of these individuals.

Mike Piper, ordinance equipment mechanic, Chad Elliott, heavy mobile mechanic contractor, and Jared Mayhugh, heavy mobile mechanic contractor, mount a new-build A3 Sentinel radar onto a M1082 LMTV trailer at Letterkenny Army Depot March 3, 2021.*(U.S. Army photo by Pam Goodhart)*

Supporting AMD Across the Globe:
Logistics, Sustainment and Materiel Readiness *for the* Army Missile Enterprise

By COL Gary W. Beard, Jr.

The specialized weapons systems used by the Air and Missile Defense (AMD) communities require a robust support structure. Supporting the tactical warfighter using these systems requires a dedicated team of professionals operating in every Geographic Combatant Command, focused on ensuring every system is ready to operate in defense of U.S. national interests whenever called upon. That support is facilitated by the U.S. Army Aviation and Missile Command (AMCOM) Life Cycle Management Command (LCMC), which develops, acquires, fields, and sustains aviation, missile, and unmanned vehicle systems. As an LCMC, AMCOM is charged with developing and delivering responsive aviation, missile, and calibration readiness to the U.S. Army in order to optimize joint warfighter capabilities at the point of need. To best align with and support the U.S. Army's missile enterprise and ensure that we meet both the current and future multi-domain capable force requirements, AMCOM heavily invests its time, resources, and focus to ensure the Army's missile community receives and operates safe, supportable, and sustainable systems.

While some Soldiers operating AMD systems are aware of AMCOM, few know of the complexity of ensuring maintenance and logistics support from the enterprise level reaches tactical echelons efficiently and quickly. Operators are free to focus on the combat operation of the systems they are entrusted to use because the AMCOM team is trained, deployed, and ready to support them no matter where on the globe they serve. The support provided by AMCOM goes far beyond monitoring and reporting operational readiness rates across the AMD portfolio.

AMCOM Logistics Assistance Representatives – forward support to the AMD Team

AMCOM's Logistics Assistance Representatives

(LARs) are closest to the tactical edge. AMCOM LARs are integral to the readiness, maintenance, and unit-level training of our global missile forces. AMCOM LARs are systems-level technical experts, extensively trained on missile and related platforms to increase Soldier maintenance knowledge and readiness across fleets. These emergency essential, mandatory mobile employees are stationed in multiple geographic locations. They are integrated into Fires units, operating organically at echelon to help units see, know, and respond to readiness challenges. The 44 AMD LARs are embedded with Patriot, Avenger, and Terminal High Altitude Air Defense (THAAD) units to ensure integration and continuity of support. Like the Soldiers they work alongside, LARs deploy globally to support contingency operations, usually with their respective AMD unit. LARs monitor, analyze, and address readiness trends, complex technical issues, and maintenance training needs at the unit level. They provide tactical-level, actionable information that assists the sustainment enterprise in identifying fleet-wide trends and readiness issues.

The LARs not only support their units, but they also support the enterprise. When required, LARs form the immediate link between units and the supply chain, directly working with item managers to expedite release and shipment of necessary repair parts. As a result, LARs, on average, improve the operational readiness rates of units by 2-4% each month across all missile platforms and support equipment, a significant return on invested time and money. Additionally, the missile LARs serve as the enterprise's feedback loop, directly coordinating with engineers, logisticians, and sustainment senior leaders to address gaps and shortfalls in system capabilities.

LARs receive extensive technical training at AMCOM's LAR University, located at Redstone Arsenal, and frequently receive additional training directly from original equipment manufacturers. This level of training equips these professionals to directly inform and train field-level maintainers and commanders on solutions to meet mission operational tempo (OPTEMPO) and demands. The combination of training and unit integration allows LARs to assist maintenance personnel and operators in identifying complex equipment faults/failures and providing over-the-shoulder training on troubleshooting and repair. Ongoing training also postures the AMCOM LAR force to support new AMD systems, including the Lower Tier Air and Missile Defense Sensor (LTAMDS), IAMD Battle Command System, and Initial Maneuver Short-Range Air Defense (IM-SHORAD) systems. Specifically, AMCOM will offer two Patriot tra ining courses per fiscal year, planned for March and September. Please contact Rodney Glaspie at rodney.w.glaspie.civ@army.mil for Patriot training information.

AMCOM Organic Industrial Base – repair and reset for the Missile Force

AMCOM's Letterkenny Army Depot (LEAD) maintains more than 2,000 industrial base personnel and extensive maintenance facilities in Chambersburg, Pennsylvania. The Department of the Army civilians and contractors are dedicated to supporting the overhaul and recapitalization of critical missile and supporting systems. Known as the "Missile Depot," LEAD provides critical services across systems such as Patriot, THAAD, Sentinel, and Avenger, while simultaneously offering Depot Forward Team capabilities – teams with tailored skill sets who travel to units across the globe to update systems and overcome operational readiness challenges. Recent changes at LEAD have reduced the reset time for a Patriot Battalion from just over 200 days to less than 150, getting operational systems back into the hands of tactical formation earlier and in better condition. Additionally, LEAD provides hands-on equipment repair training to Soldiers. The specialty-skilled workers at the depot provide a unique opportunity for units to go beyond traditional maintenance procedures and, under the careful supervision of the LEAD experts, repair equipment that has been returned to the depot for intensive maintenance. Nowhere else will Soldiers benefit from the expertise and available equipment that LEAD offers.

AMCOM also operates the Army's Stockpile Reliability Program on behalf of the Army's missile enterprise. Based on engineering and projected reliability data, AMCOM works with missile enterprise partners to offer life extension solutions to minimize operational readiness challenges within theaters. In addition, LEAD artisans perform the repair and recertification critical to keeping interceptors available and ready when needed most.

LEAD is preparing for future missile community requirements, setting the stage for the depot-level repair of hypersonic weapons systems and directed energy systems. Investments such as a new Anechoic Chamber to test and verify radar system capabilities and the creation of systems to work on laser optics, mirrors, and beam steering devices show LEAD's commitment to the AMD force of today and the future.

AMCOM Systems Integration – supporting current and future capabilities

Within the AMCOM Logistics Center (ALC), a large network of logistics support specialists ensure readiness for the current fleet and prepare for the AMD force of the future. All Army missile systems take part in extensive development processes, shaping their operational capabilities, readiness, and supportability across their life-cycle. AMCOM's matrixed logisticians and sustainment experts, embedded within Army program executive offices, work daily to assess maintenance concepts and support arrangements for systems utilized by our missile forces. In partnership with AMCOM's internal staff, this broad team of experts is leading the charge to support readiness to enduring fleets (e.g., Patriot radar, THAAD, etc.) while simultaneously building support frameworks for modernizing systems (e.g., LTAMDS, Sentinel, IM-SHORAD, etc.).

Item Managers, within the ALC order, stock, track, release, and ship over 17,000 aviation and missile parts maintained by AMCOM, with a goal of having a minimum of 90-days' supply on the shelf. Because of AMCOM, Army aviation and Air Defense Artillery units quickly receive any component or part they need, empowering units to maintain high readiness rates. Given the high demand and limited availability of many AMD-specific parts, AMCOM maintains visibility on nearly 8400 parts, and these professionals play a critical role in analyzing current demands and the operational necessity for components. ALC's efforts fill more than 600 item orders in an average month, coupled with proactive management of procurement and production, means that most demands are met immediately and shipped to units for installation. Non-Mission Capable for Supply rates across the AMD force are down to 2.5% on average, a significant improvement to the supply posture of the enterprise and a major benefit to our operational forces.

The holistic AMCOM team engages in operational reviews of current systems to assess their real-world performance against planned performance, modifying training, support, and technological investments to improve systems in use today. The team also engages across the Fires Center of Excellence, the Missile Defense Agency, the U.S. Army Space and Missile Defense Command, and the Program Executive Office - Missiles & Space to offer extensive, in-depth experience and lessons learned to shape the sustainment requirements necessary to ensure tomorrow's systems will be supported effectively across Large-Scale Combat Operations.

Corrosion prevention – the costly enemy degrading capability every day

No matter where the AMD force operates, corrosion occurs and challenges unit readiness. To address the impacts of corrosion on missile platforms and associated support equipment, AMCOM has a Corrosion Program Office (CPO). Their role is to support Soldiers in the reduction of corrosion's impacts on readiness and safety. The AMCOM Corrosion Prevention and Control (CPC) Team provides demonstrations and surveys to support Army CPC policies. These demonstrations and surveys equip commanders, operators, and maintainers at all levels with the knowledge and skills necessary to sustain assets in the constant battle against corrosion. The AMCOM CPC team can also provide a three-day technical Corrosion Monitor Course (Virtual or in-person) covering advanced general CPC theory, repair techniques, approved products, CPC references, AMCOM CPO facility tour, and Army requirements necessary for the sustainment of missile systems and support equipment. (For additional information - https://www.amcom.army.mil/Organization/Corrosion/AMCOM.)

Acquisition and materiel support – engaging the entire enterprise

The basis for sustainment and support to Army equipment is the Life Cycle Sustainment Plan (LCSP). AMCOM has established a thorough LCSP review process to ensure that all materiel documents are accurate and executable. Program Managers are encouraged to use the AMCOM Logistics Center's internal development and review process supported by expert logisticians and leaders. That process, while sometimes

lengthy, provides expert input to capture statutory, regulatory, financial, and technical sustainability concerns and associated solutions. These reviews ensure that the material developed and delivered to the warfighter is available, reliable, supportable, and sustainable.

AMCOM leads the materiel release process for Army missile systems. Prior to releasing a capability to the force, AMCOM's community of experts assesses the safety, suitability, and supportability of all missile systems. Experts across a wide range of disciplines – safety, engineering, and logistics – assess key factors to support full materiel release or conditional materiel release to warfighting units. This process culminates in a formal materiel release signed by the AMCOM Commander – the only signature that can provide assessed capabilities to the force.

AMCOM 101-Missile - bringing the enterprise together

During the annual AMCOM 101-Missile conference, leaders across the AMD enterprise come together, both in-person and virtually, to discuss maintenance, sustainment, and acquisition issues important to the community. This forum allows leaders to view and discuss information data trends and current operational sustainment issues across the enterprise. This intensive session directly informs AMCOM's investment in information age solutions supporting missile readiness. AMCOM also brings together the Program Executive Office and Program Managers for many of the AMD community's high-priority materiel solutions to ensure leaders across the enterprise are more aware of modernization and sustainment efforts. AMCOM 101-Missile allows

Missile Logistics Assistance Representatives assigned to the U.S. Army Aviation and Missile Command participate in training at AMCOM's LARs University. Highly trained, LARs are Army civilians serving in motor pools, maintenance shops and offices around the world. They are members of AMCOM's network that supports Army Air Defense assets globally. (U.S. Army Aviation and Missile Command photo)

direct engagement between leaders of the AMD community and the sustainment professionals that support their operations by facilitating dialogue and deeper understanding at all levels of the AMD enterprise.

Global support for a global mission

Through both headquarters and field-level activities, AMCOM employs more than 11,000 sustainment experts, working daily to advance our enterprise capabilities. From support to new and modernizing systems to development of improved maintenance and supply arrangements to enduring systems, AMCOM is focused on improving Soldier capabilities to deliver battlefield effects. AMCOM leverages its skilled workforce at its headquarters, its depot, and its field presence (LARs) to deliver sustainment that keeps pace with the OPTEMPO of our missile forces. This command remains an integral and relevant proponent, responsive to the needs of our force through the development of tools, technology, and training while ensuring that foundational systems documentation and reviews drive performance for systems on the battlefield.

For more information on the U.S. Army Aviation and Missile Command, visit https://www.amcom.army.mil or www.facebook.com/usarmyamcom.

COL Gary Beard currently serves as the Deputy Chief of Staff for Operations, Plans, and Strategy for U.S. Army Aviation and Missile Command. A 1997 graduate of the U.S. Naval Academy, he has served as an ADA Officer for nearly 25 years in a variety of SHORAD, Patriot, and enterprise/strategic assignments. Immediately prior to serving at Redstone Arsenal, Alabama, he was the Army Capability Manager for Short-Range Air Defense Artillery in the Fires Capabilities Development and Integration Directorate at Fort Sill, Oklahoma.

Shane Sneary, an electronics mechanic at Letterkenny Army Depot, mounts the antenna on a Sentinel A3 radar May 24, 2021. *(U.S. Army photo by Pam Goodhart)*

An AN/TPY-2 Electronics Equipment Unit undergoes rain testing at Letterkenny Army Depot Oct. 14, 2020. Letterkenny employees constructed the apparatus used to execute the test. *(U.S. Army photo by Pam Goodhart)*

Painters in the Directorate of Industrial Operations at Letterkenny Army Depot apply paint on an Avenger turret Oct. 15, 2015. *(U.S. Army photo by Pam Goodhart)*

5-52 ADA
11th Air Defense Artillery Brigade

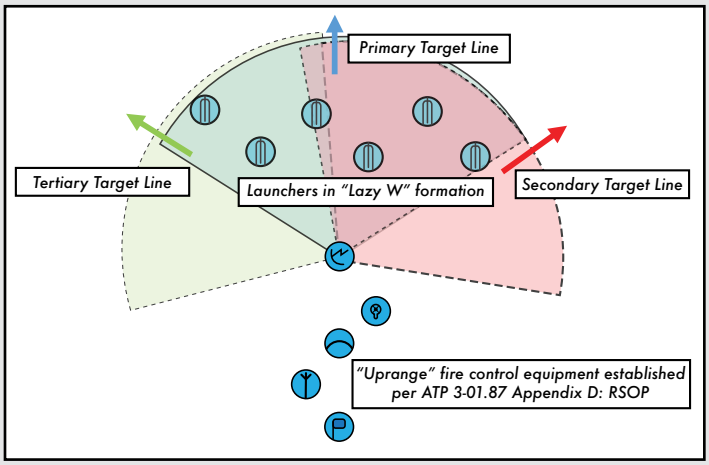
SFC Robin Rodrigues watches his Crew One execute PAC-2 missile reload during Operation Bittersweet Symphony on OBJ Bieber.

Operation Bittersweet Symphony

CPT Dillon M. Jordan

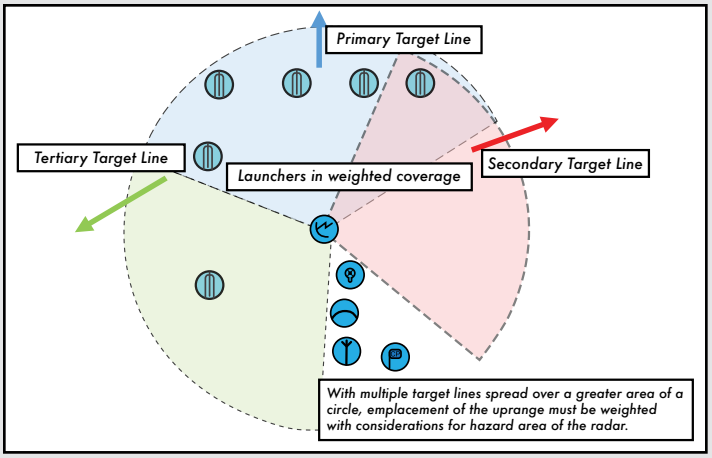
Delta Battery, 5th Battalion, 52nd Air Defense Artillery (D/5-52nd ADA) recently executed Operation Bittersweet Symphony, their Table VIII certification, and Battery Field Training Exercise. This operation was the culmination of training and integration of new personnel acquired since Delta's return from deployment this past summer. Challenged by a COVID-operating environment, the *Direwolves* achieved their Table VIII Intermediate Gunnery Certification in preparation for upcoming mission requirements.

A critical part of the success to certify was the *Direwolves'* ability to effectively emplace their battery to deal with multiple types of threats. The *Direwolves* Engagement Control Station and Battery Command Post crews train to defend various adversary weapons systems extending from fixed-wing (bombers and fighter aircraft) to ballistic missile weapon systems (such as Scud missiles) and other air threats. Per the Army Techniques and Procedures 3-01.87, there is a doctrinal, specified way of "laying out" a Patriot site so that the Patriot firing unit can execute defense of assigned assets along target lines, e.g., lines along which the weapon system will array its firepower. The notional layout looks like the diagram depicted below.



As seen above, the Fire Control equipment or "up-range" has been emplaced so that it falls centered behind the radar. The launchers, or "downrange," are arrayed in a Lazy W style formation to mass fires along the Primary Target Line. The *Direwolves'* initial location during Operation Bittersweet Symphony, Objective (OBJ) Mercury, was defended against Donovian threats (the notional enemy) along its Primary Target Line.

As seen below, the new layout had the fire unit offset to accommodate the hazard areas of the target lines, as well as modify the locations of the launchers in weighted AMD coverage. This enabled



the *Direwolves* to respond effectively to threats along multiple target lines while meeting radar hazard and safety requirements. Reconnaissance Selection & Occupation of Position (RSOP) Team's ability to effectively employ this method enabled their successful certification during Operation Bittersweet Symphony.

During the deployment, we experienced air and missile threats that defied doctrinal emplacement guidelines. Exercises like Operation Bittersweet Symphony provide training opportunities for the RSOP team to critically think and maximize the system capabilities. This ultimately enables the tailoring of the Patriot site to meet mission requirements and provides greater flexibility against the threats.

CPT Dillon M. Jordan graduated from College of the Holy Cross in 2014 with a bachelor's degree in History. He graduated from Basic Officer Leader Course at Fort Sill, Oklahoma, in 2015 and was assigned to Delta, Charlie, and then Headquarters Headquarters Battery 5-7th ADA as both Tactical Control Officer and Tactical Director. CPT Jordan attended and passed both Air Defense Artillery Fire Control Officer (2017) and Patriot Top Gun (2018) and is currently the Battery Commander for Delta 5-52nd ADA.

Operation Holy Diver

By LTC Matthew Inglis

In continued efforts to improve the training and operational readiness of the 5th Battalion, 52nd Air Defense Artillery (5-52nd ADA), the *Team Deuce* Battalion recently executed a multi-faceted deployment readiness exercise (DRE). Coined Operation Holy Diver, the battalion-led effort was characterized by the short-notice employment of battery minimum engagement packages to unknown training areas.

Kicking off in the early hours, *Team Deuce* executed its N-hour sequence (the basic framework for a DRE) with a 100% alert and recall across the formation. Additionally, the battalion staff conducted an internal Soldier Readiness Processing focused on health assessment updates, vaccinations and immunizations, and personnel record reviews and updates.

The major element for Operation Holy Diver was the deliberate preparation and employment of our four Patriot batteries and select equipment from our two Terminal High Altitude Area Defense (THAAD) system batteries.

"Air Defense (on Fort Bliss) has been conducting training at Tobin Wells for years," CPT Gordon Miller, assistant operations officer, said. "However, we wanted to establish a more visible presence here on main post. Operation Holy Diver allowed us to coordinate with 1st Armored Division, Fort Bliss Garrison, and post agencies to validate these new Patriot sites."

As the units exercised alert dispatching procedures and preventive maintenance checks, their RSOP (reconnaissance, selection, and occupation of position) teams began assessing these new locations on east and west Fort Bliss.

"This exercise allowed batteries to confirm their ability to jump mission-critical equipment quickly," said MSG Joshua Klovstad, battalion operations sergeant major. "5-52nd ADA's ability to employ to unknown terrain is a key element of our training strategy and future mission sets."

Delta "Direwolves" bring in their radar station to their new objective in support of Operation Holy Diver. *(Photo by LTC Matthew Inglis, Headquarters, 5-52nd ADA)*

While it may be uncommon to see a Patriot battery emplaced behind a residential area, the feedback from *Team Deuce* Soldiers was overwhelmingly positive.

"Air Defense Gunnery is very predictable and can become repetitive," said MAJ James Morgan, battalion executive officer. "With Operation Holy Diver, we added another element of complexity that engaged leaders at all levels."

By the end of the day, all personnel and equipment returned to their respective motor pools. Soldiers and crews across 5-52nd ADA benefitted from the additional collective training opportunity. The success of exercises like Operation Holy Diver will continue to challenge *Team Deuce's* processes, confirm the unit's training readiness, and ultimately ensure that 5-52nd ADA is prepared for any assigned mission. Proving our regimental motto Semper Paratus (Always Prepared), remains true.

LTC Matthew Inglis serves as the battalion commander for 5-52nd ADA. He received his commission from Stephen F. Austin State University.

Operation I Shot the Sheriff

By 1LT Miranda Johnston

It is the early morning of December 13, 2021. Typically, Soldiers and leaders of B Battery, 2nd Air Defense Artillery, Terminal High Altitude Area Defense (B-2nd ADA THAAD) would be preparing to move to Site Enterprise in support of the unit's modernization mission on White Sands Missile Range, New Mexico. However, this morning the *Bandits* rolled out of their beds before 2:30 a.m. while most of the battalion was sound asleep to prepare for the long day ahead of them. The sun had not yet risen as the unit formed up in the B-2nd ADA Motor Pool for accountability, weapon distribution, pre-combat checks, and pre-combat inspections. It is range density week, aptly dubbed Operation I Shot the Sheriff for the *Bandits* of Taylor Road.

PFC Levi Ford fires the M2 .50 Caliber Machine Gun with his Assistant Gunner, SGT Jacob Ent.

In preparation for a week essential to B-2nd ADA's (THAAD) individual readiness, leaders conducted multiple levels of training, briefings, and rehearsals in order to ensure 100% success. With limited time and breaks during test missions for critical tasks like ranges, it was imperative that every step of the mission to certify was planned and executed flawlessly. At the battery level, leader synchronization meetings were held weekly and even daily as Operation I Shot the Sheriff approached. Range briefs were presented to battery and battalion command teams for final approval. The crucial planning phase culminated in a Rehearsal of Concept Drill the week prior to execution, presented by range's officers in charge (OICs): 1LT Tyler Johnson, 1LT Caleb Perez, and 1LT Mike McTiernan, and noncommissioned officer in charge (NCOIC) SFC Robert Hardman. These leaders' immense efforts were on full display to the 5th Battalion, 52nd Air Defense Artillery Command Team, and all of B-2nd ADA (THAAD) to ensure a thorough understanding of all range operations for each weapon system and tactical convoy to be conducted the following week.

Not only was the planning phase of Operation I Shot the Sheriff crucial to its success, but intense and effective training was equally so. With the recent updates to Training Circular 3-20.40, "Training and Qualification - Individual Weapons," changing the requirements for individual weapons qualifications, it was necessary for the *Bandits* to place a significant amount of focus on Preliminary Marksmanship Instruction and training for the new M4 tables. The B-2nd ADA (THAAD) utilized both in-house subject matter experts as well as the Fort Bliss Simulation Center's various Engagement Skills Trainer (EST) 2000 models to methodically train every Soldier on their assigned weapon.

SSG Taylor Britt, Range Safety Officer (RSO) for the M4 qualification range, said, "As the RSO for my first M4 carbine range, what I find the most value in leading up to the execution of ranges is training Soldiers. To see these Soldiers progress from basic marksmanship tasks to qualifying on

SFC Robert Hardman provides preliminary marksmanship instruction on the M2 .50 Caliber Machine Gun.

their assigned weapon systems on Range Day makes all the planning and preparation worth it."

Throughout the execution phase of Operation I Shot the Sheriff, completed on December 16, 2021, the *Bandits* fired and qualified on every individual and crew-served weapon in their arsenal, including the M4 Carbine, the M249 Squad Automatic Weapon (SAW), the M2 .50 Caliber machine gun, the MK-19 grenade launcher, and the M320 grenade launcher. The respective OIC, NCOIC, and RSO meticulously planned, coordinated, and executed each range from convoy and ammunition operations to actions during qualification and safety precautions.

"Completing qualifications for the M2A1, MK-19, and M249 SAW in one day was a huge success for us," said SFC Hardman. "We were able to qualify more firers than required and gave many of our new Soldiers an opportunity to operate more than one weapon system."

All available B-2 ADA (THAAD) Soldiers were certified on their respective weapon systems by the end of the week.

Despite unforeseen changes during planning, the *Bandits* were flexible and adaptive and accomplished their mission just in time for the holidays and a restful block leave period. After a grueling five months serving as the THAAD modernization battery at White Sands Missile Range, not only was Operation I Shot the Sheriff a welcome change of pace from operations on Site Enterprise, but it also enabled the unit to continue its test function into the new year and for the foreseeable future knowing their readiness would be maintained.

1LT Miranda Johnston serves as Executive Officer for B-2nd ADA (THAAD); she received her commission from the University of Dayton.

SPC Alexis Ramon fires the M249 machine gun during qualification.

Mongadai Challenge

By LTC Matthew Inglis

The Soldiers, noncommissioned officers, and officers of the 5th Battalion, 52nd Air Defense Artillery (5-52nd ADA) Regiment recently completed its version of the "Best Soldier" Competition designated as the Mongadai Challenge. Taking inspiration from other versions of "spur-rides or prop-blasts," the 5-52nd ADA's Mongadai Challenge generally aligns with events associated with the Army's Expert Soldier Badge.

"The intent of the Mongadai Challenge is to provide an event that measures every participant's physical readiness, tactical proficiency, and individual grit in a crucible series of events," said LTC Matt Inglis, 5-52nd ADA Battalion Commander.

Drawing inspiration from the elite warriors of Genghis Khan, the Mongadai were the Khan's greatest fighters and leaders. Originating in the 13th Century, the Mongolian Empire would test and challenge its warriors in a rigorous selection process to determine its best warriors. Those warriors who survived and were selected became the Khan's Mongadai!

1LT Bradley Barron completes the combat water survival training portion of the Mongadai Challenge. (*Photo by SGT Sarah Gray-Holland)*

Member of Team Deuce Battalion engages his target during the "stress-shoot" phase of the Mongadai Challenge. (*Photo by SGT Sarah Gray-Holland)*

In early March, the *Team Deuce* Battalion conducted its second Mongadai Challenge, bringing together eager participants willing to test themselves.

While the detailed specifics of the events are kept hidden for an additional sense of mystery, the Mongadai Challenge endures for about 32 hours. It includes Combat Water Survivability, the Army Combat Fitness Test, individual weapons qualifications/stress shoot, squad movements, dismounted land navigation, combat lifesaver events, patrol base operations, and quite a bit of tactical road marching.

"Over the two-day event, every competitor rucked about 25 miles across rugged terrain from station to station," explained MAJ Timothy Kibbe, Battalion Operations Officer. "At each station, Soldiers executed another common task or battle drill confirming their tactical prowess."

After the event, the finishers are inducted as a Mongadai Finisher, demonstrating they are indeed among the best of the *Team Deuce* Battalion.

"I look forward to the next Mongadai Challenge in June and hope to continue to provide an event that challenges every participant and highlights the warrior spirit found in every Soldier," said LTC Inglis.

LTC Matt Inglis is the battalion commander for 5th Battalion, 52nd Air Defense Artillery Regiment.

Operation Hard Day's Night: The *Elite Executioner* Way

By 1LT Moses Vasquez

After months of preparation and planning, the *Elite Executioners* of 5th Battalion, 52nd Air Defense Artillery (5-52nd ADA) Regiment had the opportunity to execute a battalion's culminating training event Operation Hard Day's Night, in February 2022. For Echo Company, this also included testing Soldiers' resiliency, vehicle readiness, and company internal standard operating procedures and tactics, techniques, and procedures.

Operation Hard Day's Night was designed for the 5-52nd ADA to validate the unit's proficiency against all Response Force requirements and served as the capstone exercise for the year. With the planning of Operation Hard Day's Night beginning over a year ago, the leaders of the *Team Deuce* Battalion

Echo Company, 5-52 ADA stage their vehicles in preparation for convoy operations as part of Op. Hard Day's Night. *(Photo by 1LT Moses Vasquez)*

intended to develop an exercise that would replicate the demands expected to see in large-scale combat operations. Specifically, for Echo's *Elite Executioners,* the need for force and sustainment operations aligned with the ability to maintain combat capability in unfamiliar and demanding ways.

"Unlike the normal rotational deployment, Operation Hard Day's Night is intended to challenge 5-52nd ADA's ability to relocate its Air and Missile Defense capability over great distances to unknown locations," said LTC Matt Inglis, 5-52nd ADA Battalion Commander.

The initial portion of the exercise was characterized by the significant tactical movement that included nearly 150 vehicles and over 320 Soldiers, noncommissioned officers, and officers traveling 375 miles on commercial highways in Southern New Mexico. Deliberately divided across twelve different serials, every element prepared its vehicles and personnel for the journey. Traveling from Fort Bliss, Texas, to Sante Fe, New Mexico, and back to Fort Bliss, all on civilian highways, put Echo Company to the test before any other unit in the battalion.

The initial movement (Serial 1) included Echo's mission to establish a Refuel-On-Move (ROM) site and a maintenance collection point (MCP) at Objective McCartney (Sante Fe, New Mexico). As expected, the initial convoy made it to Objective McCartney, and the ROM and MCP were established before the follow-on element's arrival.

As one would expect, mechanical issues started to arise as more and more vehicles got on the road. A total of 27 vehicles became non-mission capable for various reasons (overheating, blown tire, etc.) while traveling to Objective McCartney.

These maintenance incidents provided the perfect opportunity for Echo Company to prove its worth in an unfamiliar environment with hasty time constraints and competing mission requirements. With no possible way to conduct higher-level maintenance on highways, the field maintenance teams, warrant officers, and wheeled mechanics (91B) shifted their focus to on-the-spot repairs and like-recovery operations, getting all vehicles to the MCP at Objective McCartney. Based on the talented maintainers and operators of the *Team Deuce* Battalion, Echo Company improved the status of all 27 pieces of equipment to a partially-mission capable or fully-mission capable status allowing all elements to continue the mission. Heavily focused on using tow bars (like-recovery) versus wrecker support, the adaptable, proficient, and experienced Soldiers of Echo Company facilitated the completion of this monumental training event.

"The hardest thing to deal with was ensuring we could prioritize who needed recovery (wrecker support) the most, but with the focus of who needed it being driven by battalion, it made executing our jobs easier," said CPL Nathaniel Wimpy.

Echo Company's wrecker operators were vital when applied to the recovery efforts. This was demonstrated in spades when a semi-trailer collided with an Up-armored HMMWV, sending the vehicle across the road and injuring all three passengers. SPC Tatianna Vargas, SPC Roger Ramos, and SFC Chad Gledhill exercised their combat lifesaver and recovery operations training to respond to the motor vehicle accident.

"Based on the immediate actions of SPC Vargas and SPC Ramos, we were able to quickly evacuate the three injured safely from the vehicle and ultimately transport them to the nearest medical facility. Additionally, the efforts of SFC Gledhill were critical in the recovery of the severely damaged vehicle and all sensitive items," stated LTC Inglis.

"It was a very eye-opening moment when everything happened. It made me realize how important the basic Soldier skills are and how life-changing they can be when things like this happen," says SPC Vargas.

First Lieutenant Moses Christopher Vasquez is currently serving as the Executive Officer for Echo Company, 5th Battalion, 52nd Air Defense Artillery Regiment. He resides from Cairo, Georgia. He commissioned through Officer Candidate School with Delta "Danger" Company on 19 September 2022.

Lessons Learned from **Yama Sakura 81**:

Multi-Domain Considerations for Air and Missile Defense Operations

By CPT Joshua Thompson

The Multi-Domain Task Force in YS81

It was my pleasure to have participated in Exercise Yama Sakura 81 (YS81) in Japan November-December 2021. I was the Air and Missile Defense (AMD) subject matter expert of a team from the 1st Multi-Domain Task Force (MDTF). The ten-person team was divided into three sub-teams to augment, assist, and advise U.S. and allied counterparts at three echelons during the exercise: I Corps, United States Army-Pacific, and United States Army-Japan. My sub-team was assigned to augment, assist, and advise I Corps, where I spent most of my time integrated with the G3 AMD cell in an effort to bring multi-domain operations (MDO) relevance to the exercise as it relates to AMD. There were two major lessons from the exercise in the realm of MDO related to AMD operations that are worth sharing: 1) multi-domain threat considerations for AMD operations and 2) the use of airspace model kits when the cyber domain is contested.

Multi-domain threat considerations

The first lesson learned is the consideration of multi-domain threats in AMD planning. Throughout my nine-year career, the bulk of the Air Defense branch has focused on threats from two domains: air and land, in that order.

However, our next fight will undoubtedly include threats from all domains: land, air, maritime, cyber, and space. Undoubtedly, Air Defense as a branch either operates in, utilizes resources from, or is expected to defend against threats from all of these domains to different extents. However, we have partially neglected some of our most critical and vulnerable domains. The maritime domain is the simplest to begin better incorporating into our threat analysis and planning.

Soldiers from the 9th Mission Support Command's 303rd Maneuver Enhancement Brigade pose for a group photo during the commencement of Exercise Yama Sakura 81 at Schofield Barracks, Hawaii. The Soldiers will serve as a subordinate unit for the headquarters element operating out of Camp Itami, Japan. (*Photo by 1LT Philip Regina, 9th Mission Support Command)*

Throughout YS81, the intelligence focus remained on the land and air domains, in that order, even though the enemy order of battle clearly noted a sizable and capable maritime cruise and ballistic missile threat that had the reach potential to affect friendly bilateral land operations significantly. It wasn't until the maritime threat started to impact friendly bilateral land operations that the Corps staff finally began to give the maritime threat equal weight in consideration. At that point, it was too late as there were already significant losses. In the AMD realm, intelligence analysis from the Air Defense units at the beginning of the exercise displayed only land Ballistic Missile Operating Areas. There were no planned Secondary Target Lines to slew to a maritime threat that could have easily emerged from behind Patriot radar and launcher coverage despite its significance and prominence before and during the fight.

This shortcoming necessitates a problem statement: How do we defend against a maritime threat that can easily emerge from behind Patriot coverage and target defended assets? One interim solution is to incorporate what has already been considered in U.S. Central Command since the Aramco attack in 2019: array the launchers into a "Flying V" configuration to maximize coverage rather than utilize the outdated "Lazy W" configuration. There is one issue with this solution: in the U.S. Indo-Pacific Command area of responsibility (and especially Japan), due to its often hyper-urbanized and land-constrained nature, it can be difficult to find enough land area within the coverage of defended assets to properly configure Patriot launchers into a "Flying V." However, in a time when China has built man-made islands in the South China Sea to maximize their space and increase the reach of their air and maritime assets, the "Flying V" configuration is the best interim solution. The construction of man-made islands off the coast of Japan to accommodate U.S. Air Defense assets is simply not feasible nor suitable. More realistically, we should put effort into staffing a solution to this issue in our bilateral agreements with Japan so that they can accommodate the additional land space required should the need arise.

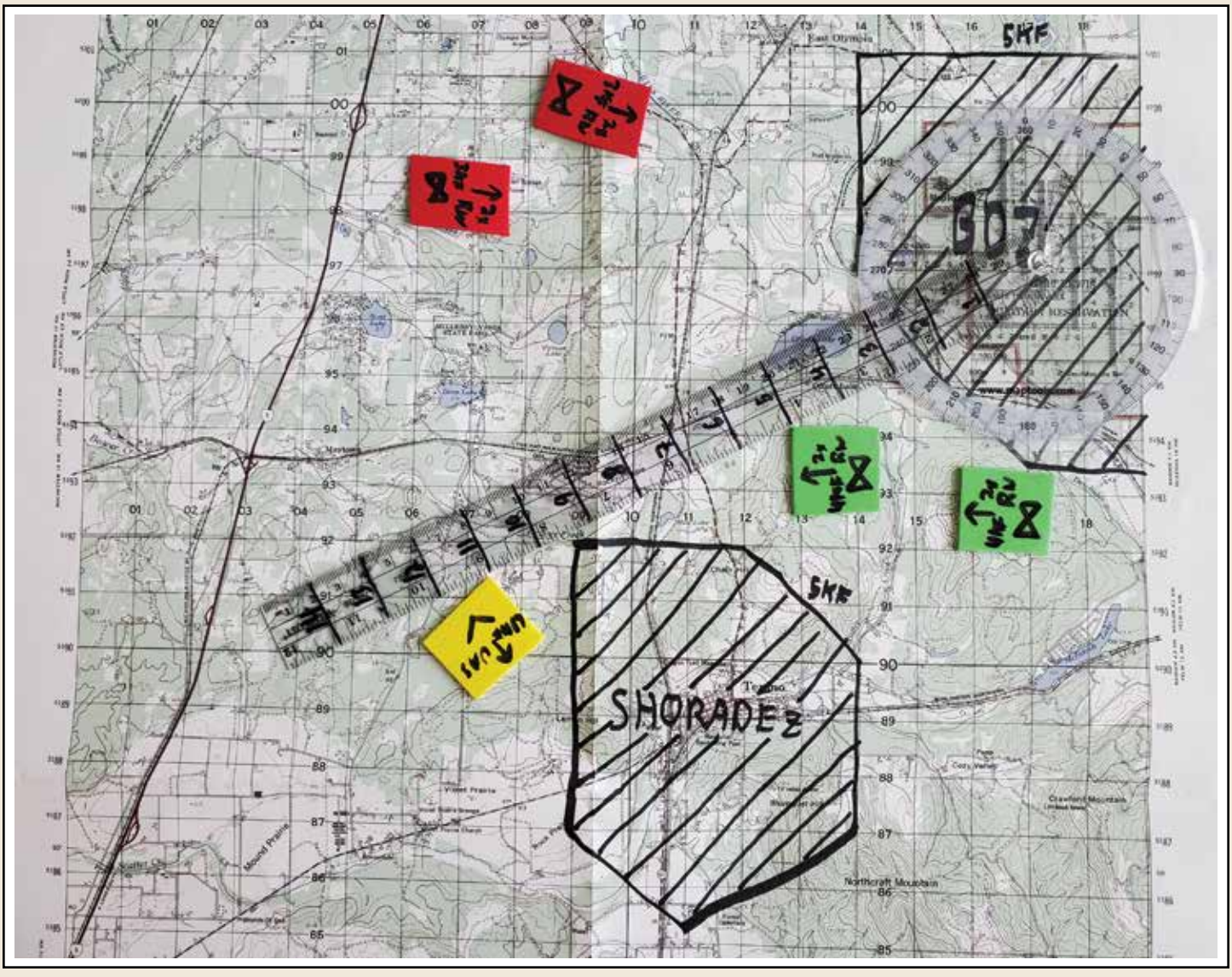
After a long week of synchronization meetings and coordination efforts Yama Sakura planners came to a culmination at the Main Planning Conference at Camp Zama June 11. This planning conference was unique from previous iterations because it's the first-time participants were able to come from the United States and take part in person since the COVID-19 pandemic. Yama Sakura 81 will be the largest U.S.-Japan bilateral and joint command post exercise which enables participants to work as dedicated partners in support of the U.S.-Japan security alliance and for continued peace and stability in the Indo-Pacific region. *(U.S. Army photo by MAJ Elias M. Chelala)*

Another domain is cyber. During YS81, we received a cyber-attack inject that resulted in all digital means of communication and situational awareness going down. Most of the Corps staff quickly realized that they lacked a sufficient alternate (non-digital) means of situational awareness and communication once this occurred. Most staff sections did not bring paper maps, so they quickly obtained maps that were either posted or laying around the bilateral Joint Operations Center (JOC). Once the sections were able to secure maps, it was another struggle to plot anything on those maps, as the maps printed and utilized by our Japanese partners were all latitude and longitude (lat/long) maps, rather than the Military Grid Reference System (MGRS). This resulted in Navy and Special Forces liaison officers having to work their way around the JOC to give expedited instruction to each staff section on how to plot and utilize lat/long maps and how to then convert lat/long coordinates to MGRS coordinates, and vice/versa. Eventually, most sections attained a rough understanding of how to plot and convert lat/long shortly before digital systems and networks were restored after several hours through an inject. This lack of skill and preparedness hindered our bilateral interoperability. It highlights the need for units at all levels to train on these basic analog skills, as these skills may be pivotal in the next fight where multiple domains will likely be contested.

The airspace model kit

Another problem statement originated from the exercise: Even if lat/long-MGRS conversions were not an issue, how could an AMD section possibly maintain situational awareness of air-

Example of an Airspace Model Kit



breathing threats on a paper map with no means of digital tracking? One solution, particularly for echelons below division, is the airspace model kit. The airspace model kit is similar in concept to a terrain model kit, except it is for maintaining situational awareness of airspace on a paper map. Different AMD units and sections can devise different techniques tailored to their needs, but the following is a good technique I learned from British Air Defenders when I was on exchange to the United Kingdom. Once having obtained the appropriate map (a very large and zoomed-out map for AMD purposes), place it flat on a table, preferably with a sheet of acetate over the map, secured in place with tape around the sides (the acetate is utilized to easily draw Airspace Control Measures as they are activated, deactivated, and modified). Place military protractors (preferably circular protractors) on the map, with the center hole of each protractor on each defended asset (bullseye). Secure the protractors in place using clear tape, ensuring that the zero-degree marking is exactly parallel to the vertical lines on the map. Place the ends of clear rulers (preferably with markings removed) over the center of the protractors and secure them in place with a thumbtack driven through the center hole of each protractor. If the rulers don't already have holes, holes will need to be made. The rulers will pivot easily over the map. Next, draw lines on the ruler to indicate distance using a Sharpie. Cut small squares out of craft foam, cardboard, or something fairly durable to use to indicate aircraft position. Each square can be appropriately labeled based on aircraft type and can be color-coded to indicate friendly, neutral, unknown, or hostile aircraft.

If digital means of maintaining an air picture are reduced or no longer an option in a multi-domain fight, Air Defense operators in the field will need to report each aircraft they spot via tactical communications using approximate bearing, altitude, and range from the appropriate bullseye, as well as aircraft type and model if it can be determined through Visual Aircraft Recognition. This will need to occur as soon as the aircraft is seen, with updates as appropriate. There will need to be a dedicated operator in the mission command center Command Post, JOC, or Surface-Based Air Defense Operations Center, etc., to constantly man tactical communications within the mission command center and make constant updates to the analog map based on the aircraft reports they receive. This method of analog tracking also requires operators in the field to be familiar with making such reports. All of this requires tactics, techniques, and procedures (TTP) to be developed and rehearsed. The personnel in the mission command center need to remain mindful that the more channels and echelons the report goes through before it reaches them, the staler their analog air picture will be. Therefore utilizing this analog method of tracking aircraft should only be at the brigade and lower echelon. Echelons above the brigade must focus on ensuring that they are receiving accurate and timely engagement reports and Surface-to-Air Missile Status Reports through a means that does not utilize digital communications, as they will likely be separated by great geographical distances and out of range of the most convenient tactical radio ranges.

Conclusion

In summary, the lessons learned from YS81 continue to clarify where we are versus where we need to be regarding our preparedness for the next fight. The Air Defense branch needs to wean itself from the binary air-land mindset, as we will likely be contested by threats from all domains in the next fight. The Air Defense branch already operates in, utilizes resources from, or defends against threats from all domains, but we need to do so to a greater degree to maintain an edge over peer and near-peer adversaries. The solution starts with intelligence: threat consideration and analyses across all domains. It involves enhancing our interoperability with our allies and partners as well as conducting analyses on and voicing MDO considerations regarding AMD operations so that they may be included in our bilateral agreements. We must have well-rehearsed TTPs in place so that we may be effective in a fight in which we find ourselves contested and even degraded across multiple battle domains.

A third-generation Army officer, CPT Joshua Thompson, was commissioned into the Air Defense Artillery branch via ROTC in 2013. He holds a Bachelor of Arts in Sociology from the University of Texas at San Antonio and a Master of Arts in Leadership Studies from the University of Texas at El Paso. Thompson has served in Avenger, Patriot, and Air Defense Airspace Management/Brigade Aviation Element positions and commanded Headquarters and Headquarters Battery, 1-7th ADA from September 2019 through April 2021. He is currently serving as an AMD operations officer in 1st MDTF at Joint Base Lewis-McChord.

Creating Standards *for a* Non-Standard System

By CPT Eric Murphy and CPT John Klier

No Soldiers, equipment, or fuel are allowed to enter Forward Operating Site (FOS) Carroll through ground transport due to agreements with the Republic of Korea. Soldiers are flown on and off-site once weekly to access the FOS, requiring persistent air superiority. To defend the site from small Unmanned Aircraft System (sUAS) threats, the Combined Task Force Defender (CTF-Defender) utilizes Drone Defenders, a non-program of record system. Gunnery standards have developed at the task-force level and are incorporated into the 35th Air Defense Artillery (ADA) Brigade Gunnery standard operating procedures. With an effective range of up to five hundred meters, the Drone Defender can provide exceptional defense for the FOS.

The Drone Defender is a versatile system that can mobilize throughout the site to meet and deny threats to mission-essential vulnerable areas. CTF-Defender conducts 24-hour short-range Air Defense coverage with its Drone Defender teams. Each individual team consists of two service members, one serving as an observer and the other operating the weapon system. Based on intelligence and preparation of the battlefield and terrain restrictions, the CTF will place its Drone Defender teams where essential.

The mission of CTF-Defender is to conduct security and sustainment operations to support an upper-tier missile defense FOS in the Korean Theater of Operations, enabling United Nations Command/Combined Forces Command/United States Forces Korea freedom of maneuver. The security force element's Drone Defender teams provide Counter-small Unmanned Aircraft Systems (C-sUAS) for FOS Carroll in support of multi-layered Air Defense. This article will detail the gunnery table program for the Drone Defender teams, the employment of the Drone Defender, and lessons learned from exercises with the system.

Gunnery Tables

Over the past few months, the CTF transitioned the Drone Defender operation in a deliberate training mission to the 2nd Infantry Division rotational infantry company from Echo Battery, 6th Battalion, 52nd Air and Missile Defense Battalion. Educating non-Air Defenders to understand the short-range Air Defense mission and take ownership of the Drone Defender mission advanced the integration of the quick reaction forces between the security force and Drone Defenders. The last week of May resulted in the first relief in place/transfer of authority (RIP/TOA) for the Drone Defender mission between security force teams. CPT Johnathan Klier, the protection officer for CTF-Defender and graduate of the Counter-Unmanned Aerial System (CUAS)

Soldiers receive instructions on Table I - Drone Defender Familiarization.

PFC Aaron Stathakis demonstrates Table II (Assembly and Disassembly of the Drone Defender).

Academy at Yuma Proving Ground, oversaw the gunnery training during the RIP/TOA, which was run by the non-commissioned officers of the outgoing unit.

The CTF established a gunnery table system for the Drone Defender to ensure the CTF commander has the confidence to deploy the system and its operators. The Drone Defender is not an Army system of record, and following testing and measuring best practices, these are the six tables used for the gunnery program:

Drone Defender Gunnery Tables		
Gunnery Phase	Table	Task
Individual	I	UAS Familiarization/Drone Defender familiarization/safety considerations
	II	Assembly & Disassembly of Drone Defender
	III	Evaluation of Tables I & II
	IV	Practice donning the Drone Defender
Crew/Team	V	Drone Defender UAS engagement rehearsal
	VI	Drone Defender UAS Live Fly Engagement

Table I instructs Soldiers on UAS characteristics as well as capabilities and limitations of the Drone Defender. Soldiers will also learn how to safely use the weapon to engage UAS. Table I takes place in a classroom setting. During **Table II**, Soldiers learn how to assemble and disassemble the Drone Defender and perform function checks and maintenance. Soldiers receive hands-on familiarization with the Drone Defender for **Table III. Table IV** is a 20-question general knowledge test on information taught in Tables I, II, and III. During **Table V**, Soldiers practice reporting a UAS, engaging the UAS, and sending up an engagement report. **Table VI** is an evaluation of the tasks Soldiers trained on in Tables IV and V. Each task is evaluated on a "Go/No Go" basis. Soldiers must receive a "Go" in each event to Table VI qualify. Table VI is a critical gate. All previous Tables must be completed before conducting Table VI.

These tables are initiated immediately upon arrival of the incoming security force unit. The standards for certifying on the Drone Defender system are not set to time and can be accomplished expeditiously. Tables' I–IV are individual gates, with Tables V and VI being conducted as crews. This gunnery program ensures that CTF-Defender has competent crews capable of defending the assigned mission-essential vulnerable areas. The Drone Defender is not operated by an individual but is employed in the following crew composition and supported by the combined command post.

Combined Employment

The Drone Defender crews have two Soldiers with a non-commissioned officer in charge of their employment. The crews are kept on rotational shifts for a work/rest cycle that maintains "fight tonight" readiness. Prior to any decisions or actions initiated by the Drone Defender team, there are supporting entities that play a role in their operation. As a CTF, the Republic of Korea Army (ROKA) battalion provides local threat-level analysis from their intelligence staff in addition to the reports the task force receives from the Waegwan Field Office and its intelligence section. These threat assessments inform the commander where to employ the Drone Defender teams.

The employment of the team benefits from additional C-sUAS assets on-site that warn the command post of incoming threats. ROKA bolsters the Drone Defender teams through robust early warning support utilizing thermal optic devices with sights on the most dangerous air avenues of approach. The Fixed Site-Low, Slow, Small, Unmanned Aircraft System Integrated Defeat System (FS-LIDS) supports the unit's response to these threats. The system places the threat and initiates the movement for the Drone Defender teams. The teams respond by any means necessary, often on foot advancing through the terrain. When the observer identifies the threat, they direct the Drone Defender operator to get eyes on it. After receiving the order, the operator can engage and neutralize the threat.

Combined Task Force Defender SPC Benjamin Strickler practices acquiring target.

Simultaneously, the UAS report is sent up to the commander and higher headquarters.

When the system neutralizes the threat, the responses can either be for the drone to return to base or for the drone to lose its connectivity to the operator and go into hover status. To prevent the UAS from responding to its operator, the Drone Defender teams keep constant contact with the UAS. This involves at least two teams switching on and off to preserve battery power and maintain full power on the threat. When the UAS has a battery failure, the combined command post will call for explosive ordnance device (EOD) support from the 718th Explosive Ordnance Disposal Company. The EOD unit will conduct a clearance of the area to ensure safety of operations, and CTF-Defender will contact the Waegwan Field Office to receive any counterintelligence support. Through this deliberate action, the CTF responds with precision and approaches each threat as required.

Exercises

The C-sUAS teams at FOS Carroll participate in site-wide battle drills during exercises such as Lightning Strikes and twice quarterly Lightning Yeonhap exercises. Exercises provide realistic scenarios that flex the unit's response to asymmetric threats. Lightning Strikes tests the detection capabilities for the FS-LIDS system by flying sUAS models and alerting the Drone Defender teams to the threat. These tests are run 15 times daily during the exercise and put stress on the crews. Lightning Yeonhap, by contrast, brings the Drone Defender teams into an environment that tests the entire CTF response to threats. The base defense exercises include the ROKA airborne unit, the infantry security force, medical team, and the command post operators. The combined command post exercises its base defense measures for the multi-day Lightning Yeonhap eight times yearly. Regularly conducting Lightning Yeonhap and the gunnery table training for the rotational security force units build consistent opportunities for mission integration and competency.

Lessons Learned

CTF-Defender has taken significant actions to improve the Drone Defender program at FOS Carroll. A live-flying drone requires approval from the Pentagon and is employed at every opportunity to strengthen teams. Previous tests of the Drone Defender had to be conducted on static systems, which did not provide a realistic training event. Receiving authorization to fly drones on-site has vastly improved our confidence in the system in identifying the threat and demonstrating the system's effectiveness. Additionally, our defensive locations have seen significant improvements in placement by conducting regular analysis of threat responses.

The most recent gunnery table training program occurred from May 24, 2022, to May 31, 2022, and certified 20 Soldiers from Bravo Battery, 1st Battalion, 6th Infantry. With the previous security force transitioning out, CPT Klier supervised the gunnery plan and followed through with an after-action review to discuss a way forward for future iterations. Comments from the Drone Defender operators demonstrated that the system is effective in neutralizing the threat and is best employed as a component of a layered defense.

SPC Grayson Etheridge said, "We got to see what the Drone Defender did through the training process, but its drawback is that it is not self-sufficient and has to be integrated into other systems."

Observing and identifying the UAS location is a difficult role, and the FS-LIDS monitoring through the C-sUAS command post is the difference in making the suppression succeed. Without a doubt, the Drone Defender is an effective system in conjunction with other systems to employ against sUAS threats.

PFC James Nickleson remarked that "By itself, it was hard to take the drone down, but combined with other Drone Defenders, it was amazing."

The Drone Defender mission on FOS Carroll succeeds best when the CTF conducts after-action reviews and updates positions. The recent iteration of gunnery training had an after-action review conducted with the recently certified operators, receiving immediate feedback and being documented for the next round of gunnery. The quarterly base defense review in the spring identified a need for Drone Defender teams to be relocated and the C-sUAS command post to relocate into a new container. The task force receives external resources through the Eighth Army emerging threat team and the CUAS Academy at Yuma Proving Ground, Arizona, where Soldiers train on a range of UAS devices. These entities improve the capability of the task force by educating the service members that operate the system as well as training the non-commissioned officers involved in their training program and exercise drills.

The mobility of the system is a major advantage when comparing C-sUAS options for site defense.

The layered defense system at FOS Carroll and the multiple systems of Drone Defenders on the site provide the necessary defense for the commander. The mobility of the system is a major advantage when comparing C-sUAS options for site defense.

Private Austin Hilton said, "It is very easy to use and lightweight and is very portable to carry around." In the mountainous terrain on FOS Carroll, mobility is the key to success, and regular training on the systems enhances its operation.

The Way Ahead for the Drone Defender Mission on FOS Carroll

CTF-Defender uses Drone Defenders due to their versatility in defending against asymmetric threats to the operating site. The portable systems are highly mobile and are effective out to 500 meters. The CTF, acknowledging the high turnover rate of the Drone Defender operators, has established an effective gunnery program to streamline training. The point-and-shoot system ensures ease of use and flexibility for the unit to train new Soldiers. The organic gunnery training program, employment of the Drone Defenders, involvement in exercises, and lessons learned detailed procedures to operate this non-program of record piece of equipment.

The next highlighted exercise is Operation Lightning Strikes 22-2, which will test the unit against the most dangerous air avenues of approach as well as against swarm attacks. The Drone Defender teams will play a major role in this exercise together with the FS-LIDS system. This exercise grew out of a rigorous test of the Sentinel Radar System on sUAS threats during Operation Lightning Strikes 22-1. The upcoming exercise iteration will change the mission to focus on the coordination between the Drone Defender teams and FS-LIDS operators. CTF-Defender has improved its C-sUAS defense primarily through advancing the Drone Defender training program and by upgrading defensive locations.

CPT Eric Murphy is the assistant operations officer for Combined Task Force-Defender and will take command of Bravo Battery, 2nd Battalion, 1st Air Defense Artillery in September 2022.

CPT John Klier is the protection officer for Combined Task Force-Defender and is a graduate of the CUAS Academy.

Preparation for Roving Sands 22 - *Back to the Future*

By MAJ Mike McEunn and MAJ Pete Bier

SSG Cody Dubay and his Soldier, SPC Gilberto Leines, from D Battery, 3-2nd ADA, conduct entry control point security to enable the battery time to emplace and conduct engagement operations.

1LT Nischal Mali from C Battery, 3-2nd ADA informs and prepares all Soldiers for movement to their Patriot site to execute Roving Sands '22.

From 1989 to 2005, Roving Sands was the premier Air and Missile Defense exercise in the world, training and validating the capability and proficiency of Air Defense units to protect defended assets in a combined or joint environment. With the Army's recent shift of focus from counterinsurgency operations to large-scale combat operations (LSCO), 32nd Air and Missile Defense Command (AAMDC) reestablished the annual exercise in 2018, executing a combat training center type of event that focused Air Defense units at echelon from battery to brigade on LSCO in a dynamic and complex training environment.

Prior to redeployment of the 3rd Battalion, 2nd Air Defense Artillery (3-2nd ADA) from the U.S. Central Command area of responsibility (CENTCOM AOR) in May 2021, the 3-2nd ADA Battalion (BN) received notification that they would participate in Roving Sands 22, taking place at Fort Bliss, Texas, in May 2022. Having spent the prior 28 months preparing for and conducting operations under a CENTCOM threat set on hardened sites with well-established lines of communication, the unit's ability to execute steady-state Air and Missile Defense (AMD) operations reached its zenith. However, mastery of steady-state AMD operations would not get a unit very far during Roving Sands. Roving Sands was designed to exercise those once prevalent skills in Air Defense units that had degraded over more than 15 years of steady-state AMD operations on hardened sites. In order to prepare for the future, the 3-2nd ADA had to revert to the fundamentals of LSCO.

Understanding that the unit must undergo a paradigm shift over the next 12 months to effectively execute Roving Sands 22, the 3-2nd ADA developed a deliberate training plan focused on preparing subordinate units for LSCO. While still affording focused effort to the execution of its AMD mission and achieving Air Defense Gunnery Table VIII certification, the 3-2nd ADA implemented a year-long training plan focused on convoy operations, communication at echelon, Patriot tactical site security, expeditionary movement of Patriot tactical sites, and the establishment and execution of sound logistical practices.

The multi-year defense of stationary assets such as air bases has inherently degraded the Patriot Air Defense force's ability to conduct movement and maneuver on the battlefield. Regaining that ability, specifically in the form of convoy operations, became a key task for the 3-2nd ADA. Immediately upon its return from redeployment and block leave in June of 2021, the

battalion focused on both day and night drivers' training, with the objective of licensing all E-6 and below within the battalion. The 3-2nd then codified its convoy standard operating procedures (SOP), ensuring that minimum expectations and standards would be synchronized throughout the formation. The unit then conducted a convoy mini-camp where all E-6s and above, those that would serve as convoy commanders per the battalion SOP, spent four days putting into practice the convoy operations standards both in a classroom and hands-on environment. From this point, convoy commanders were prepared to conduct movement and train the rest of the battalion.

Beginning in July, subordinate units began conducting weekly convoys in and around Fort Sill, Oklahoma. The battalion would issue orders directing specific vehicle composition, convoy commander, start point time, and routes taken. The battalion provided subject matter experts (SMEs) who conducted Quality Assurance/Quality Checks on vehicles, maintenance paperwork, operator licenses, attended convoy briefs, and observed movements at critical points along the published route. The battalion provided weekly after-action reviews, fostering a constructed learning environment where all leaders can grow and redevelop these fundamental skills. Convoys started small, with minimal vehicles requiring basic operations going limited distances, such as three HMMWVs traveling 10k miles, and grew over time to include all types of vehicles in the battery and traversing longer distances and varying terrain. The training culminated with all subordinate units executing full battery convoys of 45-50 km in a GPS-contested environment during the unit's March field training exercise (FTX). The Soldiers of the *Lethal Strike Battalion* regained the skill of conducting convoy operations and were prepared to maneuver the battlefield.

Another skill necessary to redevelop was that of organic communications at echelon. After multiple years of operating on sites with robust, stable communications infrastructure ranging from Voice of Secure Internet Protocol to Microwave Line-of-Sight, the skills of using organic communication equipment required concentrated training. Communications training began with the installation of Single Channel Ground and Airborne Radio System (SINGCARS) into their respective vehicles in the summer of 2021 and the verification of operability. The battalion tracked capability status of the SINGCARS and provided BN S6 assistance due to their limited use in vehicles over the previous 28 months. In the fall of 2021, the battalion began conducting weekly communication exercises with BN S6 oversight in conjunction with convoy operations, ensuring that all vehicles had fully functional SINGCARS while operators developed the ability to communicate on the move. By the spring of 2022, the battalion had mastered the skill and culminated training with a 45-50 km convoy that included multiple reporting requirements over vast distances using a retransmission team.

While mastering inter-battalion and battery communications, the 3-2nd ADA also devoted time to developing the skills necessary to communicate at echelons above battalion. Beginning with FTXs in October and November, the battalion began to employ the Joint Battle Command-Platform, a system common to maneuver units but relatively unused by steady-state AMD units while deployed. Although using this system to track movement on the battlefield introduced new challenges to the unit, the learning curve was quickly overcome, and the system became a valuable asset. At the same time, the battalion Tactical Operations Center implemented the use of the Command Post of the Future, another relatively unused system, in operations ranging from Military Decision Making Process to Battle Update Briefs

Left: SPC Isaiah Walters from C Battery, 3-2nd ADA pulls security for the battery tactical site at Roving Sands.

Right: SPC Branden Jaski from C Battery, 3-2nd ADA, ensures his site is secure by using cover and concealment.

and Commander Update Briefs. Enforcing the use of these systems early in the training cycle and employing them in four different FTXs over the course of six months, the battalion was able to develop a proficiency that fostered future success utilizing the systems during Roving Sands 22.

The "force protection" skill is possibly the most diminished due to prolonged occupation of hardened sites on secure air bases. Site security became a secondary concern in places like Camp Arifjan and Ali Al Salem Air Base, Kuwait. During LSCO, however, site security becomes of paramount importance. Similar to convoy operations, training for this skill began in June of 2021 and was delegated to the lowest practicable level – the squad leader. Although it never truly left, Leaders' Time Training was implemented with renewed vigor, dedicating and protecting every Thursday from 6:00 a.m. to 1:00 p.m. for the focused LSCO training. The battalion did issue a minimum list of force protection tasks that required training prior to the unit's movement to Fort Bliss, Texas, for Roving Sands 22, leaving the majority of training objectives to the lowest level possible. Through feedback from the platoon level and tracking at the battalion training meeting, the 3-2nd ADA was able to ensure Soldiers in the battalion were prepared to conduct applicable force protection measures. Although these are basic Soldier skills, they had atrophied over time. However, through focused effort, the skills regrew.

Another area of site operations that necessitated focused effort to regrow was expedient set up and tear down of site. Clearly, the establishment of an expeditionary site was not a requirement in CENTCOM over the last 15-plus years. Furthermore, even during Air Defense Artillery Gunnery training and certifications, units tend to focus on the expedient movement of the Patriot system, not the movement of the rest of the battery's trappings. The timely set up and tear down of a Patriot tactical site, including concertina wire, pickets, tents, living areas, fighting positions, and sustainment areas, among other things, requires practice. For this reason, multiple movements for each battery were planned during each of the four FTXs from October through March. The batteries did not simply move their Patriot system, but they would tear down and emplace their complete site at a new location multiple times during each exercise.

SPC Justin Fuller from C Battery, 3-2nd ADA, dismounts and provides security during the convoy halt.

This served to not only make the movements a drill unto themselves but also allowed the units to divest themselves of unnecessary items that encumbered and slowed their movement. Through the deliberate training of these full site jumps, units became proficient at the movements necessary for Roving Sands and operating in an LSCO environment.

The final element that required dedicated training was that of sustainment operations, specifically logistics packages (LOGPACs). The stationary, hardened, developed Patriot sites of CENTCOM leave little difficulty as it pertains to sustainment operations. However, the austere environment of LSCO will be much different. In order to prepare for this dynamic, the battalion deliberately trained sustainment operations over the last 12 months. This began in earnest in the summer of 2021, sending as many personnel as possible to troop schools to become H8 (wheeled vehicle recovery)-certified. Recovery teams were then tracked at the Maintenance Company level, similar to how Air Defense batteries track their Engagement Control Station and Reload crews. During all FTXs, the battalion utilized injects that exercised vehicle recovery operations with SME oversight, ensuring that Recovery teams maintained proficiency. Previously common but underutilized in current CENTCOM AMD operations, recovery operations became revitalized.

In addition to Recovery operations, LOGPAC operations received focused attention as well. From the fall of 2021 to the spring of 2022, Echo Company exercised the movement and issue of supplies, specifically Classes I, III, V, and IX. Early in the process, issues arose with respect to Class IX LOGPACs with the utilization of Very Small Aperture Terminals, the implementation of tactical communications from the fire unit to the supply support activity, and maintaining the chain of custody of Class IX repair parts throughout the entire LOGPAC process. Training on these operations early allowed the battalion to identify friction points and resolve them well before execution of Roving Sands 22.

In preparation for its future involvement in Roving Sands 22, the 3-2nd ADA went back to the past, planning and executing a deliberate training regimen focused on renewing atrophied skills. Although Patriot Air Defense forces have been continuously deployed to the CENTCOM AOR for the last 30 plus years, the experience has caused the loss of some skills inherent to LSCO. Exercises such as Roving Sands serve as a forcing function to compel Air Defense battalions to contend with the LSCO experience by focusing on atrophied skills to revitalize the expertise necessary to succeed on the battlefields of the future.

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MAJ Pete Bier is an Air Defense Artillery Officer currently serving in the 3-2nd Air Defense Artillery as the battalion executive officer. He previously served as the battalion operations officer and the commander for C Battery, 3rd Battalion, 43rd ADA and HHB, 94th AAMDC. Bier deployed to the CENTCOM AOR twice and holds master's degrees in Leadership Studies, Soil Science, and Operational Studies. He has served on the faculty at West Point as an assistant professor in the department of geography and environmental engineering.

IBCS: Integrated Air and Missile Defense Battle Command System

IBCS paradigm shifts

By LTC King Cooper and MAJ Joshua Urness

Integrated Army Air and Missile Defense Battle Command System (IBCS) changes how the Air Defense Artillery (ADA) fights through a combination of hardware and software evolutions, necessitating paradigm shifts. Hardware dramatically expands the ADA battlespace while software, subject to the agile software process, provides consistent and continuous relevance to counter adversary air and missile threats. The corresponding implications of those changes require ADA to rethink how it understands IBCS within the context of legacy systems, how it visualizes employment of the ADA force, how it prepares and manages training for that force, and how commanders at echelon lead that force. IBCS fielding at the battalion echelon will begin in Fiscal Year (FY) 23 and continue with Lower Tier Air and Missile Defense Sensors until FY 31. The next increment of fielding begins in FY 26 and integrates Army Air and Missile Defense (AMD) commands, brigades, other Air Defense sections across the force, and other sensors. The following are notable observations that could assist others in reevaluating how they think about the employment of Air Defense capability to facilitate paradigm shifts.

The logical fallacy of comparing Patriot to IBCS

Comparing IBCS to Patriot is an apple to oranges comparison. The Army force management paradigm drives leaders to assess whether IBCS is equal to or better than Patriot. IBCS is different, built for a different fight than Patriot, requiring operations in a denied, degraded environment where adversaries challenge force projection throughout the depth of the battlefield. The ascendency of electronic attacks, cyber warfare, unmanned aerial vehicles, and long-range precision fires across state and non-state actors forces the Air Defense community to evolve. This different fight is the one that GEN Mark Milley described when he was Chief of Staff of the Army –the character of war is changing, but the nature of war remains the same. IBCS sets conditions

< A Patriot Advanced Capability-3 (PAC-3) Cost Reduction Initiative (CRI) missile is launched during the recent successful Integrated Battle Command System (IBCS) flight test at White Sands Missile Range. *(Photo by Darrell Ames)*

for Air Defense Artillery's successful transition with the joint force to timely application of re-envisioned principles of war in the future operational environment. Therefore, instead of comparing a Patriot area of operations (AO) to an IBCS AO, the correct way to assess differences between the systems is to compare how each system fights in the future operational environment. Given operational variables of valid, future environments, the success or failure of an Air Defense task force may come down to the resiliency of IBCS' self-healing mesh network, a clear but undervalued component of IBCS compared to Patriot's Communication Relay Group/Antenna Mast Group platform.

The network is one important element in answering the fundamental question: which system can survive, fight, and win in the future operational environment?

Task Force Mindset

IBCS maximizes the newest AMD principles of agility and flexibility. IBCS achieves these principles through a combination of scalability and modularity. IBCS can deploy as a task force of all sensors and no launchers, many launchers and one sensor (Patriot or Sentinel, etc.), or a command and control node, and is scalable to larger or smaller variations. To maximize the benefit of IBCS's scalability and modularity, multiple senior leaders envision transitioning current Air Defense organizations to launcher or effector only batteries, sensor batteries, command and control batteries, and communications (Integrated Fire Control Network [IFCN]) batteries. In such a case, the senior commander of a smaller ADA task force consisting of primarily launchers (more than would be customary for a single fire unit) and one sensor could be the launcher battery

SPC Norman Parks (left), and PFC Jonathan Oliver, Engagement Operations Center crewmembers with 3rd Battalion, 43rd Air Defense Artillery Regiment, perform preventative maintenance checks and services (PMCS) on a generator. Parks reads the PMCS steps out loud so Oliver can perform a fault isolation on the AIAMD IFCN Relay. *(Photo by SSG Christopher Pabst, Air and Missile Defense Test Directorate)*

commander, as it could be in a traditional joint task force notion.

What ADA - IBCS organizational model optimizes AMD principles while enabling system integration benefits (scalability, modularity)?

AMD competency development

The "any sensor, best shooter" concept requires IBCS operators to be familiar with the entire AMD portfolio to enable the integration benefits of the system. An implication of this requirement is the ascendancy of generalism in a force based on technical expertise. The focus of expertise on a suite of software - the brains of IBCS - draws emphasis away from AMD principles, planning, and employment. It is important to note that the Army's IAMD program goal is to enable common distributed mission command to maximize sensor detection and increase weapon system engagement capabilities. IBCS serves as one of the contributions to the multi-domain Army. GEN James C. McConville describes the future battlespace and states in "CSA Paper #1" (16 March 2021) – Army formations, and capabilities will provide the necessary physical and cognitive speed to achieve decision dominance required for a faster-paced, distributed, and complex operating environment. The re-integration of AMD into large-scale combat operations requires further emphasis on the leader's understanding and implementation of the AMD Principles, Employment Tenets, the Operations process, and Operational Framework, increasing our ability to advise, assist and produce desired effects on the battlefield. The ability to communicate to the maneuver and joint force commanders will be paramount to the success of AMD modernization efforts. We will likely find ourselves as the sole Air Defense expert responsible for setting the conditions to fight and win based on the directed command and support relationship.

We should ask ourselves how well we diversify our Air Defender's experience/expertise across the entire AMD portfolio?

Training management

IBCS training management requires more deliberate, long-range planning, coordination, and resourcing than legacy Air Defense systems. Notably, military or standard installation frequency management does not support the signal types, and spectrums IBCS operates across (local installation policy changes could partially solve this problem). These differences range from multiple satellite radios requiring satellite time (which also need new and different communications security [COMSEC]) to the frequencies that support the IFCN and the Terrestrial Transmission Line-of-Site Radio backbone. COMSEC is nominally impactful after program changes occur, but requests for satellite time and the civilian-controlled radio frequency spectrum requests must be complete between 90-180 days before need. Additionally, credible, multi-echelon IBCS training requires more land than previously necessary to exercise the system and validate network stability. The accompanying resource obligations generated by the larger battlespace exceed the currently assigned strength and capabilities of even the IBCS Battalion Modification Table of Organization and Equipment (MTOE). Additional implications for echelons above the battalion include increased contracting requirements and external resourcing coordination, i.e., field feeding, Upper Tactical Internet (required for link-16 because of distance), etc.

As of this writing, there is an extremely limited capability to conduct organically stimulated simulation training on IBCS equipment due to a lack of training aids, devices, simulations, and simulators (TADSS) equipment. The absence of a sufficient Reconfigurable Tabletop Trainer capability necessitates only on-equipment training. Current on-system simulators possess limited Air Battle Management Level I-III capability. Therefore, the only way to conduct simulation or air battle management training is to coordinate with external agencies for Flight Mission Simulator/Digital (FMSD) support. Notwithstanding the additional time required to secure FMSD support, FMSD-based training constrains training time due to civilian contracts and increased training costs. The bottom line is that you cannot just go out and train or even rely on the traditional "T-9" resource lock-in planning horizons.

How does ADA, through the Regionally Aligned Readiness and Modernization Model, develop sufficient predictability to plan, coordinate, and execute dynamic and complex IBCS training, given current, local radio frequency policy constraints, land/resource requirements, and assuming increased TADSS

capability and MTOE updates focused on signal and sustainment warfighting functions?

Command

IBCS presents the duality of enhanced situational awareness of ADA systems and the ADA fight, balanced by diminished control of task force operations and leadership due to its distributed and potentially non-contiguous nature. Thus, the role of the commander, at echelon, in understanding, visualizing, describing, and directing intent-based operations becomes crucial. Ultimately, IBCS plans to support a 300k long AO (not factoring in width). During Initial Operational Test & Evaluation (IOT&E) Phase I, 3rd Battalion, 43rd Air Defense Artillery operated across a 150k long battlespace and, when factoring width, was spread across 9,800 square kilometers. Each battery echelon commander served as a task force commander responsible for all assets deployed in their battlespace. The largest battlespace consisted of a Patriot Radar, Engagement Operations Center, six launchers/effectors, three remote Sentinel sites with relays, and one IFCN relay. The 3-43rd ADA emphasized leadership development, focused on distributed mission command, operating in unfamiliar situations, and logistics and sustainment functions to enable operations across these vast spaces. IBCS alters the current ADA leadership paradigm by consigning more responsibility and depending more on the judgment of junior leaders and Soldiers (squad/section) due to the distribution of capability across a given AO. Even in the current forward "static" postures, remote relay, Patriot radar/Sentinel, and launcher sites will require more trust and empowerment to more junior levels because of decreased control.

How does ADA develop leaders of character who possess sound judgment and can manage diverse capabilities across a large span of control with limited direct supervision?

Conclusion

The focus of this article is paradigm shifts – considering how we think about the imminent fielding of IBCS. After over a decade of military and civilian personnel work, it is hard to believe that we wouldn't get fielded the perfect system. The reality is that warfare has changed over the last 10 years. Our Army and the joint force also changed a lot, meaning we must reframe how we think about that system. One of IBCS' most significant challenges is the agile software process, fraught with error and risk after each patch. The agile software process is also the concept that will allow Air Defense to evolve into the capability needed as we prepare for the next conflict. That conflict could happen anywhere in the world. In keeping with the reframing thought, there is a high probability that most of the readers of this article will read it through the lens of preparing for a U.S. Central Command (USCENTCOM) paradigm – most of the questions about IBCS seem to revolve around how the system could fight in USCENTCOM. We challenge the readers to counter that availability bias and start thinking about how to also employ IBCS in the forests of Europe and across the islands of the Pacific.

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What to expect when you're expecting: The unforeseen sustainment and personnel issues of IBCS

By CPT Colten Garcia

The path toward modernizing for the future begins with subtle, incremental changes often overlooked. We must adequately account for future incremental technological advancements that build over time to usher in new eras to progress forward. The Army has embarked on the journey to modernize into the 21st century, with Air Defense being the cornerstone of the modernization efforts. The crown jewel is Integrated Air and Missile Defense Battle Command System (IBCS). Having worked with IBCS over the past three years as an operator and battery commander, I can attest that the future has arrived right under our noses. Air Defenders are entirely unprepared for the subtle changes. IBCS liberates Air Defense Artillery (ADA) of some equipment limitations but unintentionally

PFC Anthony McGrath and SPC Isaiah Stinger, both Patriot Launching Station Enhanced Operators/Maintainers with 3rd Battalion, 43rd Air Defense Artillery Regiment, perform power-up procedures on the Launcher Electronic Module to connect with the IBCS. Stinger, newly arrived at the unit, is being trained by McGrath during operational testing of the AIAMD. *(Photo by SSG Christopher Pabst, Air and Missile Defense Test Directorate)*

creates planning problems that require immediate addressing. As Air Defenders, we must emphasize deliberate sustainment planning and personnel management to maximize the employment of IBCS.

IBCS Systems overview and highlights of significant changes

When units receive IBCS, they will receive a few new items, but most upgrades will come to existing equipment. This situation leads to the potential for some to dismiss the actual arrival of IBCS. To be clear, IBCS is not an entirely brand-new weapon system. Physically IBCS is a Frankenstein of already proven equipment. IBCS is, at its core, a software command and control (C2) system, where its beauty lies in its "brains." IBCS takes existing sensors across the joint force and effectors in the Army (currently limited to PAC-2 family, PAC-3 family, and MSE interceptors) and makes all their data actionable. The days of distinguishing between low-bright and high-bright tracks are over with IBCS because all IBCS-enabled equipment speaks the same language and can execute the best action you desire. IBCS can propel Air Defense into the 21st century since it is written in a specific Internet Protocol (IP) language, allowing updates and upgrades as new equipment comes to the force. It uses the agile software upgrade process to enable our staff to counter emerging threats rapidly as they come to the battlefield.

The current version of IBCS that Air Defenders will get is a significant step into the future. It will utilize existing Army communication equipment and architecture to create the Integrated Fires Control Network (IFCN), which is currently the backbone of IBCS. It will drastically expand the footprint that an Air Defender could be responsible for controlling. In the current construct, the IBCS-enabled battalion (BN) would receive 18 nodes of equipment (12 relays and six Engagement Operations Centers [EOCs]) that could contribute to the health and span of the IFCN. With each node being omnidirectional, latency is the only limitation to the number of connections a relay can have. IBCS is not limited to only 18 nodes per task force; as missions dictate, more nodes can join a task force as required. A nominal IBCS-enabled BN without accessing IP drops could support a geographical area of 70,000 km^2 which is roughly the size of the state of Indiana, without considering the extent of influence that sensors and effectors bring to bear. This wherein lies the rub as the branch prepares to receive IBCS. We are not configured or used to exercising the muscles required to support and manage this extensive area.

Sustainment of IBCS Task Force

As a commander during Phase I of Initial Operational Test and Evaluation (IOT&E), this logistical problem of supporting such a vast area was made clear to me. My initial battle space utilized an area of 7,850 km^2 and comprised a site with an AN/MPQ-65 sensor, an EOC, six effectors (a mix of M902s and M903s) and two remote Sentinel sensor sites with relays. My battlespace was expanded to 18,560 km^2 at the height of operations to counter the notional threats. I was responsible for controlling and supporting my site with an AN/MPQ-65 sensor,

an EOC and six effectors, three remote Sentinel sensor sites with relays, and one additional stand-alone relay site. The first issue I had to tackle was C2 of all the sites. Organically, IBCS-enabled battery's (BTRY's) only form of beyond-line-of-sight communication is Joint Battle Command-Platform (JBC-P). I had to maximize the use of all JBC-Ps afforded to my BTRY to ensure consistent communication and pass Surface-to-Air Tactical Order changes to the remote Sentinel and relay sites. My only redundant form of communication was an AN/PRC-162 satellite radio for voice communication. The AN/PRC-162 radio is not organic to an Air Defense BN, let alone an IBCS-enabled BN. Although the S280 comes equipped with four AN/PRC-117 radios, two of the radios are for satellite communications. The IFCN relay does not possess any organic beyond-line-of-site communications. Thus, requiring the AN/PRC-162 to be issued. Although our operators were able to train quickly on operating the equipment, the issue is planning and securing resources up to a minimum of six months before use. Since it requires advanced coordination of satellite resources, a finite resource with multiple competing requirements and users, it might not always be feasible to utilize it in a training environment. It could cause a training gap as units prepare to deploy the system.

The second logistical issue I had to solve was how to support the sites in my battlespace with fuel and food correctly. Upfront, the food issues were relatively easy to solve by providing the sites with the appropriate amount of meals ready to eat. The more problematic issue was fuel support because the emplacement requirements of a Sentinel sensor and IFCN relay are not as restrictive as an Antenna Mast Group and AN/MPQ-65, which means they can be even more remote and inaccessible. These remote and limited access sites challenged my fuelers to perform their mission correctly. I also had to be creative in utilizing my two fuelers, ensuring that my site with the AN/MPQ-65, EOC, and six effectors had the correct amount of fuel, and providing the remote sites with proper fuel support. On the day designated for fueler support for the remote sites, I could project that it would be gone for the entirety of the day, driving to each location and refueling them. The previous day, the other fueler had already hit the fuel point to properly support the leading site. As you can infer, I have not yet addressed the logistical support for parts as equipment breaks. I was fortunate to have minor mechanical issues that required minimal push or pull of parts from our forward-positioned Supply Support Activity (SSA). However, being the furthest site from the positioned SSA, I could expect at least a three-hour delay for parts or higher-level troubleshooting. My most distant remote location would have expected at least six hours. The current configuration of an ADA BN cannot support the geographical area an IBCS-enabled BN could be operating. In an IBCS-enabled BN, the maintenance company must adapt by transitioning into a Forward Support Company model to support the geographical area an IBCS-enabled BN could operate. Commanders must keep logistical planning in mind until the Modification Table of Organizational Equipment (MTOE) reflects these changes. They will also have to keep honest and realistic expectations with Tactical Command authorities to leverage the proper support they could offer to alleviate these issues.

Personnel Considerations for employment of IBCS

Currently, the personnel aspect of IBCS is unimaginative and is rooted in alleviating current operating environment strains on the force. An IBCS-enabled BTRY is MTOE'd with less personnel strength than a Patriot BTRY. The primary difference is the loss of the force protection section, lowering authorized personnel from 72 to 61. Applying IBCS to the current operating environment, IBCS would be able to reduce the operational strain required of the force. However, it is not a secret to anyone that the Army is pivoting and preparing for the return of Large-Scale Combat Operations (LSCO) to the battlefield, which will require the force to execute missions we generally do not perform.

The first issue this creates is the force protection section that the Reconnaissance, Selection, and Occupation of a Position (RSOP) team traditionally pulled from is no longer available to commanders. As mentioned in this article, IBCS is a C2 system that exploits existing sensors and effectors, feeding data into the plan for the best actionable data. Knowing that the AN/MPQ-65 and Patriot interceptors will be a part of IBCS, RSOP is still vital for properly in-laying a site. In LSCO, where time is a crucial asset, the ability of a team independent of primary movement crews to

gather the data and adequately prepare a site for emplacement could ultimately be the deciding factor in any operation. Assuming your unit is 100% adequately resourced and 100% deployable, you would be able to crew roster everyone without double slotting anyone. However, you would have no one left to roster an RSOP team properly. You could muster a group of one to two senior BTRY leaders and three to four low-density MOS Soldiers to conduct RSOP operations to receive the incoming equipment to a new site. Your other option would have to rely solely on map, imagery, and reports recon before movement to your new site. The RSOP question might not be an issue if the site consists of the EOC collocated with the sensor and interceptors and if every jump location is in that configuration. IBCS will allow the possibilities of what a site looks like to be as customizable as possible. It is meant to be tailorable to whatever the mission requires.

IBCS shines because it offers a new opportunity of creating sensor farms that do more than provide situational awareness. A sensor farm is not necessarily a unique concept for a few in the branch. However, the idea that an AN/MPQ-65 can be an independent site removed from the engagement operators might take a while to implement into defense planning. As one might be able to surmise, to fully maximize the employment of IBCS, it could mean that a BTRY is organically spread across three sites before other assets join their battlespace to meet mission requirements. To address this problem of limited personnel with the potential of more areas to operate, leaders must put more time into ensuring subordinates train and are equipped to handle sites with little oversight. They must also become near-perfect experts surveying an area upon arrival and wasting no time emplacing the equipment since the RSOP might not be a conceivable amenity afforded to the BTRY.

Conclusion

IBCS is wonderful at contending with problems created by current equipment limitations while creating logistic and personnel issues that require addressing. Since IBCS will update with the battlefield, it will create unintentional problems that will require mental agility to keep up. As IBCS comes to our units, we must remember that most of us may have to experience living through multiple changes to reach a final and refined product. We have had the privilege of operating on equipment that went through the "sausage-making" process and enjoying the final product. Since IBCS will rapidly evolve and utilize everything the force brings to the table, the "sausage-making" process will never end. Through assessment of pitfalls and issues associated with all facets of IBCS, like logistical and personnel issues it creates for the force. We can address them now by shaping the force to be organized to receive IBCS through either structural or mindset changes so we can deal with the more complex problems IBCS might present as it evolves to meet the changing world.

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The future of Signal in Air Defense Artillery as a vital role in the Integrated Air and Missile Defense Battle Command System

By 1LT Cerys Sullivan

With the development of the Integrated Air and Missile Defense Battle Command System (IBCS), the role of the Signal Corps in Air Defense Artillery continues to expand to include a greater amount of signal assets that work to create a cohesive network with a universal site picture that truly envelopes the IBCS motto of "any sensor, best shooter." As IBCS combines with and replaces legacy Patriot Systems, the Air Defense Artillery branch can expect changes in the manning of their Signal Soldiers and leaders. This system requires the Integrated Fire Control Network (IFCN) leaders to remain agile, adaptive, and cooperative. Their Soldiers remain attentive and flexible in everyday operations to overcome adverse obstacles faced by the Air Defense Branch in a degraded, denied environment.

What is it?

IBCS consists of 12 IFCN Relays, four Patriot Radar Interface Units, six Engagement Operations Centers (EOCs) with adjacent Interactive Collaborative Environment tents, and only M903 Launchers in a standard IBCS-enabled Patriot

Battalion with four-line batteries. All EOCs and relays work on the same frequency to push both red and black side data and utilize multiple assets with enhanced GPS capabilities to develop a more accurate site picture. The system easily integrates with other Signal and Air Defense assets; leaders can incorporate up to eight Army Sentinel Radars and any number of Terrestrial Transmission Line-of-Site (TRiLOS) Radios. These components create a local network that feeds into a greater Link 16 architecture that makes a cohesive site picture and allows a more significant number of assets to see and target potential threats.

Four IFCN Relays belong to the line batteries to extend and strengthen communications data from the EOCs; the remaining eight IFCN Relays belong to one platoon, appropriately named IFCN. This platoon consists of 40 - 25Q Soldiers and one 25A officer and falls under Headquarters and Headquarters Battery as a battalion asset. These eight relays allow the IBCS network to expand up to 300 km. The IFCN platoon leader, S6 officer-in-charge (OIC), and Signal warrant officer work together to use the relays to create a network that connects line batteries to the Fire Directions Control Section, based upon guidance from the S3 shop. This team not only strives to bridge any gaps in the network but also to provide as much redundancy as possible to prevent single points of failure. These requirements often result in the relay teams emplacing in desolate environments, miles from any line batteries that can provide support. IFCN Soldiers must possess the ability to maintain and troubleshoot their equipment as it may take days before support is available. IFCN leadership must remain adaptive as they work logistics for eight separate remote sites that could be upwards of 100 km from each other. Further, as line batteries jump, relays jump. The relay teams should be the last ones to shut down and the first ones to arrive, emplace, and come into the network to ensure that the network stays intact. The IFCN Soldiers and leadership must be able to plan and move quickly and safely to ensure mission success.

IFCN Soldiers not only act as subject matter experts for the relays, but they must know how to set up, operate, and troubleshoot TRiLOS, one of the Signal Corps' most recent developments that replaced the High-Capacity Line-of-Sight Radio. The TRiLOS and relays can be fibered together to increase the distance between remote sites, or a stand-alone TRiLOS can even act as a "retrans" between remote areas. The relay relies upon a Highband Networking Waveform Radio Frequency Unit (HRFU) that depends upon Line-of-Sight (LOS) capabilities and operates at 360 degrees, with no need to dial in a shot. When connected to the TRiLOS, Soldiers can lengthen a shot to over 30 km in two different directions, allowing the system to cover an even greater footprint with limited latency in data transmission.

IFCN Relay Soldiers must also know how to work as Air Defenders as they often need to connect the relays to the Army's Sentinel System via fiber reels. Communications Security (COMSEC) handlers must know how to load the COMSEC into the Sentinel alongside the relay and connect the two. Sentinels are often placed in remote areas of the battalion's area of operations (AO) and used as early warning detection for high-value assets. By connecting the relay and the Sentinel, Fire Direction Control can access a site picture hundreds of kilometers away from them without even accessing the Link 16 architecture. In early 2022, the 3rd Battalion, 43rd Air Defense Artillery (3-43rd ADA) Regiment proved the efficiency of utilizing Sentinels as early warning detections when they successfully jumped one Sentinel, one relay, and two TRiLOS over 90 km away from the nearest line battery during an exercise at White Sands Missile Range. Relay leadership and Soldiers could independently conduct the movement within 12 hours of receiving the order and sustain themselves for over 30 hours.

"This mission exemplifies the two newest AMD (Air and Missile Defense) principles: agility and flexibility. While this mission expanded the IBCS battlespace by nearly 2,000 km, the most decisive achievement was the establishment of an early detection capability on the other side of a mountain range in between masking terrain. TRiLOS served as a remote retransmission site on a saddle within the mountains. With minimal additional effort, we could pair an effector/launcher with a Sentinel and relay," MAJ Joshua Urness, 3rd Battalion, 43rd Air Defense Artillery operations officer, recently said about the mission.

Early warning detection changed Patriot planning and detection capabilities, and relay Soldiers are integral in ensuring the battalion obtains the most optimal site picture to defend their assets.

What has changed?

In the realms of Legacy Patriot, the IFCN Relay consolidates and replaced the Communications Relay Group (CRG) and the Antenna Mast Group (AMG). Both systems rely on LOS transmissions and possess full-duplex capabilities to transmit both voice and data through a cohesive network, and 25Q's man both systems, but that is where their commonalities end. There are several differences between the systems, but they fall into two main categories: system functionality and the concept of sustainment.

First, the CRG and AMG utilize Ultra High Frequency (UHF) and Very High Frequency (VHF) to establish their network; the relay uses HRFU. The CRG and AMG have a variety of UHF and VHF radios installed within their shelters, but the relays possess one baseband processing unit (BPU) that receives and transmits both red and black side data. The two systems have different COMSEC devices, with the relay's being more up-to-date. The IFCN Relay is also far easier to operate, with the HRFU antenna being omnidirectional. Operators must raise the antenna to the necessary mast height, and as long as two relays are within the maximum effective range, they will make the connection. CRGs, on the other hand, use a variety of parabolic dishes to create a directional shot; the CRG can mount up to four antennas at any given time, providing four different shots. Operators must adjust the antennas to dial in the shot, creating a connection. CRG shelters possess the equipment to program the shots, while AMGs act as a retransmission site. Relay operators must be able to learn and adapt quickly as many of the crew members and their leaders do not learn these systems through their schoolhouses. However, similar equipment exists sparsely across the signal realm.

The CRG and relay both present their pros and cons for the concept of sustainment. Emplacement time for the CRG varies depending on the mission and the number of antennas needed at any given time. Soldiers can emplace and connect with an accurate shot for one antenna in as little as an hour; each additional shot consumes about 15 minutes, up to two hours. Depending on the weather, the relay can emplace in as little as 1 1/2 up to 2 1/2 hours. The CRG utilizes a hydro-pneumatic system to raise its masts, providing more structural integrity while the relay is hand-cranked, and operators use guide wires to maintain the alignment. This forces relay operators to closely pay attention to the tension on any guide wires and crank and adjust the wires in a segmented manner. Safety is crucial to implementing both the CRG and the relay, but with the relay mast being unstable at times, Soldiers must stay attentive to their surroundings.

Wind dramatically affects the ability of relay operators to raise the mast; steady wind over 15 mph obstructs the team from raising the mast or coming into contact with the relay due to safety concerns. Both systems require their teams to emplace in remote locations with complex sustainment concepts. The CRG requires a four-person team to emplace and a two-person team to run crews, while the relay only requires a three-person crew to emplace and three people to run crew shifts. The CRG runs from a 30 kW generator, while a relay uses a 5 kW generator, meaning that the fuel consumption of a relay is much lower than that of the CRG. Fuel is one of the most challenging supply classes to support during these operations due to hazardous materials considerations and terrain that makes it difficult for fuelers to access remote sites. IBCS limits the amount of potentially dangerous supply runs that supporting line batteries must conduct by utilizing a generator that consumes far less fuel.

Further, CRG teams must conduct maintenance on their generators every 24 hours of operation, including shutting down the system. The IFCN Relay can run 250 hours before needing in-depth maintenance with a system shut down. IBCS allows longer run times with fewer lapses in the network. While the CRG requires less time to emplace, it requires communication with outside elements to dial in shots and conduct potentially hazardous fuel runs alongside more frequent shutdowns for maintenance. The IFCN Relay consumes more time and attention from soldiers to safely emplace but is far more self-sufficient in resupply and maintenance.

In almost all aspects, the IFCN Relay outperforms its predecessor, the CRG. With the relay's efficiency of emplacement and the diminished burden of sustainment, leaders can establish and control more sites and provide greater redundancy and less latency in a mesh, self-healing network. With more self-sustaining

capabilities, the relay is more adept for remote environments and effectively operates as a stand-alone retransmission site.

What is next?

Air Defenders and Signaleers can expect more changes as the IBCS mission expands throughout Air Defense battalions and brigades. Soldiers must remain flexible as they receive last-minute orders to jump entire sites to further remote locations. IFCN squad leaders and team leaders must be able to make decisions on their sites regarding Soldier safety alongside site and system functionality. Platoon leadership must work as a cohesive team with battery commanders, battalion staff, and command groups to ensure that the system meets the communications network requirements while simultaneously sustaining remote sites for extended periods.

Utilizing the Doctrine, Organization, Training, Materiel, Leader Development, Personnel, and Facilities framework, leaders can continue to shape the evolution and growth of different aspects related to IBCS, as seen below.

- **Doctrine: Air Defense doctrine needs to emphasize the creative planning variations the IFCN Relay adds.** Doctrine needs to evolve to include how to effectively utilize the relay network's various benefits to maximize the battlespace's area and create a more detailed site picture. The addition of IFCN and relay remote sites allows Patriot Fire Control to place deliberate sensor or launcher farms in remote locations to provide early warning detection and engagement alongside observing a greater battlespace.

- **Organization: The IFCN platoon needs to grow to be a larger IFCN battery.** The IFCN platoon does not nest under Headquarters and Headquarters Battery like CRG did in legacy Patriot Systems. This section is a battalion asset that works with the operations section and OIC, all the battery commanders, and S6 to establish and maintain the network. A single leadership team cannot effectively sustain all eight remote sites at once; thus, the line batteries must sustain any remote sites in their AO. By allotting an IFCN battery, the scalability of the battalion's assets increased, and so did the amount of command and control. The battery commander could then task individual platoons to work within a line battery's AO, increasing the amount of leadership with each asset at any given time. This would allow for far quicker and more efficient jumps and an increase in leadership on the ground to make adept decisions regarding the network.

- **Training: Air Defense Soldiers and leaders' training needs to encompass the IFCN Relay.** If IBCS is to expand and replace legacy Patriot, training at the Air Defense and the Signal Schools needs to evolve. Soldiers with the 25Q MOS must leave the schoolhouse well-versed in

SPC Isaiah Stinger (left) and PFC Anthony McGrath, both Patriot Launching Station Enhanced Operators/Maintainers with 3rd Battalion, 43rd Air Defense Artillery Regiment, perform power-up procedures on the Launcher Electronic Module connect with the IBCS. *(Photo by SSG Christopher Pabst, Air and Missile Defense Test Directorate)*

how the HRFU and BPU work together to transmit data and know-how to load and troubleshoot COMSEC. Further, these Soldiers must know how to emplace and troubleshoot the TRiLOS system. Air Defenders, specifically 14T, need to leave the Air Defense schoolhouse knowing how to emplace and tear down the relay and TRiLOS correctly. Air Defense battery and battalion commanders must know how to effectively create defense plans that most efficiently utilize the relay capabilities. Launcher and sensor farms with a relay attached are a new development in the Patriot System, and the battery alongside battalion leadership should know how to utilize these most optimally.

- **Material: Must furnish IFCN Equipment with onboard Joint Battle Command-Platform (JBC-P) and satellite communications (SATCOM).** The current IFCN Prime Mover does not have a JBC-P to send text communications to ensure personnel accountability, safety, and equipment status to the battalion tactical operations center (TOC). This addition is vital to the viability of remote sites. Additionally, because the remote locations are so far from any line battery, high frequency fails to achieve voice communications even with the addition of an OE-254 retransmission. The employment of a SATCOM Radio, specifically the PRC-162 Manpack Radio that utilizes the Mobile User Objective System waveform, provides voice communications for remote sites, and can easily integrate with the 117G radios installed in the battery S280s. By including these assets in IBCS, the Army alleviates potential communications problems between remote sites and neighboring batteries.

- **Leadership: Combining Air Defense and Signal assets on the level that IBCS does forces Signal and Air Defense leaders to learn from one another.** IFCN platoon leadership needs to know how IBCS works to create a site picture producing the greatest network possible and portraying a sense of purpose to the Soldiers. Air Defense leaders must understand the capabilities of IFCN to create an effective defense plan that most efficiently protects their high-value assets. Battery commanders must understand how to utilize all assets in their AO effectively. The IFCN Relay is not just a piece of communications equipment but can also be the heart of a launcher or sensor farm miles away from the battery TOC. IBCS forces leadership at all levels to think creatively to implement the different sensors, relays, and launchers in a way that legacy Patriot Systems did not possess.

- **Personnel: The number of people qualified to work on this system will grow in late 2022.** The convergence of the 25Q and 25N to 25H provides an abundance of Signal personnel that fit the Modification Table of Organization and Equipment slot. This MOS would truly cover all aspects of the relay - the HRFU transmission system and the server data. Unit leadership can also augment missing 25Q (25H) personnel with 14T; emplacing and monitoring the relay does not require any form of Signal knowledge. Leadership can augment a crew with one or potentially even two 14T operators if they still place a knowledgeable 25Q (25H) on the system to troubleshoot any problems that may occur.

- **Facilities: Training with IBCS requires units to secure significantly larger pieces of land.** The entire battlespace comprises a variety of tents and trailers, so it operates well in a degraded, denied environment. Because the footprint extends so large, units will need to secure more significant amounts of desolate land to conduct training to the fullest extent of IBCS capabilities.

- **Policy: Local frequency management policy must change to enable Air Defense units to train successfully.** Highband Networking Radio is a narrow window of frequencies that the IBCS system uses; however, other entities utilize those frequencies. The frequencies must be requested and approved before units can conduct any training or real-world missions. The unit must request different frequencies to avoid interference if it wants to conduct multiple training exercises simultaneously. This same problem applies to TRiLOS; units must request and acquire a different transmit and

receive frequency for every shot. To amplify the problem with the TRiLOS frequencies, they must be far enough apart that they do not cause interference. Finally, real-world missions take precedence regarding frequency and satellite access requests, which are necessary for SATCOM, meaning the resources needed to train may not always be readily available.

Conclusion

With the successful live-fire exercise as part of phase one of the initial operational test and evaluation conducted at White Sands Missile Range in early 2022, IBCS continues to change the future of Air Defense. The 3-43rd ADA created a 150 km footprint with an even greater site picture and took down five ballistic missile threats in multiple battery's AOs. The ability to provide early detection through the implementation of IFCN Relays, TRiLOS, and Sentinel Radars proves how vital Signal equipment and Signal Soldiers are to Air Defense Artillery. After all, as many Air Defenders like to say, "Air Defense is just Signal with Missiles." The evolution of technology has presented the United States Military with the ability to obtain and utilize a common net-centric and consolidated air picture to establish air dominance from any location, with the information presented from land, air, and sea. The IBCS demonstrates what Air Defense and Signal are truly capable of when the two branches join forces.

1LT Cerys Sullivan is a 25A and platoon leader of the Integrated Fire Control Network, 3rd Battalion, 43rd Air Defense Artillery Regiment. She graduated from the University of Nevada, Reno, with a Bachelor of Arts in Psychology and a Bachelor of Arts in Criminal Justice. Sullivan worked as the assistant battalion S6 before taking the IFCN Platoon. She hopes to continue her service in the military and serve as an S6 OIC and Signal company commander.

SPC Isaiah Stinger (left) and PFC Anthony McGrath, both Patriot Launching Station Enhanced Operators/Maintainers with 3rd Battalion, 43rd Air Defense Artillery Regiment, perform power-up procedures on the Launcher Electronic Module to connect with the IBCS. *(Photo by SSG Christopher Pabst, Air and Missile Defense Test Directorate)*

ADA NEWS

Women's equality resonates with ground-breaking officer

By SGT Raquel Birk

Second Lieutenant Anmol Narang, Roswell, Georgia native and Air Defense officer with 1st Battalion, 1st Air Defense Artillery Regiment, was awarded the Federally Employed Women's Meritorious Service Award during the annual FEW virtual leadership conference Aug. 10.

FEW's Military Meritorious Service Awards recognize outstanding military service members within the Armed Forces who have distinguished themselves with significant contributions to their service and the U.S.

"Second Lieutenant Narang constantly engaged with her subordinates and mentored female Soldiers in Delta Battery," said CPT Daniel Emig, Delta Battery, 1-1st ADA commander. "The future of the battery and the [1-1st ADA] battalion are bright with phenomenal young leaders like 2LT Narang. She was nominated for the FEW's Military Meritorious Service Award by one of her mentors, LTC Rosanna Clemente, former commander of 1-1st ADA, because of her outstanding leadership in Delta."

Narang made history in 2020 by becoming the first observant Sikh to graduate from United States Military Academy at West Point.

"I was hopeful that my efforts to represent my religion and community will encourage Americans to learn more about Sikhism," said Narang. "The hardest change for me, especially in regard to my religion, was being displaced from my family and anyone else who practiced Sikhism but the academy, and now my unit, are very good ambassadors of diversity."

Family and sacrifice were pivotal in Narang's decision to serve.

"My grandfather was in the Indian Army in the 1960s and 70s," said Narang. "He embedded a culture of service and giving back to your country."

A visit to Pearl Harbor National Memorial in Hawai'i during Narang's junior year of high school solidified the desire to follow her grandfather's example.

"Seeing the sacrifice those service members made and the results of that sacrifice was really impactful," Narang said.

Her decision to select the Air Defense Branch upon graduation from U.S. Military Academy West Point was based on the concept of deterrence.

"Air Defense units play a pivotal role in ensuring a free and open Indo-Pacific region and help ensure that events like the bombing of Pearl Harbor doesn't happen again," said Narang. "I'm honored to serve with my teammates and share such an important mission in the pacific."

Narang serves as the fire control platoon leader for Delta Battery, 1-1st ADA, consisting of a diverse group of Soldiers that operate U.S. Patriot Advanced Capability (PAC-3) systems.

"Diversity is important to our organization," said Emig. "The Army is making strides to ensure that we get the right mix of talent that will represent the nation we are sworn to defend."

Narang was honored to receive the FEW Meritorious Service Award and strives to inspire others.

"I want my Soldiers and future Soldiers to know that gender and religion do not hinder a person's ability to be successful," said Narang. "That's the great thing about the United States military: it brings together people from all corners of the world."

Left: 2LT Amnol Narang, Roswell, Georgia native and Air Defense officer with 1st Battalon, 1st Air Defense Artillery Regiment, shares why she joined the U.S Army in a Women's Equality Day video interview during a training event at Patriot Missile Range Facility Aug. 26. Narang made history on June 12, 2020 when she graduated the United States Military Academy West Point as the first observant Sikh. (U.S. Army photo by SGT Raquel Birk)

Right: BG JB Vowell, U.S. Army Japan, presents 2LT Anmol Narang, Air Defense officer with 1st Battalon, 1st Air Defense Artillery Regiment, with a USARJ coin of excellence, for her preparation of Air Defense crews for upcoming exercises during a visit to Kadena Air Base July 27. (U.S. Army photo by 2LT Jeronne Carter, 1-1st ADA)


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SGT Zane Pettibone and SPC Svenson Albert, a Stinger Man-Portable Air Defense System (MANPADS) team with 1st Battalion, 16th Infantry Regiment, 1st Armored Brigade Combat Team, 1st Infantry Division, conduct engagement sequences and the 13 critical checks of the Stinger MANPADS, as part of the multinational live-fire training exercise Shabla 19, June 11, 2019. Shabla 19 is designed to improve readiness and interoperability between the Bulgarian Air Force, Navy and Land Forces, and the 10th Army Air and Missile Defense Command, U.S. Army Europe. (*U.S. Army photo by SGT Thomas Mort)*

The final 2022 submission deadline for the

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