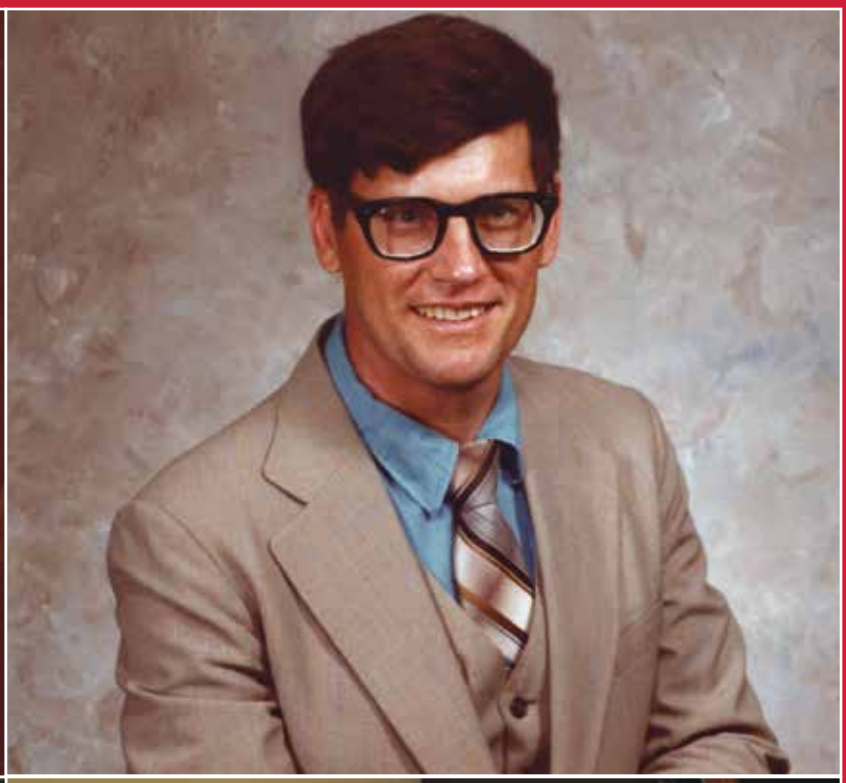
The official publication for U.S. Army Air Defense Professionals

AIR DEFENSE ARTILLERY

Journal



Dr. George A. Foust

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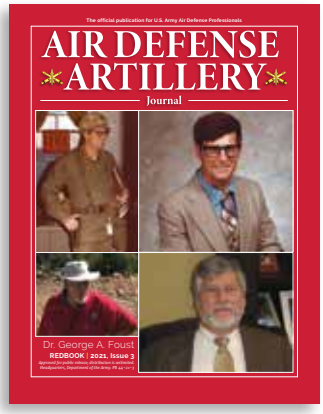
Purpose:

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.



ON THE COVER

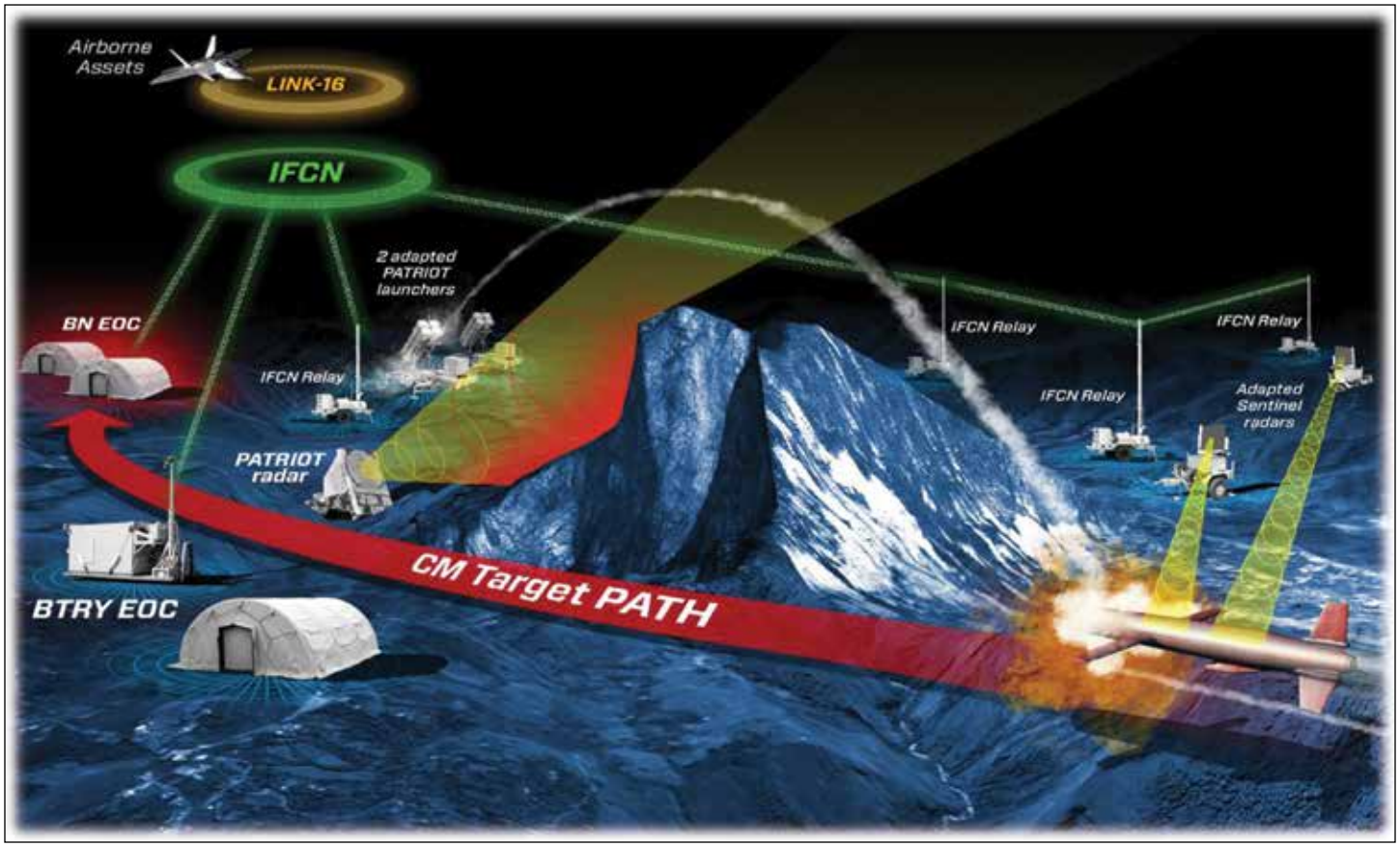
Dr. George A. Foust:

The Godfather *of the* Integrated Air *and* Missile Defense Battle Command Systems

Forward by MG Brian Gibson

In the years following Air Defense Artillery's performance during Operation Iraqi Freedom, we were tasked by the Commandant to develop a new way of operating, focused on breaking the constraints of our current weapon systems and better integrating with Joint Partners. I first met Dr. George Foust in 2003 while I was stationed as a Major at Fort Bliss, Texas, as the Chief of Concepts in the ADA Directorate of Combat Developments. I was directed to meet with Dr. Foust and retain him as an expert to develop the Commandant's intent. After a few discussions and a thorough read of his dissertation, I quickly learned he had been thinking about this very thing for decades and we had better listen to his ideas. Over the next few months, we jointly developed the first white paper that became the branch vision for Army Integrated Air and Missile Defense (AIAMD), of which the Integrated Battle Command System (IBCS) is today's materiel solution. Our branch is undergoing its greatest modernization since the Cold War, centered around connecting sensors, shooters, and a common Command and Control System (aka IBCS), to give warfighters tremendously better options in countering potential adversaries. I count it my great fortune to not only work with George during those early times, but to later serve with his son Dr. Mike Foust, to make the vision a reality. This would not have been possible without George's vision and a life-long commitment to Air Defense Artillery. First to fire!

Throughout the Air Defense community, there are but a few highly regarded individuals who not only served for several decades, but also carried the water of the most difficult tasks and programs… and yet left an impactful legacy that will endure the decades to come. One man that fits this pedigree is Dr. George Foust, commonly referred to as the 'Godfather of IBCS.'



For over forty years, Dr. George Foust has provided senior analytical support to numerous Army AMD programs.

A graduate of Middle Tennessee State University's ROTC program, Dr. Foust was commissioned as a 2nd Lieutenant of Air Defense in 1970. After attending the Officer Basic Course, Dr. Foust would attend the Hawk Missile system's follow on course and off to his first unit at Fort Bliss, Texas. It was at Fort Bliss where [then] Captain Foust would command the first of his two battery-level commands, C Battery, 2nd Battalion, 55th Air Defense Regiment. Later, he would be reassigned to Korea, where he commanded C Battery, 2nd Battalion, 71st Air Defense Regiment.

By 1980, Captain George Foust had other goals and career paths in mind and left the Army to pursue graduate school. His efforts paid off, and he earned his Doctorate in Engineering from Century University. It was during this time that he wrote his dissertation titled, "Communication Command and Control (C3) in Air Defense." An interesting perspective in introducing a more robust network-centric C3 integrated fire control system within the Air Defense. This would become the backbone of the AIAMD concept.

Dr. Foust led the engineering analyses of several AMD weapons. Working to incorporate his command and control, and communications systems theory on systems such as the Medium Extended Air Defense System (MEADS), Surface-Launched Advanced Medium Range Air-to-Air Missile and Terminal High Altitude Air Defense (THAAD); always at the tip of the spear in providing leadership for major Army test programs. Dr. Foust was the instrumental lead in development of AMD concept-based requirements and has synthesized systems requirements from these concepts. Dr. Foust has continued to serve as a chief operational research advisor on other major AMD studies.

Dr. Foust has developed and implemented analysis plans for conducting mission/performance analysis of various cruise and ballistic missile defense concepts. These have included assessments of architectures with currently planned AMD systems and architectures requiring technology insertion in the forms of advanced sensors, communications, data processing, and sensor netting.

Finally, in 2004 Dr. Foust got to implement his theory as a 'systems of systems' project, leading a multi-agency team in providing critical technical and operational mission, performance, and supportability analyses throughout the formulation and development of requirements for the currently planned AIAMD system upgrades and developments.

Army Integrated Air and Missile Defense:
Provides common mission command across all Army AMD echelons, improves combat identification, flexibility in task organization, and improves joint integration. AIAMD will replace multiple disparate Command and Control systems, enabling improved coordinated engagements, positive control of sensors and weapons, friendly protection, and shared situational understanding.

Dr. Foust has conducted extensive analyses of cruise missile defense concepts, to include the role of elevated acquisition and fire control sensors, and the ability of weapon systems to use data from such advanced sensors to extend their battlespace against low radar cross section, low altitude threats.

He painstakingly endured the laborious task to assess command and control issues, timelines and data latencies, data accuracy, and end game aspects for both "forward pass" (control of interceptor in flight is passed to a system other than the launching system) and "local control" (data from external sensor is passed to launching system which updates interceptor in flight using organic communications means) aspects of engage on remote. The products of the Special Working Group on which Dr. Foust provided key analytical leadership were the Operational Requirements Documents, supporting rationale, and operational concepts for THAAD, Patriot Advanced Capabilities-3, and MEADS.

In FY 22, we will honor this legendary figure of Air Defense through a formal ceremony and presentations at White Sands Missile Range, New Mexico.

2021
Air Defense Artillery
Year in Review

94th Army Air *and* Missile Defense Command

This year saw the *Sea Dragons* of the 94th Army Air and Missile Defense Command (AAMDC) conducting real-world operations and exercises at a relentless pace across the Indo-Pacific. With over half of the world's population, more than half of the earth's surface, and three strategic competitors, it is easy to see why the Indo-Pacific is the Department of Defense's priority theater. The 94th AAMDC serves under U.S. Army Pacific, directly supports Pacific Air Forces, commands 38th Air Defense Artillery Brigade (ADA BDE) in Japan and Guam, and serves as the Training and Readiness Authority for 35th ADA BDE in Korea.

Serving as the air and missile defense theater enabling command for the Indo-Pacific means the *Sea Dragons* conduct real-world operations and exercises across the globe. *Sea Dragon Soldiers* are on watch 24-7 in the 613th Air and Space Operations Center to ensure mission readiness. The command works with joint theater air and missile defense stakeholders from all services on a daily basis to manage the posture and readiness of a wide array of air and missile defense systems across the Pacific. We also coordinate with Air Defense Branch and Army Futures Command equities to bring the most advanced and capable air and missile defense systems to our theater to maximize our readiness.

Several challenging command post exercises allowed the command to exercise its wartime functions in a joint and multi-lateral environment. The 94th sent staff enablers to Korea for two Combined Command Post Training exercises and conducted an external evaluation of 38th ADA BDE in Japan, while the rest of the command supported those exercises from home station. Operation Pacific Fury in February saw the *Sea Dragons* involved in the first exercise in recent history that combined all Indo-Pacific service components and the Indo-Pacific Command (INDOPACOM) staff in a fully integrated exercise. In June, Operation Pacific Sentry included the INDOPACOM service components along with our Australian partners. Personnel from 263rd AAMDC also augmented the 94th staff to help the command perform its crucial role during this important bilateral exercise.

The *Sea Dragons* recognized the most important facet of the air and missile defense mission here – our people - by co-hosting the Hawai'i Missile Defender of the Year awards ceremony with the Missile Defense Advocacy Alliance. The ceremony recognized the critical contributions and outstanding performance of missile defenders from the Navy, Air Force, and Space Force, along with *Sea Dragons'* LTC William C. Hunter III and CW3 Robert Finley.

The 35th ADA BDE continued its tradition of excellence as the *Dragon Brigade* maintained the readiness and posture required on the Korean peninsula. The brigade conducted the first-ever deployment of a Patriot battery to

CW3 Robert Finley receives MDAA Missile Defender of the Year.

LTC William Hunter III receives MDAA Missile Defender of the Year.

Cheongju Air Base, strengthening the ability of U.S. and Republic of Korea (ROK) forces to operate together. Combined Task Force Defender maintained 24/7 operations at the Terminal High Altitude Air Defense system (THAAD) site, working hand-in-hand with our ROK partners to ensure the safety and stability of the peninsula.

This year 38th ADA BDE achieved multiple "firsts" as the *Pacific Guardians* deployed a Patriot battery to Amami Island (a small island in Japan's southwest island chain), conducted the first-ever Patriot live-fires in Australia and Hawaii, and supported the Army's first-ever deployment of the Iron Dome Defense System. They did this while also conducting their real-world missions at the THAAD site in Guam and Patriot sites throughout Japan, displaying an impressive ability to juggle multiple significant operations across the theater.

As planning continues for operations in 2022 and beyond, the *Sea Dragons* of 94th continue to focus on the command's priorities of readiness, calibrated posture, and allies and partners. The next year will see many more "first evers" with the professionals that make up the command continuing to build relationships with the allies and partners that will help us continue to ensure a free and open Indo-Pacific.

You can follow the Sea Dragons at www.facebook.com/94thArmyAMDC or on Twitter at @94thArmyAMDC

SSG Cody Hall graduates from Air Assault School.

6th Battalion, 52nd Air Defense Artillery Regiment, Air and Missile Defense Battalion

Team Iron Horse

The 6th Battalion, 52nd Air Defense Artillery Regiment, Air and Missile Defense Battalion is headquartered at Suwon Air Base (AB) in the Korean Theater of Operations. The *Iron Horse Battalion* consists of four Patriot firing batteries, one Avenger battery, one maintenance company, and one headquarters battery. Patriot batteries align to their defended assets at Suwon AB (B/6-52nd), Osan AB (D/6-52nd), and Camp Humphreys (A/6-52nd, C/6-52nd). The Avenger battery is at Camp Humphreys while the Battalion Headquarters and Maintenance Company are located at Suwon AB. The 6-52nd ADA's Mission is to "on order" neutralize North Korean air and missile threats against assigned defended assets in order to enable non-combatant evacuation (NEO), sortie generation, and force generation. The battalion also supports adjacent unit missions by providing counter-unmanned aircraft system (C-UAS) support to Combined Task Force Defender, and by providing Short-Range Air and Missile Defense (SHORAD) for 210th Field Artillery Brigade.

Patriot Air and Missile Defense

The *Iron Horse Battalion* defends some of the most critical infrastructures on the Korean peninsula against air and ballistic missile threats. In order to maintain readiness and uphold the ability to "Fight Tonight," 6-52nd ADA mandates that every Patriot crew certify Table VIII gunnery twice a year. The increased certification frequency, high operating tempo, and fast personnel turnover rate creates a unique challenge for Air Defenders in Korea.

"While most units conduct annual Table VIIIs, our units perform Table VIIIs twice a year," said CPT Anthony Clay, the battalion battle captain. "Essentially, that means that we are constantly training new personnel and building crews to ensure we are proficient."

The 6-52nd ADA continues to spearhead ADA Branch modernization. It was the first unit in the Army to field the Reconfigurable Tactical Control Station (R-TCS). This case-mounted TCS configuration, similar to the Dismounted Patriot Information Coordination Central, came with a new prime mover. Additionally, it can be set up to operate in a Deployable Rapid Assembly Shelter. As the first unit to receive this equipment, 6-52nd had the opportunity to influence doctrine by providing feedback and input into the preparation for movement & emplacement evaluation standards for a newly fielded piece of AMD equipment.

The *Iron Horse Battalion* took point in Operation Dragon Shield, a combined mission that deployed the first U.S. Patriot battery to Cheongju Air Base in the Republic of Korea. The 6-52nd ADA team developed the defense design and validated the battalion's ability to occupy a new defended asset. This effort took weeks of coordination between U.S. and Republic of Korea (ROK) leaders and further strengthened the alliance by demonstrating our readiness to defend Korean assets in theatre at a moment's notice.

One of the biggest muscle movements for the *Iron Horse Battalion* during FY21 was the permanent relocation of one of its Patriot fire units to Camp Humphreys. One of 6-52nd ADA's ongoing responsibilities is to maintain the ability to posture and reposition AMD forces in response to an ever-changing and evolving threat. The battalion exercised an extensive military decision-making process (MDMP) to execute the relocation of the unit's equipment and personnel while reshaping the defensive posture of the battalion.

SHORAD Air and Missile Defense

The *Iron Horse Battalion* executes a one-of-a-kind SHORAD mission in the Air Defense Branch by providing SHORAD and Counter UAS capabilities in Korea. Like the Patriot batteries, the SHORAD battery, E/6-52nd ADA, must Table VIII certify twice a year to maintain threshold readiness due to the high turnover rate of Soldiers in Korea. While Patriot batteries are largely dedicated to their defended assets for certifications due to mission constraints, E/6-52nd ADA is free to conduct its certifications at off-post training areas. In FY 21, E/6-52nd ADA hosted ROK ADA Soldiers during their Table VIII Gunnery at a Korean training area named "Nightmare Range." This exercise allowed the 6-52nd ADA to qualify its Avenger crews while also building relationships with our ROK ADA counterparts.

The 6-52nd ADA's SHORAD element is a high-

demand capability in the Indo-Pacific Theater. Second Infantry Division (ROK/US Combined Division) requests SHORAD support for rotational armored brigade combat team validation exercises every 10 months. The unit executed the first full iteration of these "Warrior Raider Strike" exercises in February of 2021 with E/6-52nd ADA integrated into the air assault and breach operations with 2nd Battalion, 7th Infantry Regiment, and the 3rd Battalion, 69th Armor Regiment respectively. E/6-52nd ADA recently completed its second iteration in support of the 2nd Infantry Division (2 ID) in September of 2021 and supporting breach, wet gap, and countering weapons of mass destruction operations. These operations directly improve the lethality of the 6-52nd ADA and support 2 ID's wartime mission and execution of mission command table training.

Staff training (Mission Command Tables)

A major training focus for the *Iron Horse Battalion* during FY21 was the execution of Mission Command Training Tables for the 6-52nd ADA staff. The battalion conducted this training through three major exercises. The first exercise, Objective Forge, trained basic Mission Command Training Tables and the MDMP. The second, Objective Iron, built upon the basic foundation of Mission Command in a simulated wartime environment. These exercises culminated in Objective Steel, a brigade external evaluation of the 6-52nd ADA battle staff where the battalion was certified at the Mission Command Training Table X level. These Mission Command training events help refine Mission Command standard operating procedures for the battalion and provided a smooth transition into Korea's bi-annual Combined Command Post Training exercise.

NEO training

Due to its physical proximity to the 35th ADA Brigade and 8th Army headquarters, 6-52nd ADA is the go-to battalion to support training and exercises at the brigade and theater level. The 6-52nd ADA participated in the Courageous Channel NEO event on Osan AB, where families and NEO wardens from the *Iron Horse Battalion* conducted training and updated binders and records for all Non-Combatant Evacuees (NCEs). The face-to-face meetings in the exercise helped establish rapport between wardens and NCEs and account for all *Iron Horse* families and ensure accurate record keeping. Later the battalion supported the theater-wide Freedom Passage exercise, where 6-5nd 2 ADA Soldiers role-played as NCEs going through the entire evacuation process from the host nation to numerous designated NEO nodes in Korea and the U.S. while exercising NEO tracking at the battalion level. These two exercises helped ensure *Iron Horse* families would be safe and accounted for in the event of a wartime scenario in the Korean theater.

ROK Alliance

The location of the *Iron Horse Battalion* headquarters on a Korean air base in Suwon offers an excellent opportunity to foster professional relationships between the U.S. and ROK military. The 6-52nd ADA S2 regularly meets with the ROK 10th Fighter Wing Protection Cell on Suwon AB to clarify perimeter defense during both contingency training and armistice operations. The product of these interactions was put to the test during the 10th Fighter Wing's Operational Readiness Exercise; the first combined training exercise on Suwon AB since the outbreak of the COVID-19 pandemic. This exercise included a joint table-top/base defense exercise with additional meetings discussing internal base security, concepts of operations plan, and alternate jump sites for the Patriot batteries.

The 6-52nd ADA also relied heavily on support from the Korean National Police (KNP) for all convoy operations outside of military installations. As an expression of gratitude, key members of the *Iron Horse Battalion* visited the Suwon Nambu Police Station and presented a certificate of appreciation to KNP members. The 6-52nd ADA was able to enhance solidarity between the unit and KNP in Suwon Nambu Police Station through this opportunity.

Conclusion

The 6-52nd ADA has an enduring and challenging mission to be ready to "Fight Tonight" in response to aggression at any time. No other unit embodies the 52nd Air Defense Artillery Regiment's motto, "Always Prepared," more than the 6th Battalion does. The battalion lives this motto every day and makes it the focal point of every bit of training, maintenance, and planning in the battalion. You can follow us at www.facebook.com/652ADABN.

Fight Tonight • Always Prepared

Combined Task Force Defender, 35th Air Defense Artillery Brigade

Defending the sky with a Lightning Shield

Combined Task Force Defender (CTF-Defender) and the Republic of Korea Army's (ROKA) 201st Airborne Brigade (BDE) man the forward operating site Carroll to provide upper-tier missile defense coverage of southern Korea. CTF-Defender's mission is two-fold; defend geopolitical assets within the ROK while also maintaining an integrated base defense. CTF-Defender executes both missions by operating the only upper-tier missile systems in the ROK while also working with the ROKA 201st Airborne to provide a layered defense against ground threats and small unmanned aircraft systems (sUAS). To conduct this second mission, CTF-Defender has tactical control (TACON) of a U.S. infantry security force (SECFOR) and a counter-sUAS team. The execution of this mission set requires rigorous air and missile defense, combined arms, and Soldier training that makes CTF-Defender the most ready unit in the Air Defense Artillery (ADA), as Korea's overall "fight tonight" mission of deterrence and rapid response.

Delta Battery, 2nd ADA Regiment, executes CTF-Defender's upper-tier air and missile defense mission. As the sole upper-tier Army system in Korea, they vigorously train their crews to and beyond a Table VIII gunnery standard. One of the most important on-site tasks is the operational readiness exercise, which evaluates alert and recall, up-order, alert state assumption, air battle management, reporting procedures, and maintenance. The battery conducts no-notice, battery-directed alert state assumptions to test the crew's ability to condition the system to a directed alert state. These tasks are a critical readiness component of CTF-Defender's combined arms training during Lightning Yeonhap and Dragon Stance.

Lightning Yeonhap ("yeonhap" means "united") is CTF-Defender's semi-quarterly combined arms exercise, which brings together all of Defender's units for integrated base defense training. Its specific purpose is to "train, refine, and validate the task force's ability to integrate mission enablers, build combined command post cohesiveness in preparation for the signature brigade training event, Dragon Stance." In simpler terms, the exercise ensures CTF-Defender is capable of responding to perimeter breaches, sUAS fly-overs, incoming missile threats, and other tactical-level actions prior to the brigade-wide Air Defense exercise. This exercise is unique among ADA units because of its integrated nature and the direct participation of ROKA paratroopers. The U.S. SECFOR platoon works in conjunction with our bilateral partners to protect the perimeter from outside breaches and conduct twenty-four-hour security of critical assets. The ROKA Soldiers are essential to this mission as they are the only site personnel who can legally detain Korean civilians attempting to intrude to conduct their own surveillance. Military working dog teams also participate in the exercise to track intruders who breach the perimeter. Breaches can also take the form of UAS activity, which can pose a greater threat than ground penetration, as sUAS can quickly gather reconnaissance over a wide area and may contain loitering-munitions, effectively functioning as flying improvised explosive devices. The capability to detect, track, jam, and recover intelligence from an unknown UAS thus becomes vital to base protection, especially for the launchers and radars. The command post node (CPN) takes a major role in the exercise as well by maintaining communication security throughout all drills and troubleshooting networking problems, including outages. Some simple but vital drills are responding to medical incidents, fire drills, missing Soldier reports, mass casualty procedures, and even moving the sections to the bunkers and sending up full accountability in response to theater ballistic missile (TBM) detection. The task force then applies the training lessons learned in this exercise to brigade training.

Lastly, Dragon Stance is a 35th ADA BDE internal exercise that encompasses all battalions within the brigade for peninsula-wide readiness training. For CTF-Defender this whole-of-force approach to readiness encompasses D-2nd ADA, all staff sections, and the TACON units. During this exercise, the task force evaluates D-2nd ADA's AMD operations by executing preparation for movement and emplacement drills and conducting air battles in accordance with Table VIII standards. All staff sections, the CPN, medics, and the TACON units simultaneously react to injects and cross-train in the execution of support operations. Cross-training injects include scenarios such as D-2nd ADA responding to TBMs while all other sections conduct the corresponding reaction drill. The TACON units in particular conduct the combined arms drills they refine during Lightning Yeonhap in order to defend D-2 ADA from any potential penetration threats as D-2 ADA defends strategic assets in the peninsula from missile threats.

CTF-Defender carries out a very different kind of mission among Air Defenders. Not only does the task force operate the only upper-tier missile defense battery in Korea, but it also sustains and protects it through combined arms. By partnering with U.S. units and the ROKA 201st Airborne Brigade, CTF-Defender executes a force protection capability and mission not found anywhere else in the ADA branch. By melding strategic, operational, and tactical training together, CTF-Defender sustains a readiness posture that allows it to act as deterrence against the North Korean Strategic Rocket Force while rapidly responding to any base defense threats. Appropriately, CTF-Defender's battalion motto is *Lightning Shield!*

CTF Defender personnel from the US Army and ROK Army following a combined training.

38th Air Defense Artillery Brigade

Running the gauntlet - A record year of firsts for the 38th Air Defense Artillery Brigade

October 16, 2021, marked the third anniversary of the reactivation of the 38th Air Defense Artillery (ADA) Brigade at Sagami Army Depot, Japan. The brigade, like other Air Defense units, draws its lineage from the coastal artillery. The 38th Artillery Brigade, Coastal Artillery Corps formed in August of 1918 at Camp Eustis, Virginia, and saw action in France during World War I. The brigade was inactivated after the war, but in 1933 it was reconstituted as the Headquarters & Headquarters Battery, 38th Coastal Artillery Brigade. Prior to World War II, the full brigade reactivated in 1941 at Camp Stewart, Georgia, and, with America's entry into the war, deployed to the European Theater. In 1943, during the height of World War II, the brigade reorganized as the 38th Anti-Aircraft Artillery Brigade and received a campaign streamer for participation in the Ardennes-Alsace campaign. Following the war, the brigade went through a series of activations and deactivations until 1961 when the brigade reactivated in the Republic of Korea. In 1972 the brigade reorganized as the 38th Air Defense Artillery Brigade before its deactivation at Osan Air Base, South Korea in 1981.

Forty years since its inactivation and three years since its reactivation, the brigade has reconstituted its personnel and capabilities to enable command and control of all Air Defense units across the Pacific region; this ability gives the unit its moniker as the *Pacific Guardians*. The brigade is composed of Headquarters Battery, 38th ADA Brigade at Sagami Depot, Japan; the 1st Battalion, 1st Air Defense Artillery (1-1st ADA) Regiment on Kadena Air Base on the island of Okinawa; the 10th Missile Defense Battery (MDB) at Shariki, Japan; the 14th MDB at Kyogamisaki, Japan; and Echo Battery, 3rd Air Defense Artillery Regiment Terminal High Altitude Area Defense (THAAD) at Andersen Air Force Base, Guam. All personnel in the 38th ADA Brigade wear a shoulder sleeve insignia that features a gauntlet representing the defense the brigade provides to the region. This insignia was an apt representation for the gauntlet of exercises and live-fires that laid ahead for the

The 38th ADA Brigade and Australian partners during Talisman Sabre 21.

brigade. With all personnel and capabilities now in place, 2021 showcased a fully mission-capable 38th ADA Brigade which accomplished a number of "firsts" throughout the year.

First CCPT exercise

In March 2021, the brigade participated in its first-ever Combined Command Post Training (CCPT) exercise that trains units on the defense of the Indo-Pacific region. The brigade participated in the exercise by integrating for the first time with the 5th Air Force at its headquarters at Yokota Air Base, Japan. From Yokota, the brigade also successfully established network connectivity with its higher headquarters at the 94th Army Air and Missile Defense Command (94th AAMDC) located at Hickam Field, Hawaii; the 35th ADA Brigade in the Republic of Korea; and E-3rd THAAD unit in Guam. In the August 2021 CCPT iteration, the brigade not only sent a forward element once again to Yokota Airbase but also operated from its newly constructed Brigade Operations Center at Sagami Army Depot. Both CCPT exercises validated the brigade's ability to support regional operational plans and demonstrated unit readiness amidst the COVID-19 pandemic.

First AAME recognition

The next first for the brigade was recognition from the Chief of Staff of the Army for the Army Award for Maintenance Excellence (AAME) in the field-level large category. The annual AAME program recognizes Army units that have demonstrated excellence in their maintenance programs. The award evaluates Soldier maintenance competence, the strength of a unit's maintenance program, and leadership effectiveness. Despite being such a young unit, the brigade has quickly established maintenance processes across the brigade that were recognized as being among the best in the Army. The 38th ADA Brigade went on to represent the U.S. Army during the Secretary of Defense's field-level maintenance competition.

First Patriot Master Gunner Course

From April 19 to June 28, 2021, the brigade hosted the first-ever Patriot Master Gunner (PMG) course in Japan. The 1-1st ADA Regiment hosted this elite Air Defense course at Kadena Air Base on the island of Okinawa. Personnel in the course received an advanced understanding of Air Defense operations, standards, and doctrine. Students in PMG 701-21 included not only Soldiers from across the 38th ADA Brigade, but also Soldiers from the 35th ADA Brigade in the Republic of Korea, and the 94th AAMDC in Hawaii. All the Soldiers graduated from the course with enhanced knowledge, training, and expertise in Air Defense operations in the Indo-Pacific region.

"To be a Master Gunner means you are a technical and tactical expert," said CSM Kellen Rowley of the 38th ADA Brigade. "You are expected to know the standard and be the person in your unit to enforce it and make sure that teams are qualifying correctly. The badge you earn after completing this course is an indicator to commanders and Soldiers to heed your advice regarding training and employment of Air Defense systems."

First Patriot deployment to Amami Island

Orient Shield is the largest U.S. Army and Japan Ground Self-Defense Force (JGSDF) bilateral field training exercise executed across Japan annually. The exercise enhances interoperability and test to refine multi-domain operations between the allies. Orient Shield 21, executed between June 24 and July 9, 2021, included the *Pacific Guardians'* 14th MDB and 1-1st ADA Battalion.

The 14th MDB conducted the Guard and Protect Exercise at its radar site at Kyogamisaki, Japan. Personnel from the 8th Military Police Brigade from Schofield Barracks, Hawaii, deployed to Japan to train with Soldiers from the JGSDF's 7th Infantry Regiment to exercise the defense of the radar site during a contingency. Both units partnered with the 14th MDB's own internal security force to further develop and refine the best practices and procedures to secure the radar site.

Orient Shield 21 also featured Bravo Battery, 1-1st ADA, which deployed the first-ever Patriot battery to Amami Island. Amami is a remote island in Japan's Southwest Island Chain. Getting

to Amami was a Joint operation with the U.S. Marine Corps, which used a high-speed vessel to move the Patriot equipment from Okinawa. Once on Amami Island, the Bravo Battery Soldiers conducted bilateral training with JGSDF personnel from the 8th Anti-Aircraft Artillery Group. The JGSDF Soldiers deployed the Type 03 Chu-SAM system from Camp Aonohara near Kobe in the Hyogo Prefecture of Central Japan. The CHU-SAM provides Air Defense against both aircraft and cruise missile threats. The troops from both units trained for the first time together on an Integrated Air & Missile Defense (IAMD) scenario centered on the defense of the Southwest Island Chain.

The drill clearly demonstrated the brigade's ability to deploy a missile defense asset to defend a remote island at a time when tensions continue to grow in the region due to the People's Republic of China (PRC) provocations towards Taiwan and territorial disputes in the South China Sea.

"We are trying to demonstrate our ability to quickly move our units around the Indo-Pacific to be able to counter any threat that is out there," said COL Matthew Dalton, the 38th ADA brigade commander. "… Our ability to move to different locations quickly, set up and establish defense of a particular asset."

During Orient Shield 21, the brigade proved it can rapidly move a Patriot unit to an austere location—an activity the *Pacific Guardians* would replicate throughout the summer.

First Patriot live-fire in Australia

Talisman Sabre (TS) is a large-scale, biannual military exercise involving the U.S., Australia, and nine other countries. Troops from Canada, Japan, New Zealand, the Republic of Korea, and the United Kingdom and delegations from India, Indonesia, France, and Germany participated in this year's TS-21 exercise. In total, 17,000 Soldiers trained across Australia during TS from July to August 2021. During the exercise, Soldiers from Alpha Battery, 1-1st ADA made history by deploying a Patriot battery to Australia for the first time. Additionally, Soldiers from the brigade headquarters deployed the Air and Missile Defense Planning and Control System (AMDPCS) to serve as the command and control element during the exercise. The Patriot and AMDPCS deployment supported the U.S. Army Indo-Pacific Pathways strategy to advance a free and open Indo-Pacific by strengthening relationships, building trust, and interoperability among allies and partners in the region.

During TS-21 Alpha Battery Soldiers conducted bilateral IAMD training with the 16th Air Land Regiment (ALR) of the Royal Australian Army at the Shoalwater Bay Training Area in the Queensland region of Northeast Australia. The 16th ALR is equipped with the Swedish-made Bofors RBS-70, which is a man-portable anti-aircraft system. The IAMD portion of the exercise included a bilateral live-fire of both the Patriot and RBS-70 systems. Alpha Battery's successful engagement of two drone targets represented not only the first Patriot live-fire in Australia but also the first live-fire in the Southern Hemisphere.

Another notable first from the event was that an Air Defense Artillery Fire Coordination Officer (ADAFCO) embarked on one of the Royal Australian Navy's Hobart-class destroyers, the *HMAS Brisbane*. During TS-21, the ADAFCO was responsible for coordinating engagements between land-based U.S. Patriot assets and the section Air Defense commanders for the Australian military.

"We're going to have to move forward with integrated air and missile defense that comes from the ground, the sea, and air so we have to make sure all the services are fully nested and capable to counter emerging threats," said Maj. Gen. Jake Ellwood, commander of the Australian Army's 1st Division, emphasizing the importance of the IAMD command and control during an interview.

The significance of the TS-21 Patriot live-fire was also not lost on the PRC, which sent two sophisticated surveillance vessels to gather intelligence on the exercise from off the coast of Australia. What they learned was that the *Pacific Guardian Brigade* once again successfully demonstrated its ability to project combat power across the vast distances of the Indo-Pacific in partnership with a key U.S. ally in the region.

First Patriot live-fire in Hawaii

Following the successful live-fire in Australia, Soldiers from Delta Battery, 1-1st ADA deployed to the Pacific Missile Range Facility on the Hawaiian island of Kauai to participate in the Tenacious Archer exercise on September 1, 2021. During this exercise, the Delta Battery Soldiers conducted training with Soldiers from the 35th ADA Brigade in South Korea equipped with the Avenger Air Defense system. The Joint exercise also involved the U.S. Navy destroyer, the *USS Curtis Wilbur*, which linked its Aegis radar targeting system with the U.S. Army Air Defense assets.

The exercise concluded with a Patriot and Stinger live-fire. The successful intercept of two drone targets was the first Patriot live-fire ever conducted in Hawaii.

"Deploying our forces across the Indo-Pacific Theater and then integrating them into a joint fires architecture with the Navy is vital to our mission of ensuring peace and prosperity in the Indo-Pacific," said BG Mark Holler, the 94th AAMDC commander, following the exercise.

First U.S. deployment of Iron Dome

Iron Dome is a counter rocket, artillery, and mortar system that is also capable of engaging cruise missiles and unmanned aircraft systems. Iron Dome is manufactured by the Israeli defense company Rafael in partnership with the American company Raytheon. The U.S. Army purchased two Iron Dome batteries as an interim solution to fill the current cruise missile gap as the U.S. develops a more enduring capability to counter various air and missile defense threats. As part of the Iron Dome purchase, the 2019 National Defense Authorization Act required the Army to deploy an Iron Dome battery with equipment and Soldiers to Guam to test its deployment and sustainment requirements by the end of 2021.

Soldiers from the 2-43rd ADA battalion at Fort Bliss, Texas, deployed to Guam from October to November 2021 as part of Operation Iron Island. The deployment gathered data on sustainment operations, deployment considerations, and how to integrate Iron Dome with existing Air Defense systems, including the E-3 THAAD

The 38th ADA Brigade and Japanese Ground Self-Defense Force's Patriot Systems on Amami Island during Orient Shield 21.

battery already on Guam. Soldiers from the brigade headquarters deployed the AMDPCS to command and control and integrate with the Iron Dome and THAAD battery. Operation Iron Island tested not only the Army's newest Air Defense capability but showcased the U.S. Army's commitment to the defense of the Guam mission.

First Shining Star live-fire

Shining Star is a Patriot live-fire hosted by the 11th ADA Brigade in conjunction with the Japanese Air Self-Defense Force (JASDF) and the Dutch Air Defense Forces at the McGregor Range Training Complex on Fort Bliss, Texas. The goal of the live-fire is to improve interoperability between the allies and validate the training Soldiers receive on the Patriot missile system. This year's Shining Star occurred in November 2021 and included Soldiers from Charlie Battery, 1-1st ADA. Prior to deploying to Fort Bliss, personnel from 1-1st ADA coordinated and trained with their JASDF counterparts from the 5th Air and Missile Defense Group at Naha Airbase. Shining Star was not just another great bilateral training event with our Japanese allies, but also the *Pacific Guardians*' third successful live-fire, on a third continent, within five months.

The year ahead

Clearly, 2021 was a year of firsts for the 38th Air Defense Artillery Brigade, but 2022 is set to bring even more challenging exercises and operations. The brigade will begin the year with its largest ever participation in Yama Sakura 22, a major annual exercise between U.S. Army, Japan, and the JGSDF. Following Yama Sakura, the brigade will then participate in Keen Edge 22, the brigade's most important bilateral exercise with the JASDF, and continue its participation in the CCPT series of exercises. The *Pacific Guardian Brigade* will also return to Australia and a host of other Pacific-focused exercises and live-fires next year. The 38th ADA Brigade may be only three years old, but in this short time, it has clearly demonstrated that its Soldiers are the *Guardians* of the Pacific.

You can follow us at www.facebook.com/38thADABrigade.

The 38th ADA Brigade conducts a Patriot live-fire during Talisman Sabre 21.

11th Air Defense Artillery
Imperial Brigade

The year 2021 was full of unprecedented achievements and dynamic changes for the 11th Air Defense Artillery *Imperial Brigade*, the Army's largest and most complex Air Defense Artillery (ADA) brigade. The brigade successfully completed a nine-month deployment to the U.S. Central Command (USCENTCOM) area of responsibility (AOR) as "Top Notch," the senior Army ADA Brigade Headquarters in support of Operation Inherent Resolve and Operation Spartan Shield. The brigade's deployment saw a dynamic and fluid operating environment, oftentimes under heightened periods of interest, with multiple air and missile defense (AMD) assets changing locations simultaneously and a transition to the first Patriot Post Deployment Build 8 (PDB-8) pure theater. The brigade remained adaptive and agile, adjusting to theater variables by executing defense design analyses, incorporating sense-in-depth and defense-in-depth concepts tailoring the theater for the most effective and efficient use of the PDB-8 capability. Furthermore, sensor-shooter boards were fed through ground-up assessments and vetted through multiple boards consisting of Patriot Top Gun graduates. With recommendations from the boots-on-ground warfighters, the 11th ADA Brigade staff presented phased sensor-shooter decisions to the 11th ADA Brigade Commander and the Deputy Area Air Defense Commander to improve the air and missile defense posture of units across the USCENTCOM AOR.

Building upon this momentum, the 11th Brigade focused heavily on the integration of

Pictured are SGM Franciso Lloret, the 11th Brigade operations sergeant major, MAJ Steve Zhang, 11th Brigade operations officer, and 11th Brigade CSM Robert Walker, discussing areas to sustain and improve after completing a staff exercise. Picture credit 1LT Mariah Love, HHB.

all available weapon systems, including the Terminal High Altitude Area Defense, Patriot, Avenger, and Counter-Rocket Artillery and Mortar, under the purview of the appropriate centralized authority. The brigade enacted a "Max Protect" concept to bring all available combat power to the target engagement, or "kill-chain," authority based on the nature of the threat. In a complex, tactical operating environment facing adversarial threats that spanned multiple engagement zones, Max Protect enabled commanders to associate the most lethal, economic, and effective weapon system to any given threat. Furthermore, the concept allowed for proportionality on the battlefield and prevented a "Patriot only" mindset. Max Protect allowed the 11th ADA Brigade to flex operations as required in support of theater-planned transitions occurring throughout the deployment.

Missile Range for field testing and data collection. The 2-43rd ADA has also been at the forefront of a critical modernization mission effort by not only standing up the first-ever Iron Dome Defense System batteries but by also deploying this critical capability to the USINDOPACOM AOR for exercise support and further operational assessment. The brigade headquarters and headquarters battery itself underwent modernization strides, refitting and implementing its Air and Missile Defense Planning and Control System (AMDPCS). The brigade's tactically refreshed AMDPCS will provide a correlated, real-time joint and coalition air picture in order to track aircraft outside of an organization's operational area. Furthermore, the 11th Brigade having both the AMDPCS-A and AMDPCS-B shelters means that the commander can control the scale and configuration of the tactical operations center

Train to Fight, Battle Ready!

Upon the successful and safe return from its USCENTCOM mission in February 2021, the 11th ADA Brigade began setting conditions to receive, reintegrate, refit, and refocus all of its subordinate echelons at home station for the first time in over two years. With the arrival of a new 11th ADA Brigade Commander, COL Tim Woodruff, in July 2021, an imminent modernization mission on the near horizon, direct support to a division warfighter, and a capstone Air and Missile Defense exercise, Roving Sands 2022, in the not too distant future. The brigade once again would have to capitalize on its gains and continue to seize the initiative, all the while undergoing a period of substantial staff turnover in the summer of 2021.

Up first on the brigade's list of priorities post-deployment was direct support to one of the Army Chief of Staff's priority missions, the Army Integrated Air and Missile Defense Battle Command System. With 3-43th ADA *Legion Battalion* leading this modernization effort, Soldiers completed multiple operations to test the capabilities of this comprehensive system and continue to deploy their firing units on weekly rotations to White Sands

depending on the mission requirements. This system will revolutionize the capabilities of the commander and arm the staff with a multi-domain battlespace that can quickly adapt to the demands of the operating environment.

While modernization remains a critical command priority for the remainder of CY 2021 and heading into CY 2022, it is by no means the only priority. The brigade headquarters is set to implement several programs aligning with Operation People First and Foundational Readiness Day initiatives that will ensure its force is in peak mental and physical shape down to the lowest level. In conjunction with its assigned Holistic Health and Fitness team trainers, the brigade headquarters stood up its first of a series of Fit-to-Fight academies. The goal of these academies is to arm platoon-level leadership with applicable knowledge of FM 7-22 while also teaching leaders the basics of nutrition, mental resiliency, rehabilitation, strength and conditioning, and injury prevention. Graduates of the academy are ready to confidently create and lead effective physical training that is grounded in both science and doctrine.

The brigade headquarters also focuses its efforts on combating harmful behaviors and rooting out toxic micro-cultures that deteriorate readiness from within the formation. With this goal in mind, the headquarters stood up its unique version of a junior Soldier SHARP Ambassador Program. As an innovative alternative to in-class, leader-led instruction primarily through slide presentations, this week-long course greater illustrates to junior Soldiers how detrimental sexual assault and sexual harassment are to their unit and how they can help create a safe culture through a bottom-up approach. The future ambassadors hear directly from the brigade command team, a registered trauma nurse, Criminal Investigation Division agents, the brigade chaplain, the brigade legal team, and survivors of sexual assault willing to share their stories in order to gain a clearer picture of sexual assault and sexual harassment's damaging effects. Lastly, the brigade headquarters, in the absence of embedded behavioral health specialists, stand up a network of trained brigade and battalion suicide prevention representatives so that Soldiers have immediate resources at their disposal that are more personal, in addition to Department of Defense-wide and installation-wide suicide prevention resources. The *Imperial Brigade* believes that caring for the overall health of the force is just as critical in maintaining mission readiness as gunnery and modernization operations. By molding the desired culture from the inside out, the 11th ADA Brigade is working toward a more resilient and healthy formation of warfighters that builds confidence from within and trust of leadership.

https://www.facebook.com/11thADAImperial

https://www.instagram.com/11adabde/

COL Timothy Woodruff, 11th ADA Brigade Commander, is seen addressing his formation after completing the first brigade run in over two years due to demanding deployment schedules. Picture credit 1LT Mariah Love, HHB.

1st Battalion, 43rd Air Defense Artillery Regiment
Cobra Strike Battalion

Soldiers from 1st Battalion, 43rd Air Defense Artillery Regiment reunited at Fort Bliss in the summer of 2021 following a seven-month deployment throughout the United States Central Command's area of responsibility in support of Operation Inherent Resolve and Operation Spartan Shield. The *Cobra Strike Battalion* displayed incredible adaptability and determination this year as they manned three Command and Control (C2) nodes and four Patriot sites across Erbil Air Base and Al Asad Air Base in Iraq, Muwaffaq Salti Air Base (MSAB) in Jordan and Ali Al Salem Air Base (AASAB) in Kuwait. They were also reunited with A-2 Terminal High Altitude Area Defense (THAAD), who redeployed from Prince Sultan Air Base (PSAB) in the Kingdom of Saudi Arabia after initially deploying in September 2020.

Cobra Strike Soldiers rang in the New Year in theater and immediately got to work. The first hurdle to clear was theater-specific crew certifications. In a contested environment complicated by both COVID-19 and a dynamic enemy threat, *Cobra Strike* took advantage of every spare minute to refine and master their tactics, techniques, and procedures (TTPs). Thanks to the hard work of both units, the 2-43rd ADA team was able to head home on time with confidence that the defended assets were in the capable hands of the 1-43rd ADA.

Bravo Battery commander, CPT Jackson Guttenberger, is pictured providing a site brief to the commander of Operation Inherent Resolve.

As the year rolled on, *Cobra Strike* remained vigilant. Each C2 element integrated with their respective base defense operations centers to provide visibility to the commanders and establish a robust layered defense against enemy unmanned aircraft systems and other aerial threats. At MSAB, the Dismounted Patriot Information and Coordination Central relocated to the U.S. Air Force's Wing Operation Center, allowing greater situational awareness for the 332d Air Expeditionary Wing (AEW) commander and more efficient sharing of information. While at PSAB, A-2 THAAD served as the Network Time Reference for all U.S. pilots in the region and coordinated joint training exercises with the Special Purpose Marine Air-Ground Task Force, U.S. Air Force Explosive Ordnance Disposal, 1-62nd ADA, 3-265th ADA, and 378th AEW.

Maintenance was a top priority while operating in an austere, high- tempo environment with a mission that pushed equipment to the limits. Echo Company maintainers were relentless in their pursuit of equipment readiness, supporting the operations of the entire battalion from a displaced supply support activity. In between radiate blocks, fire units, and C2 elements exercised the Patriot maintenance sustainment program, ensuring mission success by keeping equipment at the highest levels of readiness.

Despite spending months at a heightened alert state that was punctuated by several attacks, *Cobra Strike Battalion* executed multiple Operational Readiness exercises to maintain constant preparedness and tactical flexibility. Coordinating with joint partners throughout theater, the unit executed routine Transition to War exercises and provided crucial situational awareness and track amplification during real-world periods of interest. Combining lessons learned with the expertise of the unit's experienced tacticians, *Cobra Strike* conducted thorough military decision-making processes

to improve Patriot tactical positions and provide recommendations to higher echelons, enhancing defense designs, refining base defense TTPs, and maximizing Joint Kill-Chain efficiency.

Mobility was a constant theme for 1-43rd ADA throughout the deployment. When the order came to relocate their unit from MSAB to AASAB, the Soldiers of Alpha Battery moved quickly and deliberately to enable a theater-wide Air Defense realignment that was completed on time and according to plan. After the battalion received the mission release order in June, operational focus shifted from active defense to equipment retrograde and interceptor redistribution. Despite minimal airlift support due to competing requirements in theater, 1-43rd ADA redistributed hundreds of interceptors throughout the theater. Thanks to the tireless efforts of the *Cobra Strike Soldiers*, all personnel and equipment were safely prepared for transport and shipped back to Fort Bliss by late August.

When they stepped off the airplane at Biggs Army Airfield, the Soldiers of *Cobra Strike* were greeted by friends and loved ones, with shoulder sleeve insignias for military operations in hostile conditions proudly affixed underneath the flags on every right arm. From there, the focus shifted from a dangerous, kinetic, combat environment to reintegration, block leave, and adaptation back to garrison operations. Throughout September and the first quarter of the new fiscal year, the unit focused on its Command Supply Discipline Program and Command Maintenance Discipline Program to reset and refit equipment.

The deployment was challenging, but the resilient Soldiers, Officers, and NCOs of *Cobra Strike* rose to the challenge and exceeded all expectations. Looking forward, *Cobra Strike* is poised for a productive year of training in 2022.

Train to Fight, Battle Ready!
Cobra Strike, For Life!

LTC Erica Jackson is seen here presenting the shoulder sleeve insignia for military operations in a hostile conditions to CSM Albert Fletcher III.

2nd Battalion, 43rd Air Defense Artillery Regiment
Warrior Battalion

The fiscal year 2021 was a standout year for 2nd Battalion, 43rd Air Defense Artillery Regiment (ADAR), which started with a rapid deployment to Central Command during the COVID-19 pandemic. From November 2020 to January 2021, the *Warrior Battalion* conducted split operations in Al Asad Air Base and Erbil in Iraq while simultaneously assuming the Air Defense mission at Muwaffaq Salti Air Base in Jordan.

Upon redeployment in January, the 2-43rd ADA immediately sent its Patriot equipment to Letterkenny Army Depot to undergo reset and assumed responsibility of A-2 Terminal High Altitude Air Defense, 1-43rd ADA Rear Detachment, and 5-52nd ADA Rear Detachment. In July, 2-43rd ADA also assumed command of the two Iron Dome Defense System-Army (IDDS-A) batteries and their associated test missions. The re-alignment of F/55th ADA and G/1st ADA under 2-43rd ADA marked the battalion's transition from a pure Patriot battalion into a composite air and missile defense battalion. Also during this time, the 2-43rd ADA conducted a change of command and responsibility, giving LTC Kurt Pryor and CSM Jessica Wells the reigns of the *Warrior Battalion*.

On top of focusing on individual skills training in preparation for Roving Sands 2022, the battalion continues to lead the Army's air and missile defense modernization efforts through its two IDDS-A batteries. The IDDS-A units achieved multiple operational milestones this year and set the foundation for integrating the IDDS-A weapon system into multi-domain operations. As the first IDDS-A Battery, F/55th ADA has activated, underwent new equipment training, completed collective training, conducted two live-fires, and is currently executing a dynamic employment to the U.S. Indo-Pacific Command Theater of operations all in the past year. The battery's participation in Operation Iron Island served as a proof of concept for strategic-level commands on how the U.S. Army should man, equip, deploy, and operate an IDDS-A battery. Additionally, F/55th ADA and G/1st ADA developed tactics, techniques, procedures, and a gunnery certification program for the new IDDS-A weapon system. The F/55th ADA and G/1st ADA continue to provide vital information on IDDS-A capabilities and how to best incorporate this asset into a holistic, integrated air and missile defense architecture.

The fiscal year 2021 saw the *Warrior Battalion* achieve incredible feats and continuously exceed the demands of their higher headquarters. The 2-43rd ADA conducted split operations in a combat environment while also working closely with Army Training Doctrine Command, Army Futures Command, and various civilian and foreign partners to overcome significant challenges associated with fielding and implementing a new weapon system. *Warrior Battalion* leads the way in their Patriot and modernization missions!

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3rd Battalion, 43rd Air Defense Artillery Regiment
Legion Battalion

This past year, Soldiers from 3rd Battalion, 43rd Air Defense Artillery Regiment, the *Legion Battalion*, focused their efforts on evaluating the Air Defense capabilities of the Integrated Air and Missile Defense Battle Command System (IBCS) in preparation for the Initial Operational Test and Evaluation (IOT&E) in FY22. To prepare for the largest IOT&E in Air Defense history, the 3-43rd Battalion completed several field operations designed to test the capabilities and limitations of IBCS. In conjunction with the expertise of the Soldiers of 3-43rd Battalion, the IBCS software representatives captured data points within the system to improve both the system capability and user interface. This process resulted in equipment software upgrades every three to four months, often for weeks at a time, which impacts the agile software process.

The battalion executed Delta Training following each software upgrade. Delta Training took place in each battery's IBCS Collaborative Environment with a focus on changing the interface and operations from the last Program Increment to remedy issues observed during both test events and regular field operations.

Operation Raising Romulus, executed from October to December 2020, was the first operational approach to IOT&E. The battalion conducted individual gunnery training to prepare IBCS crew members to operate together while also accomplishing individual tasks. This operation was also used as an opportunity to establish the battalion's gunnery program, a foundation built and validated with the Directorate of Training and Doctrine.

From January 2021 to February 2021, the 3-43rd Battalion conducted Operation Legion Marius which focused on intermediate gunnery training to prepare for IOT&E. The battalion then conducted Operation Aquila from April to May 2021 with the intent of all crews certifying on the revised Intermediate Gunnery Tables that were drafted based off of the feedback from Operation Legion Marius. Crew certifications demonstrated that crew members had all of the necessary training and knowledge base to execute the expeditionary mission. Any failure in IOT&E will not be due to lack of training or preparation by the *Legion*.

Following Operation Aquila, 3-43rd Battalion completed Operation Hastati from June to July 2021. The mission was to conduct a Mission Readiness Exercise in order to operate as a full task force. The battalion flexed the capabilities and limitations of IBCS spanning a 150 kilometer footprint with relays strategically emplaced at various locations to ensure a thorough network. Operation Hastati allowed the battalion to get as close to a real life pre-deployment scenario as possible by allowing the batteries to execute a level two deployment readiness exercise. The battalion executed 24-hour operations consisting of force operations and air battles at the highest level of intensity. Injects pushed from an integrated higher echelon drove battle drills and staff functions throughout operations.

In August 2021, the battalion began staging for IOT&E. This mission, codenamed Operation Châlons, is scheduled from September 2021 to March 2022. The intent of this operation is to evaluate IBCS by conducting air and missile defense operations and expeditionary operations with current IBCS equipment and software. The battalion is already staged across White Sands Missile Range with each battery deployed TDY to their respective sites on a weekly rotation to push IOT&E operations forward.

The success, or failure, of IBCS during this mission will be relayed to the commander of 3-43rd ADAR, who will issue a recommendation to the commander of 32nd Army Air and Missile Defense Command on whether the system is ready for initial operational capability. At the time of this writing, Operation Châlons is ongoing with the end result yet to be determined.

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CSM John Adams is pictured addressing his formation.

5th Battalion, 52nd Air Defense Artillery Regiment

Team Deuce

The 5th Battalion, 52nd Air Defense Artillery Regiment began 2021 by deploying to the Middle East to defend U.S. Central Command's (USCENTCOM) most critical assets for air and missile threats in Qatar and United Arab Emirates (UAE). Additionally, the 5-52nd ADA was assigned tactical control (TACON) over the two Patriot batteries defending assets in Bahrain and TACON for the integrated Avenger Platoon, 1st Platoon, B Battery, 3rd Battalion, 265th Air Defense Artillery (Florida National Guard). With an expanded mission and span of influence, the Air Defenders of *Team Deuce* diligently worked with joint and coalition partners to refine the integration of Air Defense capabilities into local base defense operations centers (BDOCs). The 5-52nd ADA helped improve situational awareness of the theater-wide threat and bridge the gap in addressing counter-unmanned aircraft systems (CUAS) capabilities. The Soldiers of 5-52nd ADA greatly advanced the technical integration within 380th Air Expeditionary Wing (AEW) at Al Dhafra Air Base, and 379th AEW at Al Udeid Air Base by establishing the combined operational air picture (COP) feed directly to the wing operations center (WOC). By providing the COP directly to the WOC and BDOCs, *Team Deuce* was able to facilitate the Wing Commander's establishment of the localized base defense zone and coordinate the internal response efforts, whether it be emergency services, UAS recovery and exploitation, or runway repair operations. This integration was trained and exercised multiple times through numerous integrated base defense exercises with 380th AEW and 379th AEW that combined a simulated air and missile attack with large-scale, mass casualty, and emergency response drills.

The 5-52nd command team, LTC Matthew Inglis and CSM Jose Ramirez, are seen here in front of their unit's t-wall prior to their departure after a successful deployment rotation.

In February 2021, key leaders from 5-52nd ADA led an Air Missile Defense (AMD)/CUAS working group with our UAE partners. Normally a USCENTCOM-led requirement in support of the command and control interoperability board process, COVID-19 travel restrictions limited participation from the Combatant Command Headquarters. In conjunction with the Air Warfare Center, *Team Deuce* led the week-long session with Emirati Air Force and Emirati Air Defense Force counterparts to address current shortcomings in the interoperability between the United States and UAE. This team also suggested improvements to UAE's defense design and the application of CUAS capabilities in defense of UAE's internal assets. The results of this AMD and CUAS working group were incorporated into USCENTCOM's security cooperation efforts and U.S. Air Forces Central's (USAFCENT) interoperability efforts with UAE.

Similarly, *Team Deuce* was tasked to support Qatar's planning for air defense operations in preparation for the upcoming World Cup in 2022. In conjunction with USCENTCOM, USAFCENT, and 32nd AAMDC, key leaders from 5-52nd ADA facilitated Qatar's development and codification of their air operations plan and combined Air Defense design. Bringing in representatives from Great Britain, Italy, France, and Turkey, the combined operational planning group developed the new equipment fielding, training

and exercise requirements, and validation events leading to the World Cup. If successful, this monumental undertaking will greatly enhance Qatar's air defense capabilities and proficiency while leveraging and integrating multi-national defense assets.

While deployed, the Soldiers of 5-52nd ADA also sustained their AMD proficiency through support to USAFCENT's Integrated AMD (IAMD) training events which exercised most aspects of the combined defense of the Arabian Gulf Operation Plan and the Join Kill-Chain. As the only battalion to provide flight missile simulation devices in theater, operators from *Team Deuce* supported the IAMD simulation that replicated ballistic missile, cruise missile, and lethal one-way UAS attacks against USCENTCOM assets.

Additionally, in January 2021, without interruption to the assigned mission, all batteries successfully completed air defense gunnery table (ADGT) certifications while validating multiple alternate battle positions on both Al Dhafra and Al Udeid Air Bases. The 5-52nd ADA's commitment to no-notice survivability jumps to alternate battle positions greatly facilitated our tactical mobility training and enhanced the integrated base defense exercises. By the end of the deployment, each battery had successfully conducted at least six survivability jumps in support of various joint and combined training events.

The 5-52nd ADA's 12-month deployment ended in May of 2021 following the successful relief in place with 1st Battalion, 44th Air Defense Artillery Battalion. Continuing *Team Deuce's* commitment to multi-echelon training, the reception and emplacement of 1-44 ADA's Patriot equipment was incorporated in a larger training opportunity. Crews from 5-52nd ADA conducted a survivability jump to an alternate battle position and regained defense of the assigned asset. Once the defense posture was recovered, crews from 5-52nd ADA jumped the equipment from 1-44th ADA on to the original position. Lastly, the equipment from the alternate battle position was returned in preparation for redeployment operations. Synchronized across the UAE and Qatar, this operation applied a realistic scenario and tactical aspect to the relief in place while validating 5-52nd ADA's mobility proficiency. Concurrently with training and certification of 1-44th ADA crews, the Soldiers of 5-52nd ADA prepared and executed the redeployment of its own equipment ensuring that a trail party was not required. Successfully coordinating with the host nation and joint custom agencies, *Team Deuce* was able to prepare and load all vehicles and containers prior to the transfer of authority and relieve 1-44th ADA of any requirements after our departure.

The 5-52nd ADA redeployed to Fort Bliss, Texas, in late May 2021 to eagerly awaiting friends and family. In June 2021, the battalion focused on the reintegration efforts into garrison and family life while also integrating B Battery, 2nd Air Defense Artillery Terminal High Altitude Area Defense (THAAD) into battalion operations.

B-2nd ADA THAAD *Bandits* redeployed in October 2020 from the Kingdom of Saudi of Arabia as the first THAAD deployment to USCENTCOM and successfully set conditions for *Team Deuce's* return a few months later. Following a successful ADGT VIII certification in May 2020, B-2nd was assigned the THAAD modernization mission for 32nd AAMDC. In conjunction with the Missile Defense Agency (MDA), B-2nd began its preparatory training and system upgrades in support of the effort to combine Patriot Advanced Capability-3 missile segment enhanced (MSE) within the THAAD sensor and engagement system. This integration of Patriot missiles under THAAD sensors is a key advancement and will eventually tie into the Integrated Air & Missile Defense Battle Command System.

In late June 2021, A-4th was assigned to 5-52nd ADA establishing *Team Deuce* with a second THAAD battery and ultimately increasing the battalion combat strength to eight units.

Following block leave, the new *Team Deuce* Battalion returned to operations with the reception of its Patriot equipment from USCENTCOM in August. B-2nd completed system upgrades and transitioned their equipment and personnel to White Sands Missile Range in support of MDA's Controlled Test Vehicle-01

(CTV-01) test. In September, the Bandits successfully executed the first simulated flight test in CTV-01 which demonstrated the ability to launch a Patriot MSE from a THAAD Fire Control Center and validated the operational concept.

In October, 5-52nd ADA began reset activities in a deliberate effort to repair, service, and return all Patriot and conventional equipment to proper standards over the course of three months. The 5-52nd ADA installed all communication systems and Joint Battle Command-Platforms to enhance tactical focus. Also in October, A-4th completed their ADGT VIII certification in conjunction with their field training exercise. Incorporating the threat scenario to be utilized in 32nd AAMDC's Roving Sands in May of 2022, A-4th has incorporated individual Soldier tasks, field craft, and survivability efforts to align with ADGT requirements. The Patriot batteries of 5-52nd ADA also returned to collective ADGT training in order to incorporate new Soldiers and crews within the experienced formations.

Soldiers of 5-52nd are pictured here conducting equipment emplacement upon arrival to their assigned PAT site for deployment.

In November, 5-52nd ADA held the inaugural Mongadai Challenge as an internal "spur-ride" event. Originating in the 13th Century, the Mongolian Empire would test and challenge their best warriors in a rigorous selection process to identify the elite warriors for Genghis Khan's Army. The warriors who survived and were selected became the Khan's Mongadai. For *Team Deuce*, the Mongadai Challenge serves as a crucible to challenge individual strength, endurance, will, and leadership capabilities while validating individual tactical proficiency. Mirroring the majority of Expert Soldier Badge tasks, the Mongadai Challenge identifies the best talent within *Team Deuce.*

Additionally, November kicked off with 5-52nd ADA's staff exercise to train and rehearse battle staff procedures and conduct military decision-making process for the upcoming Immediate Response Force culminating training event, in February 2022, and Roving Sands in May 2022. Like A-4th's ADGT VIII, all Battalion and battery training is executed within the Roving Sands scenario and threat capabilities. Additionally, November was filled with multiple Patriot battery field training exercises (FTX) coupled with their ADGT VII and ADGT VIII certifications. Each FTX confirmed the battery's ability to tactically deploy, sustain, and defend itself while completing ADGT certification. The mixture of individual tactical training, night-driving, and manual emplacement, all challenged the precedent of stoic and rigid air defense field problems.

By year's end, the *Team Deuce* Battalion will be fully trained, certified, and staged for the next assigned mission. The 5-52nd ADA sustained its commitment to the *Team Deuce* imperatives of people, readiness, teamwork, and professionalism. *Team Deuce* will be ready; experts of any mission assigned and will bleed and thrive together.

Always Prepared! Team Deuce for Life!

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31st Air Defense Artillery Brigade
Ready and Vigilant!

The 31st Air Defense Artillery Brigade, *Archer*, experienced an exciting year that began with training for and executing a mission readiness exercise (MRE), certifying the brigade to deploy to the U.S. Central Command area of responsibility (AOR) to assume command as the *Top Notch Brigade*. During the brigade's deployment, the headquarters executed a large-scale drawdown of Air Defense forces in the AOR, worked to rapidly improve counter-unmanned aircraft system (C-UAS) operations in Iraq, assumed command and control (C2) of the counter-rocket, artillery, mortar (C-RAM) battalion, and supported the noncombatant evacuation operations (NEO) out of Afghanistan.

Upon assuming responsibility as the *Top Notch Brigade* in February 2021, the headquarters of the *Archer Brigade* assumed C2 of the largest and most diverse U.S. Army Air Defense force in the world, comprised of four Patriot battalions, one C-RAM battalion, two Avenger batteries, one THAAD battery, and multiple remote Sentinel Radar early warning sites. This force was in response to the regional tensions the previous year, and the *Archer Brigade* became responsible for the phased retrograde of units and capability out of theater in support of the National Defense Strategy's refocus to the Indo-Pacific Command AOR. The retrograde included the integration of one globally-sourced battery from 5-7th Air Defense Artillery (ADA) from Germany, closure of several Patriot and Sentinel Radar sites, movement of hundreds of missiles, and dozens of airlift operations. *Archer Brigade* executed all operations under short notice without the loss of Air Defense coverage of any critical assets in theater and resulted in the successful posturing of the theater future operations.

During the reduction of Air Defense in theater, there was an unprecedented increase in the number and sophistication of hostile UAS attacks within Iraq, including the first successful attack against a U.S. installation. This necessitated a halt in the redeployment of Avenger capability and a need to improve tactics, techniques, and procedures (TTPs) and C-UAS capabilities. What followed was a rigorous and intrusive deep dive into C-UAS operations in the Combined Joint Task Force for Operation Inherent Resolve, supported by the ADA Branch through 32nd Army Air Missile Defense Command (AAMDC) with 31st ADA Brigade (*Top Notch*) supported by the U.S. Air Force regional Air Defense commander and the project managers for the C-RAM office. Through these efforts, the team identified and rapidly improved four key areas: integration of layered capabilities, delegation of authorities, application of control measures, and improved training. This resulted in the first-ever successful engagements of UASs in combat by both C-RAM (1-194th Field Artillery Regiment [FAR]) and Avenger (C/5-5th ADA) in United States Army history.

While the *Archer Brigade* was executing the ADA draw down and working to improve C-UAS operations in theater, the United States was drawing down in Afghanistan. This included closing several C-RAM sites as forward operating bases were closed. The additional capability and Soldiers in support of the C-RAM mission, 1-194th FAR followed by the 1-101st FAR shifted to Iraq in support of continuing operations. Due to the shift in capability, the 32nd AAMDC recommended to Army Central Command that C2 for C-RAM shift from United States Forces Afghanistan to the *Top Notch Brigade*. Prior to this recommendation, the C-RAM battalion only had an informal coordination requirement to the senior Air Defenders in the *Top Notch Brigade* headquarters. The change in the C2 relationship enabled the 32nd AAMDC and *Top Notch Brigade* to provide improved support to the unit and streamline reporting requirements. This challenged the *Archer Brigade* to rely on its own imbedded C-RAM knowledge and experience, along with updating unit TTPs to seamlessly integrate the 1-101st FAR for the first time in *Top Notch* history while the unit was completing Afghanistan withdrawal operations.

While the *Archer Brigade* was supporting the

1-101st FAR's draw down in Afghanistan there was a rapid shift from an orderly retrograde to a hasty NEO. This involved the brigade headquarters providing over 20 personnel, with officers and NCOs, to support the refugee operations on Al Udeid Air Base while continuing to maintain 24/7 Air Defense operations for the theater. The volunteers from the brigade supported the hasty housing, feeding, and onward movement of over 25,000 Afghanistan refugees, with over 15,000 being present on the installation at any given time. The Soldiers and leaders of the brigade who volunteered embodied the Army Values and selflessly threw their hearts and bodies into their work to support the embattled children, women, and men coming out of Afghanistan. This support continued beyond the final flight of 1-101st FAR Soldiers out of Hamid Karzai International Airport and was ongoing until the final tent city was closed on Al Udeid Air Base.

Shortly after the NEO was complete, the leaders and Soldiers of the 31st ADA *Archer Brigade* shifted to prepare for the Relief in Place (RIP) and follow-on Transfer of Authority (TOA) with the incoming 69th ADA *Lightning Brigade*. This preparation culminated in a flawless two-week RIP, an exceptional TOA ceremony, and the successful redeployment of all *Archer Brigade* personnel back home to their families in Fort Sill, Oklahoma. The nine-month deployment had shown that the women and men of the unit were truly *ready and vigilant!*

4th Battalion, 60th Air Defense Artillery Regiment

From July 18 to August 6, Air Defense officers from the 4th Battalion, 60th Air Defense Artillery (4-60th ADA BN), 31st ADA Brigade (BDE) attended the Stryker Leader Course (SLC) at Fort Benning, Georgia. They were the first batch of Air Defenders to attend SLC and slotted to go to maneuver short-range air defense (M-SHORAD) units. At the end of the course, 1LT Terry Wang with hard work and dedication became the first 14A in the history of the course to be named Honor Graduate. Below is a summary of 1LT Wang's experience and lessons learned during his time at Fort Benning.

After returning from a three-year tour in Area IV, Korea, 1LT Wang flew to Fort Benning to attend SLC. From July 19 to August 6, 2021, he and two other 4-60th ADA officers studied Stryker Operations and Tactics and participated in three field training exercises including one Stryker live-fire range.

SLC is split into two phases: Vehicle Operation & Maintenance (Phase I) and Stryker Weapon/Tactics (Phase II). For junior Air Defense officers, Phase I is like the ADA weapon system familiarization class taught during Basic Officer Leader Course where instructors covered vehicle capabilities and limitations, vehicle variants, maintenance, and operating procedures. During the weapon and tactics phase, all four ADA officers struggled specifically with the Combat Vehicle Identification and group Operations Order (OPORD) projects due to large differences between how Air Defense and other combat arms operate. SLC cadre and most of the students came from a maneuver background, so the class vernacular was foreign to the duck hunters of the class. The four ADA officers had to quickly adapt and learn company/platoon-level infantry tactics and verbiage to be successful in OPORD briefings. However, working together with infantry NCOs and officers proved to be a great experience, as the ADA officers gained valuable insight into the maneuver side of Army operations.

SLC is not a classroom-focused course. Students receive extended hands-on training, and this rotation was no exception. Each member participated in three field training exercises during the 21-day course: Vehicle Recovery, Mounted Terrain Walk, and Remote Weapon System (RWS) live-fire range. The RWS range was an extremely unique experience and showcased a weapon system that Air Defenders typically don't encounter.

Among the 44 students in the class, nine were Thai Army officers from the Royal Thai Army who are slated to become the first group of Thai Stryker instructors. 1st LT Wang utilized the course to develop friendships with 1st Lt.

Rewan Rattanan and 2nd Lt. Atom Sirisawas as he worked with them during class and in the field. As their team leader, he enjoyed the opportunity to execute the OPORD briefing and numerous study sessions, and to build close relationships between our militaries.

The 4-60th ADA BN provides a unique experience for ADA officers coming into the unit to attend specialized professional military education. Today, a majority of ADA officers have backgrounds in either Patriot or the Terminal High Altitude Air Defense systems and are not familiar with the infantry/ maneuver tactics. Changing from a tactical control officer or tactical director mindset to a mounted infantry mindset is not an easy transition. ADA leaders who attend the course in the future must prepare and study maneuver doctrine prior to attendance in order to adapt quickly during the course and be willing to learn from maneuver branch officers and NCOs. The SLC allows ADA officers to understand the maneuver side of the Army and allows them to apply the M-SHORAD weapon system effectively for future operations. The students greatly appreciate the 31st Brigade's leadership for orchestrating the course.

"Stryker is not just a fighting vehicle, it's an attitude!"

5th Battalion, 5th Air Defense Artillery Regiment

Dragon Slayer Battalion

Over the last year, 5th Battalion, 5th Air Defense Artillery Regiment proved it is always "w*illing and able"* to provide critical short-range air defense (SHORAD) to geographical combatant commanders in order to protect the critical U.S., allied, and partner assets from rockets, artillery, and mortars (RAM), enemy aerial surveillance, and all other hostile aerial platforms. *Dragon Slayers* deployed to multiple locations across the U.S. Central Command (CENTCOM) area of responsibility (AOR) executing high-priority missions in support of both Operation Inherent Resolve and Operation Spartan Shield. Simultaneously throughout the year, the *Dragon Slayer Battalion* was the premier trainer for multiple mission readiness exercises to ensure the National Guard units selected to assume counter-rocket, artillery, and mortar missions in the CENTCOM AOR were ready to fight and win! More than 300 National Guardsmen were certified for deployment on Forward Area Air Defense interface software, network integration, Land-Based Phalanx Weapon System, Engagement Operations Cell processes and procedures, and indirect fire & counter-unmanned aircraft system defeat tactics, techniques, and procedures.

Soldiers from all subordinate units deployed in various roles across the CENTCOM AOR to include the deployment of the Army's only remaining legacy SHORAD weapon system (the Avenger) to multiple locations to defeat enemy air threats in support of the *Top Notch Brigade's* "layered & tiered" defense design with superior and historic impact to the branch. *Dragon Slayers* from C/5-5th added to the storied Air Defense legacy by successfully prosecuting the first-ever combat Avenger/Stinger intercept and destruction of an enemy aircraft. The lessons learned over the past year were numerous and further emphasized the importance of SHORAD to the maneuver force and U.S. assets in combat.

Remaining on the cutting edge in support of the Army's modernization priorities, the *Dragon Slayer Battalion* hosted and supported Lieutenant General L. Neil Thurgood and the Army's Rapid Capabilities and Critical Technologies (RCCTO) office in July 2021 at Fort Sill, Oklahoma, during the Directed Energy Mobile Short-Range Air Defense program's 50-kW laser developmental test. *Dragon Slayers* were able to assist and provide a critical Soldier touchpoint to the RCCTO team on one of air & missile defense's key modernization initiatives.

As shown by their historical mission success, continued support to Army modernization and selfless dedication to training others, it is clear the *Dragon Slayer Battalion* remains highly trained, disciplined, and fit to fight and win!

4th Battalion, 3rd Air Defense Artillery Regiment

I Strike Battalion

The 4th Battalion, 3rd Air Defense Artillery (ADA) Regiment spent the majority of the past year at home station in Fort Sill, Oklahoma. The Soldiers of the *I Strike Battalion* continued to overcome adversity brought on by the global COVID-19 pandemic, functioning effectively and accomplishing all missions. Chief among those was the preparation to receive the newly upgraded battalion equipment. Lacking Patriot equipment, the Soldiers remained busy by training Warrior Tasks/Battle Drills, individual and crew-served weapon certifications, and Air Battle Management training in the brigade Reconfigurable Table Top Trainer lab, all while supporting the Fires Center of Excellence. Through the summer of 2021, the battalion executed numerous military funerals ranging across Oklahoma and neighboring states, which allowed the battalion to showcase great pride in honoring our fallen service members appropriately.

The 4-3rd ADA spent six months out of the year working tirelessly through the modernization of their Patriot equipment. The equipment upgrades for Post Deployment Build (PDB) 8.0.5 provided fire units with a modernized, secure communications infrastructure and an increased capability to defend worldwide strategic assets. Obtaining upgraded equipment allowed the battalion to get hands-on training for all Soldiers, which positively contributed to the successful execution of Air Defense Gunnery Table VIII certifications. This accomplishment enabled the battalion to assume the Global Response Force (GRF) mission for a U.S. Army Forces Command Patriot unit in the summer of 2021.

Serving as a culminating exercise for the fielding of upgraded equipment, the battalion planned and executed its PDB 8.0.5 capstone event in mid-August. This exercise validated upgrades by connecting all batteries and

Practicing clearing tactics.

thereby demonstrating the functionality of all equipment. Successful completion of the capstone event catapulted the battalion into its first field training exercise (FTX) with upgraded equipment. The 4-3 ADA's FTX focused on Operational Readiness Evaluations and site operations, with an emphasis on sustainment. Since the battalion remained on a GRF status, this training and experience would prove invaluable if the need to rapidly deploy were to arise.

Having successfully demonstrated a high level of proficiency in Air Defense competencies, the battalion sent 82 personnel and 32 rolling stock in the fall to Fort Bliss, Texas, in support of two live-fire exercises, Project Convergence 21 (PC21) and Field Surveillance Program Shining Star (FSP SS). PC21 allowed Soldiers to witness and execute a Patriot live fire and permitted the interface with the next generation of multi-threat Air Defense systems provided by the Integrated Battle Command System and Integrated Air and Missile Defense. FSP SS provided Soldiers an opportunity to interact with Japanese Air Defenders and Soldiers from 1-1st ADA stationed in Okinawa, Japan. This multi-national live-fire exercise greatly enhanced the partnership strength of American and Japanese Air Defenders by demonstrating tactical competency and equipment interoperability.

Executing such a wide array of mission sets over the year challenged the Soldiers of the battalion across the spectrum, pushing them to go harder and further than they previously thought possible. Acknowledging the demanding operational tempo, battalion leadership seizes every opportunity to recognize Soldiers for their hard work and dedication to the mission. This recognition, along with a shared understanding and respect across the formation, has enabled 4-3rd ADA to maintain a high level of morale and positive command climate. The positivity and professionalism of all *I Strike Soldiers* will prove critical to success as the battalion prepares for a spring 2022 deploym ent and all requirements that naturally occur with such an endeavor. Standing on the hard-earned experience gained over the year, 4-3rd ADA is postured to execute all future missions.

Weapons marksmanship training.

2-44th ADAR innovates, challenges *and* overcomes

By CPT Zachary Buenger

The 2-44th Air Defense Artillery Regiment emplaces and conducts Table VIII Certifications at Sabre Army Airfield, Fort Campbell, Kentucky. (1LT Lawrence Babilya/U.S. Army)

Apache AH-64 helicopters passed overhead, MQ-1C Gray Eagle unmanned aircraft systems circled, and light attack MD 500 Defenders piloted by the famous "Night Stalkers" maneuvered nearby. No, this was not Afghanistan, Iraq or any area outside of the continental United States. This was the scene where the historic 2nd Battalion 44th Air Defense Artillery Regiment conducted Indirect Fire Protection Capability (IFPC) Table VIII certifications. Co-located with the 101st Combat Aviation Brigade on Sabre Army Airfield, the 2-44th ADAR built lasting relationships, broke barriers in innovative training, and tested the unit's logistical strength in sustaining for more than 72 hours in an austere environment. Building a varsity team requires stringent self-reflection, broadening culminating training events, and logical processes for feedback and reflection.

During the two-week event, two batteries of Counter-Rocket Artillery and Mortar protection drove numerous tactical vehicles to a training area unfamiliar to the battalion. Located at the end of the helicopter staging tarmac, two Land-Based Phalanx Weapon Systems emplaced and operated, simulating a deployed environment defending the commander's critical assets. The remaining equipment consisting of the Engagement Operations Cell, two Sentinel Radars, Battery Command Post, and Q-50 Lightweight Counter-Mortar Radar emplaced in a field adjacent to the active runway, behind the staging tarmac. Historically, battalion IFPC Table VIII certifications were conducted in garrison operations, in the motor pool and battery footprint. This accomplished the mission in certifying crews and testing weapon system proficiency but lacked the additional initiatives in building unit readiness through challenging and realistic training. The future battlefield demands units and leaders to possess the drive and determination to cultivate problem solvers and innovators. The battalion analyzed past certifications and the current skillset of battery Soldiers to determine the need for increasing proficiency in unique challenges. Upon reflecting on the weaknesses of the formation and delivering an honest assessment drove initiative

Battery crews conduct upload and download drills with the Land-Based Phalanx Weapon System. (1LT Lawrence Babilya/U.S. Army)

in executing Table VIII certifications beyond what is expected. Emplacing in a new environment highlighted the importance of meeting the demands for future challenges.

While this training was largely focused on gunnery certifications, arguably the most important outcome culminated with lessons learned in sustaining forces. Battery leadership learned through trial and error the efficiency in crew rotations, utilization of experience in noncommissioned officers for concurrent training, and implementing

AH-64 Apache Attack Helicopter with the 101st Combat Aviation Brigade hovers overhead an emplaced AN/MPQ-64 Sentinel Radar. (1LT Lawrence Babilya/U.S. Army)

the Army's sustainment principles listed in ADP 4-0. What could be called a 'rocky' start in coordinating class I (rations) and class III (fuel), ended with seamless operations-driven from lessons identified early on to lessons learned and implemented by the conclusion of the training. Battery leadership established procedures, disseminated roles, and the unit planned properly for unexpected contingencies. The battalion's role in planning the training event consisted of providing the training area, latrines, and evaluators. The rest of the time was yielded to the battery command team to resource and establish their operations. The batteries enforced basics in utilization of the Troop Leading Procedures through receiving the mission, initiating movement, and operations dissemination. Proper planning allowed units time to account for all variables expected in a complex unforgiving environment. This process was initiated from the battalion, producing timely orders, synching warfighter functions, and disseminating direct actionable information.

The battalion's Live-Fire Exercise and Table XII certification occurring in October became IFPC's culminating training event. Prior training schedules and preparation to engage live rounds, must follow strict adherence to doctrinal certification. This is achieved by mimicking training challenges expected in a deployment environment while enforcing unit survivability to stress tactical systems. Realistic training leading toward a single culminating training event needs to serve a larger purpose to develop readiness at all levels. This will allow both batteries and the battalion to achieve more of the desired outcomes of the training event, as well as identifying gaps to be improved upon in future training exercises.

Battalion leadership directed the need for expeditionary readiness training, focusing on basic Soldier skills, convoy movement, and rigid crew certifications. To build upon a solid foundation and expanding training opportunities, the 2-44th ADAR prioritized understanding the big picture by improving supporting systems and SOPs. At the pinnacle, the battalion strives to be ready for the future fight, and develop innovative solutions to maximize combat effectiveness and efficiency. Future training must continue to challenge semi-annual milestones, by innovating processes and utilizing the feedback from historical events. The precedence set forth from a single training event captures the need to continually innovate, create, and overcome challenges. This drives unit excellence by achieving easy wins in realistic training.

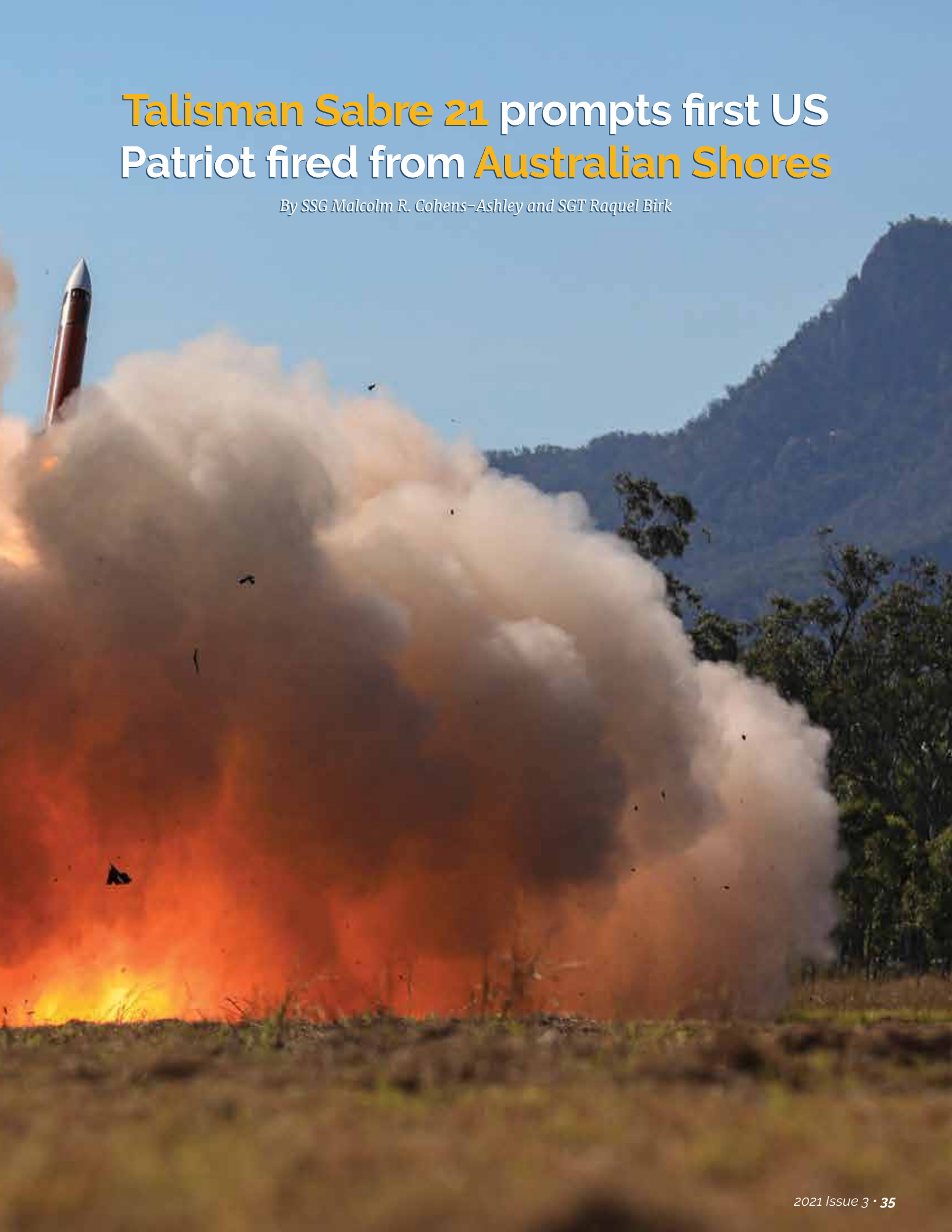
The battalion emplaces in an open field next to the staging tarmac. This was a first for the 2-44th ADAR and Sabre Army Airfield Operations. (CPT Zac Buenger/U.S. Army)

CPT Zachary Buenger is currently assigned to 2-44th ADAR as an assistant operations officer in Fort Campbell, Kentucky. Most recently, Buenger graduated from the Marine Corps Expeditionary Warfare School, Quantico, Virginia.

This is the ninth iteration of Talisman Sabre, a large-scale, bilateral military exercise between Australia and the U.S. involving more than 17,000 participants from seven nations. The month-long multi-domain exercise consists of a series of training events that reinforce the strong U.S./Australian alliance and demonstrate the U.S. Military's unwavering commitment to a free and open Indo-Pacific. *(Photo by SSG Malcolm Cohens-Ashley/U.S. Army)*

Talisman Sabre 21 prompts first US Patriot fired from Australian Shores

By SSG Malcolm R. Cohens-Ashley and SGT Raquel Birk



A combined task force of 17,000 troops from the United States, Australia, New Zealand, Japan, Republic of Korea, and United Kingdom participated in exercise Talisman Sabre 2021(TS21). This exercise took place July 1-31, 2021, throughout Northeast Australia to strengthen relationships and interoperability among key allies and enhance the collective capability to maintain a free and open Indo-Pacific region.

TS21 is a large-scale, bilateral military exercise conducted biennially since 2005 between Australia and the United States, enhancing collective capabilities to respond to a wide array of potential security concerns. It's a demonstration of a strong alliance underpinned by deep levels of cooperation and trust built over decades of operating and training together.

TS21 featured, for the first time, the MIM-104 Patriot and it was fired from Australian shores. This was achieved on July 16, 2021, by the U.S. Army's 38th Air Defense Artillery Brigade firing Patriot surface-to-air missiles to successfully engage drone targets at Shoalwater Bay Military Training Area.

COL Matthew W. Dalton, 38th ADA commander stated the brigade trains "to demonstrate our ability to quickly move our units around the Indo-Pacific to be able to counter any threat that is out there. We need to rehearse our ability to move to different locations quickly, set up and establish defense of a particular asset."

The ability to rapidly deploy Air Defense capabilities was the focus of this, and past exercises such as Orient Shield and Keen Sword, where Patriot assets were moved to various strategic locations throughout Japan.

While the focus was on the live-fire exercise itself, there was much planning and training that led 38th ADA and 1st Battalion, 1st Air Defense Artillery Regiment (ADAR) Soldiers to this historic moment.

The planning phase of TS21 for the 38th ADA BDE spanned over the past year and has been revised at multiple levels.

"Since last summer, we were looking at coming to Australia," stated MAJ Joel Sullivan,

Soldiers from 1-1st Air Defense Artillery Battalion fire a Patriot missile during Exercise Talisman Sabre 21 on July 16, 2021, at Camp Growl located in Queensland, Australia. (MAJ Trevor Wild/U.S. Army)

the executive officer for 1-1st ADAR. "In the meantime, we started preparing and conducting military decision-making processes in order to get Alpha Battery [1-1st ADAR] trained up."

Unlike recent years, the world has been working through a global pandemic, and it has reshaped the plans of billions of people, including military operations. Although faced with much adversity, a collective group of service members still found ways to continue the mission.

"We worked with the U.S. Air Force to make sure the flights were ready, and we worked with the 38th ADA Brigade in order to get the proper mobility to move equipment from Okinawa to Australia," said Sullivan. "The arrangement for a vessel to take the rest of the equipment was made through the assistance of working with the brigade and U.S. Army Pacific Command as well."

In addition to movement from one country to the next, there are also training requirements for Soldiers in order to carry out and complete the mission. Proper training often begins months before any major training exercise begins.

"We had recently conducted a Table VIII gunnery certification back in April that fell perfectly in time for the Soldiers to be prepared to execute the mission," said CPT Phillip Le, Alpha Battery commander, 1-1st ADAR. "When we got on ground, all we had to do was make sure our systems and maintenance were up to date, and at that point, all the Soldiers knew exactly how to conduct the mission and integrate themselves into battalion and brigade echelons to execute.

With the planning phase of the mission complete, the only thing left to do was to execute. For many Soldiers, this would be their first time witnessing a Patriot missile fire.

"It was definitely an amazing experience to be in such an important position and have a very close view during this live-fire," said SGT Taylor Blitch, a Patriot launching station enhanced operator/maintainer assigned to Alpha Battery. "The most memorable part was right after that first missile fired. My crew began setting up the next can for fire, and I got to unlock the missile as the first can was still billowing soot and smoke."

While other Soldiers have been a part of other Patriot missile live-fires, this historical event may have topped their list.

"The best part was the fact that we actually got to emplace a site and fire from a location that no one has ever done before," said SSG Brendon Street, a Patriot launching station enhanced operator/maintainer assigned to Alpha Battery. "It's exciting being the first one to do something like that."

In addition to successfully completing the Patriot missile live-fire, continuing to strengthen the bond with the Australian Defence Force (ADF) was equally as important. Many Soldiers and ADF military personnel worked closely together and were able to exchange flags of their respective nations, unit patches, and knowledge.

"Working with the ADF was not only an amazing experience but a pleasure," remarked Blitch. "The similarities between our two organizations are quite unique, and we fit together perfectly like a puzzle piece."

TS21 allowed us to conduct operations in a combined, joint, and interagency environment that increased our ability to respond and integrate.

"Talisman Sabre will also involve space, cyber, land, air, and sea operations," said Maj. Gen. Jake Ellwood, Australian Army task force commander. "[The training] makes sure that our systems can operate together, that we understand how each other work."

Working together to ensure a free and open Indo-Pacific region is a mission that spans beyond a single country. This mission can only be achieved through continuous partnerships among many nations. The 38th ADA carries on the long-standing alliance with Australia and looks forward to future training opportunities south of the equator.

SGT Raquel Birk is currently the public affairs noncommissioned officer for 38th Air Defense Artillery Brigade at Sagami General Depot, Japan. She previously served as command information manager for the 2nd Infantry Division/ROK-U.S. Combined Division at Camp Humphreys, Republic of Korea. She received a Master of Arts in Sociology from St. John's University, Jamaica, New York.

Preparing Air Defenders to operate in a GPS-denied environment

By MAJ Jay R. Colloton

Top left: "The NEAT" or Navigation Electronic Attack Trainer, is a hand-held GPS jammer capable of denying the GPS signal to all receivers within an 800 mile radius.

Center left: A shielding device protecting the GPS antenna on a Stryker Infantry Carrier Vehicle from line-of-sight jamming. Note how it is open at the top allowing a clear view of the sky.

Bottom left: A Space and Missile Defense School Army Space Training Division Observer Controller/Trainer uses a NEAT device against a UH-60 Blackhawk Helicopter during a Field Training Exercise.

The Patriot Missile fire control crew was lost. They knew exactly where they were but faced a problem that they could not solve. Their battalion instructed them to conduct march-order, move to a new tactical site, and emplace in defense of a new asset. Their march-order and road march went well, and they arrived at their new site without issue. As the one-hour emplacement clock started running, the physical emplacement of the equipment was flawless; however, the crew was struggling to initialize the system software to prepare for combat. After the fourth failed attempt, the crew's officer in charge (OIC) determined there was a hard-fault in the system and contacted the battery commander. The OIC requested permission to cease emplacement and turn the system over to the maintenance team for troubleshooting.

The system itself was actually fully mission-capable. Unbeknownst to the crew, their issue

was originating from a small, 6 inch by 6 inch, olive drab box nestled in the backpack of a nearby observer-controller/trainer (OC/T). This device was a Navigation Electronic Attack Trainer, or NEAT, and was capable of denying the Global Positioning System (GPS) signal to all receivers within an 800-meter radius. Only after significant coaching from the OC/Ts were the operators able to identify the issue and manually initialize the system; at this point, six hours had elapsed since the battery arrived on site. Moreover, the defended asset remained vulnerable to attack for an additional five hours longer than planned. GPS denial also resulted in second and third-order effects. The battery commander had to reallocate personnel to assist with troubleshooting which compromised site security. Additionally, planners at the battalion and brigade had to shift their focus from future operations to planning for an unexpected loss of Air Defense coverage. Most critically, an operational-level asset was left vulnerable to attack for an extended period of time.

OC/Ts captured this example during a large-scale air and missile defense training exercise conducted several years ago but the lesson remains as true today as it was then: Air Defense Artillery (ADA) forces are extremely reliant on GPS and are unprepared to recognize, report, and react to the denial, disruption, or degradation of this signal. Both Patriot and the Terminal High Altitude Area Defense (THAAD) systems require extremely precise location data to successfully perform their air and missile defense mission. Small positioning errors during emplacement and system initialization can lead to enormous errors at intercept. The GPS signal also provides the timing protocol for almost all of the communications systems used by ADA forces, and any interruption of this signal could lead to a loss of communications and/or command and control.

The ADA community's reliance on GPS for communications and precision location makes them vulnerable to adversary threats. It is no secret that our adversaries will contest our use of the electromagnetic spectrum and work to deny us critical warfighting capabilities like GPS. Being trained on manual emplacement is not enough to counter the threat of GPS disruption or denial. This article will discuss how Soldiers and leaders must recognize the threat to GPS, understand measures they can take to mitigate the threat, and train in a contested GPS environment to ensure they can accomplish their mission in future conflicts.

Our enemies recognize that our reliance on space, specifically GPS, leaves us vulnerable to interference or attack. Soldiers and leaders must understand that widespread GPS disruption is a persistent characteristic of our current operational environment (OE) and will continue to be. Near-peer competitors see our reliance on space-enabled and space-based capabilities as a vulnerability they can, and will, exploit. They moved quickly to develop electronic warfare systems aimed at denying our use of space. While enemy electronic warfare will target more than just GPS frequencies, GPS is likely to be a major target due to its low power and our heavy reliance. To maximize combat effectiveness in future conflicts, Soldiers must both understand and mitigate the threats to GPS-enabled equipment.

To mitigate the effects of GPS denial (jamming), you must understand how the system functions. A constellation of 31 satellites orbit the earth and continuously broadcast their position and the time. Each satellite broadcasts on two different frequencies, commonly referred to as L1 and L2. These signals transmit at very low power, comparable to a 40-watt light bulb shining from 20,200 kilometers away. To get an accurate location, your receiver must acquire the signal from a minimum of four different GPS satellites. Your receiver then compares the difference in time from each of the four GPS satellites' signals to pinpoint your position and provide your location.

The single most important thing a Soldier or leader can do to mitigate the effects of GPS jamming is to use a Department of Defense approved GPS receiver that can be encrypted using the latest Communication Security (COMSEC) keys. The Defense Advanced GPS Receiver, or DAGR, is the primary GPS receiver used by ADA forces. As mentioned, each GPS satellite broadcasts two different frequencies simultaneously. The first frequency, L1, is the frequency available to GPS users all around the world. The second frequency, L2, is only available to properly encrypted military GPS receivers. The encrypted L2 frequency provides increased signal accuracy and greater protection against jamming and spoofing threats. The DAGR will detect jamming attempts and notify operators with a "Jamming Environment

Detected" banner. While an unencrypted DAGR will notify the operator of attempts to jam the L1 frequency, only a properly encrypted DAGR will provide this notification for attempts on both L1 and L2.

An encrypted DAGR must also be properly set up to function in a jammed environment. For the DAGR to transition over to the L2 frequency, it must first acquire the L1 signal. Once it successfully acquires the L1 signal, the previously loaded encryption allows for a "handshake" to successfully acquire L2, the encrypted signal. The requirement to acquire L1 before L2 means Soldiers must initialize their DAGR before it enters the jamming environment. This becomes problematic when Soldiers notice that their DAGR is not operating properly, then perform the most common troubleshooting method – turning it off and back on. Upon power-up, the DAGR is unable to acquire the jammed L1 frequency, which prevents the receiver from acquiring L2. Soldiers must refer to the DAGR technical manual to ensure their DAGR power settings are set to stay on during critical movements or times, such as during march-order, to prevent it from going into standby mode or powering off when a threat to GPS exists.

Although a properly encrypted DAGR is one of the most important ways to mitigate GPS jamming and spoofing, it is also one of the least understood methods. During large-scale training events observed by the Space and Missile Defense School's Army Space Training Division (ASTD), units properly encrypt only 15 – 25% of DAGRs. The primary reasons most units cite are the lack of proper fill cables, the belief that encrypting a DAGR makes it classified, and unfamiliarity with DAGR operations.

The DAGR fill cable is a unique item and is not a standard W4 cable. ASTD recommends units place DAGR cables on order as soon as they identify a shortage as they are often back-ordered. DAGR fill cables can be ordered using the NSN 5995-01-521-3185. For classification, an encrypted DAGR requires no more additional security than an unencrypted DAGR. The DAGR takes on the classification and handling requirements of the data entered into the device, not the COMSEC loaded into the DAGR. For example, loading waypoints for a classified mission will increase the classification and the handling requirements of the DAGR to the same level as the mission. Soldiers can familiarize themselves with the set up and proper operation of the DAGR by referencing the appropriate technical manual, TM 11-5820-1172-13&P. The technical manual will show how to properly configure the DAGR for your mission, how to use the "Jammer Finder" function, and most importantly, how to properly encrypt the DAGR. ASTD has several resources that can be referenced on the following website:

https://atn.army.mil/space-training-integration-d3soe/army-space-training-division

Another way to mitigate the effects of jamming and spoofing attempts against GPS is to shield the receiver from the source of the malicious interference. When an adversary wants to target the GPS signal, they can target either the ground receiver segment or the satellite segment. Targeting the GPS satellites themselves is difficult due to the number of satellites in the constellation and the risk to the enemy. Targeting the receiver is much more likely as it is much cheaper and relatively low risk. To target ground receivers, adversaries broadcast a signal on the same frequency as the satellite, but at a higher power which prevents the receiver from acquiring the legitimate signal. The low power of the signal from the satellite makes it extremely easy for adversaries to overpower it over large areas. Spoofing is another threat to GPS that Soldiers face. Spoofing operates on the same principle as jamming but uses a false signal instead of noise. The spoofing device transmits a signal with false information on the legitimate signal's frequency to provide incorrect positioning and timing information to the operator. Both jamming and spoofing require the receiver to be within line of sight from the malicious emitter. This allows Soldiers to overcome jamming by shielding their receivers to break line of sight.

While there are many ways to shield a GPS receiver, using a large terrain feature as a shield is the only viable method for a stationary Air Defense system like Patriot or THAAD. This is often not feasible due to tactical site set up requirements. Additionally, the same terrain features that can shield the receiver could potentially degrade the ability of the battery to detect and intercept aerial threats. Luckily, with a vehicle-mounted system, the operator only needs to shield the line of sight from the

ground emitter to the GPS antenna, while still allowing a clear view of the sky to maintain GPS signal acquisition.

A simple way to accomplish this that has been tested and proven effective is to shield the vehicle's GPS antenna with a coffee can or similar device. The GPS antenna is a small disc similar in size to a hockey puck and can be located using the associated technical manual for your equipment. Vehicle operators must ensure the opening of the can is positioned to allow an unobstructed and clear view of the sky. This method has proved effective at Combat Training Centers, allowing units to penetrate deeper into the contested GPS environment. ADA vehicles can use the same procedure to better prepare themselves to operate where a jamming threat exists. Operators must be aware that although this method does increase protection from line of sight jamming, it can limit the GPS antenna's view of the sky. This method can decrease the number of satellites the antenna will receive a signal from and may increase the time it takes the receiver to acquire the most accurate position fix possible. However, as long as four satellites are in view, the positioning data is still usable.

While configuring equipment to operate in a contested environment is important, it is no substitute for realistic training. If you survey leaders across the Air Defense community on how they prepare their units to operate in a contested GPS environment, the common answer is training on manual emplacement. Most will not give a second thought to the question, assuming manual emplacement is enough to counter the threat. However, as the vignette at the beginning of this article demonstrates, units must first recognize they are experiencing GPS jamming before they can take appropriate measures to react, mitigate and report the jamming. The battery in the vignette was trained to manually emplace the system but was not trained to identify GPS jamming on their equipment. The only way to prepare Soldiers and leaders to operate in the contested GPS environment is to replicate that environment during training.

The Space and Missile Defense School's ASTD provides training on this very issue of GPS jamming. Subject matter experts from ASTD routinely travel to units across the Total Army to provide classroom and hands-on training on how to prepare for, recognize, react to, and report a Denied, Degraded, or Disrupted Space Operational Environment, which includes GPS denial/jamming. Furthermore, ASTD is equipped to provide live GPS denial effects during unit-level training. ASTD structures its training program around a "crawl – walk – run" methodology beginning with classroom training. ASTD subject matter experts tailor their instruction to the needs of the unit and can offer courses on GPS fundamentals, GPS Jamming Mitigation, Satellite Communications (SATCOM), classified threat briefings, and Leader Professional Development Sessions.

ASTD is also equipped to coordinate for and provide live GPS, SATCOM, and Friendly Force Tracking denial effects. These effects can be provided on either a static range or integrated into a culminating training exercise. A static range complements classroom instruction by providing a controlled environment for Soldiers and leaders to gain hands-on experience with their equipment in a contested GPS environment. ASTD will also integrate into unit-level Field Training Exercises, providing live effects as desired by the unit to accurately replicate the OE. All ASTD training personnel are National Training Center or Joint Readiness Training Center OC/T academy trained and provide feedback to leaders at all levels about their unit's ability to operate in a contested space OE. As of today, Space and Missile Defense Command (SMDC) fully funds this training for the Army and training is provided at no cost to the unit.

Our adversaries view our reliance on space-based capabilities as an exploitable vulnerability. The Air Defense community is reliant upon GPS for accurate position and timing data to accomplish its operational mission. ADA Soldiers and leaders must understand how to mitigate GPS jamming threats by encrypting and properly configuring their DAGRs, and shielding their GPS antennas. Additionally, units must replicate the conditions of the OE during training to ensure that Soldiers and leaders are prepared to recognize, react, and report GPS jamming. Doing so will ensure that ADA forces are prepared to successfully perform their mission in future conflicts.

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Air and Missile Defense modernization well-suited for future LSCO Operations

By CPT Paul Spikes and MAJ Pete Bier

The Army has placed renewed emphasis on building its Air Defense capabilities, which will be crucial for achieving air superiority in a great power conflict. The increase of Air and Missile Defense (AMD) capabilities has emerged concurrently with the threat of near-peer adversaries and the future likelihood of Large-Scale Combat Operations (LSCO).[1] These near-peer conflicts will heavily rely upon air superiority, something that U.S. forces may not readily possess, but something AMD forces can directly affect. The Army has announced several AMD procurements that will assist in these future operations, including Maneuver Short-Range Air Defense (M-SHORAD) Battalions, Indirect Fire Protection Capability Battalions, and the purchase of two battalions of Iron Dome missile defense systems from the Israelis.[2] The Patriot missile system is also receiving a significant radar upgrade in the near future.[3] Though no single advancement will act as the cure-all for fostering future AMD success in LSCO, holistically, the steps the Army is taking to modernize its AMD forces will adequately meet the needs of future near-peer conflicts.

With the end of the wars in Iraq and Afghanistan, the counterinsurgency (COIN)-focused Army of the past two decades is transitioning to LSCO in order to match the new operational environment.[4] This is made clear in the most recent National Security Strategy that defines the central challenge to U.S. prosperity and security as the reemergence of long-term, strategic competition of near-peer adversaries.[5] Adversaries, such as Russia and China, are quickly building arsenals that rival the sophistication and capability of the United States.[6] Capable AMD forces will serve a critical role in countering such advancements, and the Army must continually prioritize AMD forces in order to succeed in future conflict.

One of the major characteristics of successful LSCO includes gaining and maximizing air superiority/supremacy. Two of the most successful military operations of recent history include the 1967 Six-Day (Arab-Israeli) War and the 1990-91 Gulf War due to their decided and quick victories.[7] In the 1967 Six-Day War, the Israelis successfully defeated the Egyptian Air Force, eliminating their operational capability.[8] Similarly, the United States utilized air power to shut down the Iraqi electrical grid, target fuel and lubricant storage and transportation, achieve clear-cut interdictions of Iraqi transport into Kuwait, and destroy the Iraqi Air Force.[9] The air superiority displayed by the Israelis and the United States enabled decisive ground operations.

The U.S. reliance on air superiority cannot be taken for granted in future conflicts with near-peer adversaries. Air superiority not only adds a significant tactical advantage to maneuver forces, but it also has a tremendous psychological effect as it gives Soldiers a greater sense of security while conducting operations.[10] Brigade combat teams (BCTs) require AMD capabilities that will provide them with the mobility, firepower, and protection to fight at the tactical level and protect small units at the point of the spear.[11] In order to continue to out-match our adversaries during conflict, the U.S. Army would be wise to understand how to implement AMD forces into the maneuver fight in an optimal manner, something it has not done in a generation. High to Medium Air Defense (HIMAD) and SHORAD AMD forces have the capability to significantly reduce the impact that an enemy air force presents to ground forces, greatly enabling future success in a great power conflict. Ground forces face significant risk if the only ability to counter an enemy air force is with friendly aircraft, which potentially could be insignificant or non-existent.

The U.S.'s ability to maintain air superiority relies heavily upon the interaction of HIMAD and SHORAD systems. The Patriot missile system serves as the primary HIMAD system of value to maneuver forces. The Patriot system is the U.S. Army's bellwether AMD defense system, capable of engaging ballistic and cruise missiles, loitering

munitions, and aircraft.[12] Although equipped with a phased-array radar, the Patriot system remains highly mobile. The mobility component of the system proves crucial for the defense of high-value friendly targets, such as command and control centers, airfields, and logistics bases, from aerial attack.[13]

The capabilities of the Patriot systems have also been combat-proven, successfully engaging targets in the Gulf War and Operation Iraqi Freedom.[14] Since these two combat experiences, the system has received additional upgrades, ensuring that it can counter the increasingly sophisticated arsenal of adversaries. The radar component of the system will also receive a significant upgrade in the near future that will provide 360-degree detection capability to eliminate any blind spots, ensuring successful engagements of emerging threats.[15]

The implementation of the Patriot system as an asset for BCTs would significantly increase their protection from aerial threats and ensure the safeguarding of critical infrastructure, thereby optimizing the efficiency of ground operations against a near-peer adversary. Patriot's ability to engage Tactical Ballistic Missiles (TBMs) would prove crucial in a near-peer fight. Currently, the U.S. Air Force generally assumes that it will destroy TBM launch sites shortly after hostilities commence. However, this luxury may not be assured against a near-peer competitor with a well-equipped and trained air force. Recently, the Patriot missile system has served as a legitimate strategic deterrent weapon that rarely engages targets while deployed. Against a near-peer adversary, this system will quickly become critical for success at the tactical level of operations.

The Patriot missile system has great capability with respect to defending critical infrastructure and communication nodes, but

CPT Edward Ellingson, 35th Air Defense Artillery Brigade public affairs officer, explains the U.S. Patriot missile system to Republic of Korea Air Force cadets during a visit Jan. 21, 2014. Nearly 100 cadets attended the trip to learn about the U.S. Patriot missile and Army air defense. Photo by SSG Heather Denby, 35th Air Defense Artillery Brigade, Pyeongtaek, 41, South Korea.

it has limitations when directly impacting maneuvering forces. The system lacks a "shoot-on-the-move" capability that BCTs require when closing with and destroying the enemy. This acknowledgment by military leaders led to the development of the M-SHORAD system. The system integrates existing guns, missiles, rockets, and sensors onto a Stryker platform and is designed to defend maneuvering forces against unmanned aircraft systems, rotary-wing, and residual fixed-wing threats.[16] This modernized version of the Stryker system allows ground forces the freedom of maneuver to achieve objectives while continually combatting aerial threats. Prior to this system, AMD assets could do very little to defend ground forces that were not in a static posture. This maneuver capability bore little attention for the past two decades because of the absolute dominance of air power the U.S. enjoyed over its adversaries in a COIN environment. The Army emphasized stationary and static weapon systems due to their strategic deterrence effect and because most mobile AMD assets were of little use during COIN operations.

The recent acquirement of the Iron Dome system from Israel bridges some of the gaps between the Patriot and M-SHORAD systems. Although it bears similarities to the Patriot system in that it lacks a "shoot-on-the-move" capability, Iron Dome effectively destroys short-range artillery shells, rockets, and unmanned aircraft systems.[17] [18] Additionally, the system is combat-proven with over a 90% intercept rate in multiple conflicts.[19] Without air superiority, rockets and artillery pose a significant threat to BCTs' critical command, logistical, and infrastructure nodes. Previously mentioned AMD systems cannot optimally engage these threats alone, but Iron Dome adds a crucial element of layered defense when implemented along with Patriot and M-SHORAD.

Finally, the Army's development of Integrated Battle Command System (IBCS) will link sensors and shoots across the battlefield.[20] The IBCS will not only have the ability to integrate systems that engage TBMs but it has also been expanded to include a broader array of sensors and shooters capable of defeating complex threats such as cruise missiles and unmanned aircraft.[21] This capability will ensure that the AMD systems defending maneuver forces have up-to-date engagement data to maximize firepower and identify incoming threats, directly increasing survivability rates.

The modernization efforts of AMD forces, to include the improvement of existing systems and the introduction of new systems, will adequately meet the needs of LSCO at echelon. Their ability to defend ground forces from aerial attack comes at a time where air superiority may no longer be enjoyed by U.S. forces and will prove crucial against a near-peer adversary. The emergence of these competitors and the potential of a great power conflict places a great emphasis on the importance of coordination between maneuver and AMD forces. However, the existence of these systems will not necessarily portend success. More must be done. Prior coordination, especially within the context of annual training exercises, will ensure that ground forces receive protection in the form of mutual support, overlapping fires, and defense in depth from the various AMD sensors and shooters. But, the acquisition of the systems is a step in the right direction.

…coordination, especially within the context of annual training exercises, will ensure that ground forces receive protection…

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OPERATION LOWRIDER

By 2LT Casey McNamee

Following a 12-month deployment to the Middle East providing uninterrupted air and missile defense of U. S. Central Command's most critical assets, the Soldiers of Charlie Battery *Cobras* has prepared for the arrival of its Patriot and support equipment back to Fort Bliss, Texas. Along with sister batteries of the 5th Battalion, 52nd Air Defense Artillery Regiment, the *Team Deuce* Battalion, the *Cobras* have successfully prepared for its first major effort since redeployment; rail load operations.

Assigned as Operation Lowrider, the reception of inbound equipment was based within inherent coordination requirements with external transportation agencies ranging from the port, different trucking/line haul services, and the Fort Bliss Railhead. Additionally, Operation Lowrider was challenged as the delay in transport shifted the arrival deep into the battalion's block leave period hindering the availability of all personnel.

The first element was the preparation of available teams for licensing and rail load certification. Leaders from the *Cobras* conducted numerous recons and coordination with the railhead resources. Working diligently with the other batteries, the team consolidated resources and distributed the licensed drivers accordingly. Through successful rehearsals, Charlie Battery refined its dispersal of efforts supporting three distinct but supporting functions; breaking chains, laying spanners (the connective bridge between railcars), and driving the vehicles. Through these rehearsals, leaders recognized points of friction or weak spots in the planning and were able to adjust with leader presence or slight adjustments to the plan.

"The breakdown into teams and division of labor greatly helped the efficiency of the effort, said SPC Bryce Stoepler, B Battery, 5th Battalion, 52nd Air Defense Artillery. "Everyone knew their assigned tasks which reduced any waiting or delay."

Unknown during the initial planning efforts, the battalion's equipment was intermixed with the heavy equipment from an Engineer Battalion from the Alabama National Guard. The first arrival of the train spurred the requirement for additional coordination between the two units as Air Defense and Engineer equipment was sprinkled throughout the railcars.

"While unexpected, working with the Alabama National Guard provided everyone an opportunity to learn from each other and apply the best practices," said MAJ Timothy Kibbe, battalion operations officer, Headquarters and Headquarters Battery, 5-52nd ADA. "In ADA, we don't interact with Engineers or their heavy equipment too often, so this was good experience."

In the end, Operation Lowrider was a success with Charlie *Cobras* and the rest of *Team Deuce* successfully receiving all the returning equipment without damage or safety incidents. This invaluable training experience and the willingness of the team to adjust the plan due to operational dynamics proved the adaptability of our junior leaders.

"I learned with proper planning and diligent execution that larger and monumental tasks can be completed efficiently," said SPC Stoepler, B/5-52nd ADA. "This mission proved that when all the pieces understand the plan and more importantly their portion of the plan; the entire effort can be successful."

2LT Casey McNamee serves as Fire Control platoon leader for Charlie Battery, 5-52nd ADA; he received his commission from the University of Akron.

Left: MAJ Timothy Kibbe and 1LT Dashan Craft, from the Team Deuce Battalion, overlook as an M901 Launching station is strategically loaded onto the railhead.

Right: A highly skilled driver from 5-52nd ADA Battalion takes direction from an Alabama National Guard noncommissioned officer, together, they safely and strategically maneuver a Patriot launching station onto a narrow railhead ramp.

Left: Soldiers from both 5-52nd ADA Battalion and the Alabama National Guard work together to unsecure all pieces of equipment, preparing for a safe and smooth maneuver off the railhead.

Improved training *and* development *for* 14G *and* 14H Soldiers *and* NCOs

CW2 Josh Green

The purpose of this article is to identify the disparity between Air Defense system integration requirements (with specific emphasis on tactical data system initialization and operation by junior enlisted Air Defense Soldiers) and the lack of training and development opportunities.

Although the Air Defense Artillery branch places great emphasis on the importance of integration with adjacent weapon systems and joint platforms, there is a significant lack of Officers and enlisted Soldiers who understand how this is achieved. Within Air Defense units, 14G (Air Battle Management System Operator) and 14H (Early Warning System Operator) are the Military Occupational Specialties (MOS) that are meant to specialize in the initialization, operation, and maintenance of Army tactical data link systems that enable joint integration. Often, because of the difficulty of creating "training" tactical data networks, it can be hard for these Soldiers to receive recurrent training at operational units. This results in the Soldiers having to train exclusively on the job, only building on their system integration knowledge during exercises or operational deployments.

Additionally, the presence of the 140A (C2 Systems Integrator) can become a crutch for tactical data system operators within operational Air Defense units. The 140As receive in-depth training on tactical data link systems, and can fix issues with systems and equipment more quickly as a result. This results in 14G and 14H Soldiers leaning too heavily on their 140A to solve system integration issues, rather than taking the time to troubleshoot problems on their own. It can be difficult for 140As in organizations that occupy multiple locations with numerous tactical data systems and terminals to respond to every issue requiring troubleshooting.

A contributor to this problem is that neither the 14G nor 14H Soldiers receive extensive troubleshooting training on any of their systems. While they do receive instruction on the initialization and operation of the various radios, computers, and terminals required for joint interoperability, the course material lacks focus on how tactical data links and joint data networks function.

One of the major contributing factors to 14G and 14H knowledge gaps is a lack of experienced non-commissioned officers. Because the function of 14G and 14H is so commonly misunderstood, they are often placed into positions outside of their functional area in order to support the organization, such as the orderly room or supply room. This undermines the Soldier's need for repeated, intentional exposure to their equipment. Just as with their 14E, 14P, and 14T counterparts, if they are not regularly immersed in practice, the skills atrophy. Over time, these Soldiers become NCOs who, though a valuable asset to their organization, do not possess the depth of knowledge about their systems or basic tactical data link principles.

This results in 14G and 14H junior leaders being unable to arrange and conduct effective tactical data link training for their subordinates. In fact, it is often expected that the 140A be the singular source for tactical data link training within an organization. This expectation is folly, because while 140As are the Army's tactical data link experts, the role of training and developing these Soldiers must fall to the NCOs.

The 14G and 14H are the only two enlisted MOSs throughout the entire United States Army that undergo extensive training on terminals, computers, and systems that allow for joint communication. Yet, recurrent training for these Soldiers is significantly under-prioritized at operational units. This is because the importance of tactical data links is not universally understood throughout most Army units the way it is in the other services. In Air Defense Artillery, tactical data links enable the safe and effective engagement of hostile targets while reducing the risk of fratricide. In Air Defense, the

14G and 14H Soldiers must be able to initialize, operate, and if necessary, troubleshoot tactical data links on their own. Along with reflecting this in their Advanced Individual Training, this is accomplished through repetitious and intentional exposure to each of the tactical data systems. It is in this practice of navigating the menus, exploring the ancillary functions, and experimenting in the command prompt, that the Soldiers truly learn how each machine and terminal behaves in different circumstances. Leadership should do more to ensure that this exploratory training occurs before the organization deploys in support of exercises and operational missions.

If 14G and 14H Soldiers are untrained and inexperienced before an exercise, the training value for that event has already been reduced exponentially, as much of their exposure to the systems will be hasty efforts to establish connections with no real understanding for how it is done. With no expectation that they will call upon the skills until the next exercise, the Soldier has no incentive to internalize them, and will likely struggle just as much during the organization's next training event. This attitude, while a nuisance during an exercise, can have deadly repercussions. Units that participate on tactical data networks must ensure that their tactical data system operators have a thorough understanding of how to do so properly. At a minimum, poor understanding of tactical data links can lead to inaccurate positional data being transmitted, intermittent communication, or a complete inability to establish connectivity altogether. In a worst-case scenario, it could result in data loops, incorrect network role assumption, or the misidentifying of friendly and hostile aircraft, all of which could lead to the destruction of equipment or loss of life.

The function of tactical data link training must be returned to the NCOs in these MOSs. The 14G and 14H leaders must be empowered and enabled to learn as much as they can about the principles of tactical data links, as well as how to operate the necessary systems and terminals. Commanders and senior leaders must enable "freedom of education" on these topics for 14G and 14H Soldiers whom they seek to promote. Additionally, leaders must hold these Soldiers accountable for their knowledge as they graduate into leadership positions. NCOs in these MOSs must exhibit an understanding of tactical data links, systems, and terminals that will enable them to train and lead Soldiers in this unique and vital discipline.

Col. Byron Newell, commandant of the Advanced Airlift Tactics Training Center, Missouri Air National Guard, briefs airmen at the Data Link User Group conference. The conference is designed to innovate and improve all areas involved with data link communications. Photo by Senior Airman Andrew Rivera, 139th Airlift Wing, Saint Joseph, Missouri.

The culture of these MOSs must be reformed in order to:

- Increase the tactical data link knowledge base across Army organizations
- Cultivate a continued flow of junior leaders who can lead tactical data link training

Tactical data links are unique communication media that the Army shares with the entire joint community. The Navy, Marine Corps, and Air Force understand this joint concept. For the Air Force and Navy, tactical data link competence is so essential to their daily operations because many of their platforms require line-of-site means of exchanging data. Because of this, they place great emphasis on the training and development of the personnel who initialize, operate, and manage tactical data links within their units.

The Army cannot be different in this aspect. Because tactical data links are a joint concern, the Army must take up the same level of concern for the training and development of their operators. The Army must take a greater interest in the training and development of 14G and 14H Soldiers. Ensuring that these Soldiers are continuously exposed to and tested against the principles of their systems and equipment will increase the knowledge base for tactical data links across the Army.

Starting this at the base level for 14H and 14Gs would undoubtedly result in the growth of proficient leaders in both MOSs. The ground-level experience will help them understand tactical data links to such a degree that they can organize effective training and troubleshoot issues with connectivity and equipment independent of a 140A. This adds to the autonomy of units that occupy multiple locations, but still require tactical data link participation to accomplish their mission.

Changes to 14G and 14H NCO professional development would augment culture change as well. As these Soldiers matriculate in the Advanced Leader's Course (ALC) and Senior Leader's Course (SLC), they should be approaching the pinnacle of their tactical data link knowledge level. Implementing more tactical data link course material at these levels would serve to fill in gaps for those who lack experience from the different levels of Air Defense operations, as well as to hold the entire 14G and 14H NCO community accountable for tactical data link knowledge. The Army must insist upon "technical and tactical" proficiency in this domain from all ALC and SLC graduates. As they transcend into senior leadership of the MOSs, they will become the standard bearers for how the Army utilizes tactical data links.

Tantamount to 14G and 14H's NCO Education System, is the attendance of schools offered by the Joint Interoperability & Data Link Training Center (formerly, the Joint Interoperability Division). These courses include:

- JT-102: Multi Advanced Joint Interoperability Course
- JT-201: Multi-TDL Planner's Course
- JT-220: Link Unit Manager's Course
- JT-310: Advanced JICC Operator's Course

The Joint Multi-Tactical Data Link School offers these courses to service members from across the DOD who work with tactical data links. Attending these courses puts Army tactical data link personnel in the chair next to their Air Force, Navy, and Marine Corps counterparts to receive in-depth tactical data link training. This training enables them to see how Army units (as well as the other services) fit into the puzzle. The knowledge gained regarding platform capabilities and limitations, the Operational Tasking Data Links, and data link management are invaluable to leaders in 14G and 14H MOSs. Adding these courses to the career map for 14G and 14H would greatly increase tactical data link proficiency and knowledge throughout the entire Army.

Leaders in the Air Defense Artillery branch must ensure that 14G and 14H Soldiers are placed into positions that allow them to train on their tactical data systems regularly. The 14G and 14H NCOs must be encouraged to attend schools that expand their knowledge of tactical data links, in order to ensure that immersive, engaging training is provided to their Soldiers. To be a truly "joint" Army, we must make sure that the operators of our tactical data systems are proficient, and proficiency in tactical data links only comes through immersive training.

CW2 Joshua Green is a Command and Control Systems Integrator currently participating in the Air Defense Artillery Warrant Officer Training with Industry program. Since becoming a Warrant Officer, CW2 Green has been assigned to 2nd Infantry Division Artillery ADAM/ BAE Cell, Charlie Battery, 5-5th ADA, and 5-5th ADA BN Headquarters.


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Applying space fundamentals to improve Air Defense resiliency

By CPT Josh Fergel

Throughout Operation Enduring Freedom and Operation Iraqi Freedom, the enemy's weapon of choice was the improvised explosive device (IED). The United States was ill-equipped to operate in an IED-rich environment, which significantly restricted the military's freedom of movement. The U.S. spent billions of dollars to develop countermeasures to mitigate the effects of the enemy's most lethal and plentiful weapon.[1] The U.S. Army's training was initially insufficient in promoting force protection in IED operational environments, and the insurgent forces demonstrated that the IED was the "King of Battle."

As the Army shifts its focus to near-peer threats, identifying the next "King of Battle" will mitigate the same sense of vulnerability created by the IED. Given the increased dependency on technology, the "King of Battle" in a near-peer conflict will likely involve the electromagnetic spectrum (EMS). While the Army's recent technological advancements have significantly improved the force's capabilities, the consequence of continuous modernization is that the Army is transitioning from a space-enabled force to a space-dependent force. While the Army retained space superiority throughout counterinsurgency operations, near-peer adversaries demonstrated methods to deny our space-enabled capabilities. Modern adversaries can jam, spoof, and disable our space-based technology. Most importantly, they can deny our satellite communications (SATCOM) and our position, navigation, and timing (PNT) capabilities. This denial creates what is referred to as a denied, degraded, and disrupted space operational environment (D3SOE) where the EMS is contested. The EMS is nicknamed "the spinal cord of the modern Army." Obtaining EMS superiority fosters a combat advantage across every other domain.[2] As Air Defenders, a failure to understand the implications of a D3SOE will result in the inability to execute our mission in a near-peer conflict. Unfortunately, the Army's Initial Entry Training curriculum does not adequately cover the basics of mitigating a D3SOE. By implementing a few simple practices at the battery and battalion levels, units can significantly improve their resiliency to enemy EMS interference.

While D3SOE covers both the EMS and the physical architecture that enables space-based assets, specific characteristics are more critical to the air and missile defense mission. The robust communications equipment within ADA units result in Air Defense batteries being comically described as communications units with interceptors. Air Defense batteries are often required to be geographically separated from their sister units (and commonly their higher headquarters). This separation demands a robust and validated primary, alternate, contingency, and emergency communications plan to maintain situational awareness of the collective defensive counter-air fight.

Depending on a unit's emplacement location, the local terrain or the physical distance between units may rule out line-of-sight (LOS) communications. For example, dependency on LOS communications in the Indo-Pacific Theater can almost guarantee unit autonomy, given the mountainous terrain and significant distances between adjacent units. In the absence of LOS communications, a common alternative is satellite communication systems. Whether achieved through organic capabilities or the augmentation

1 *Operating in a denied, degraded, and disrupted space operational environment.* Center of Army Lessons Learned (2018). Fort Leavenworth, KS.

2 Freedberg, S. J. (2016). Red electrons: Army rapid capabilities office fights Russian GPS jamming, cyber, EW. *Breaking Defense* Retrieved from https://breakingdefense.com/2016/11/red-electrons-army-rapid-capabilities-office-fights-russian-gps-jamming-cyber-ew/

of an attached signal team, SATCOM mitigate the effect that terrain and distance impose on units. However, the robust architecture required for SATCOM is an ample target for adversaries. If geography denies traditional LOS communications and the adversary denies SATCOM, Air Defense units need to find alternative methods to maintain connectivity.

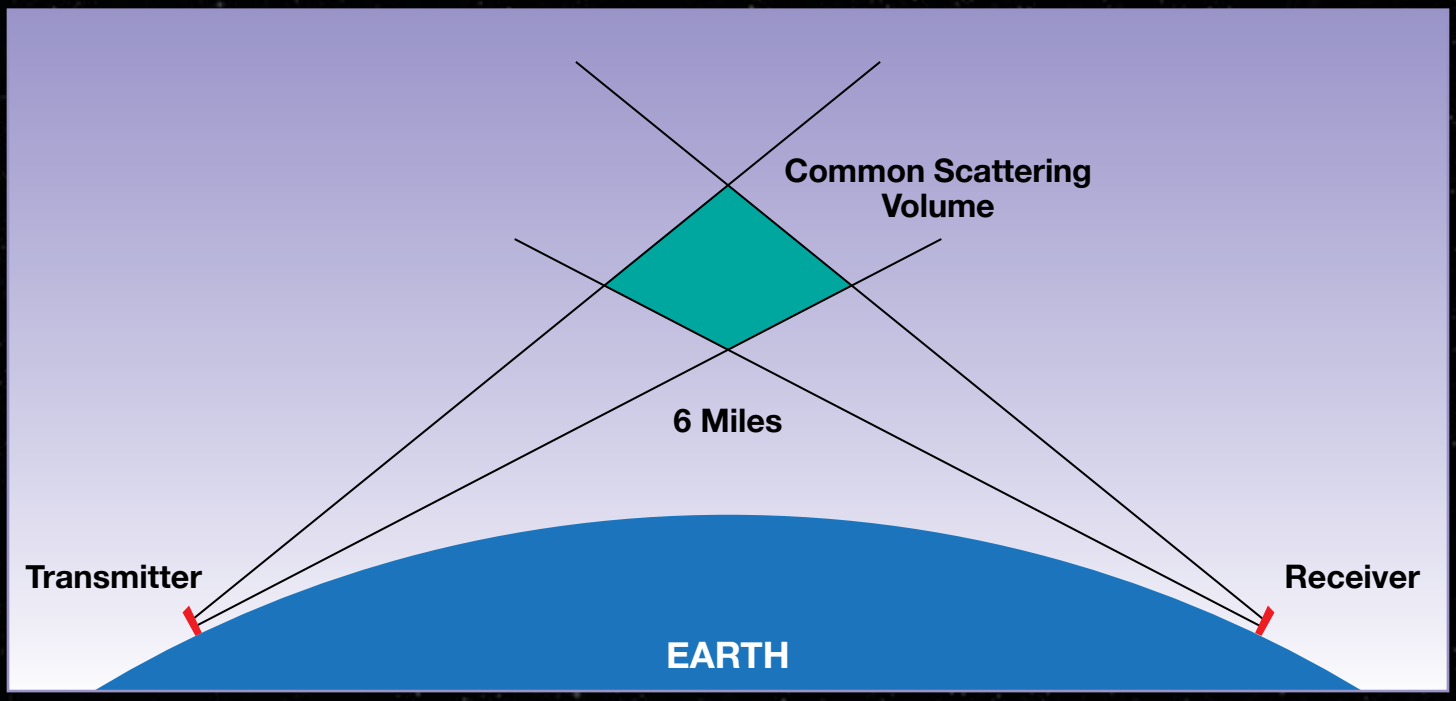
Troposcatter communications (commonly referred to as "TROPO") is an under-trained communication method that combines LOS communication's ability to establish point-to-point communications with SATCOM's ability to extend connection beyond the horizon and over terrain. TROPO extends point-to-point communications beyond the horizon to ranges as far as 200 miles by bouncing radio signals off of the troposphere.[3] Since the troposphere is where water vapor collects in the atmosphere, some radio frequencies are unable to pass through the vapor and are instead reflected towards the ground. If aimed correctly, Air Defense units can bounce these radio signals off the troposphere towards an adjacent unit that would otherwise be masked by terrain.

While TROPO for voice communications dates back to the 1960s, modern Air Defense units often lack the training to incorporate this capability into their communications plan. With the emerging threat posed by D3SOE, TROPO offers a more reliable method of communicating. Unlike SATCOM, TROPO does not rely on a space-based infrastructure and is therefore challenging for enemies to jam. A unit that is proficient in TROPO is a unit that is better prepared to operate on a modern battlefield.

Arguably the most significant impact a D3SOE will have on Air Defense units is the denial of PNT. The Global Positioning System (GPS) signal is weak and can be easily jammed with inexpensive equipment found worldwide. By using a GPS jammer that uses one-fifth of the power of a standard tactical radio, the enemy can neutralize all GPS-enabled devices within 50 miles.[4] It can be assumed that GPS will be partially or completely unavailable on a modern battlefield, given the significant cost-benefit ratio of GPS jamming. Therefore, the two most prevalent warfighting challenges are how to recognize GPS jamming and how to mitigate these effects.

3 Keller, J. (2013). Army revisits troposcatter communications technology as alterative to long-range SATCOM. *Military & Aerospace Electronics*, 24(9), 6-7. Retrieved from https://www.proquest.com/docview/1433034825/abstract/84B01EA806A04789PQ/1?accountid=12085

4 Morgan, W. (2017, September 2). *U.S. Army unprepared to deal with Russia in Europe*. Politico. Retrieved October 17, 2021, from https://www.politico.com/story/2017/09/02/army-study-173rd-airborne-brigade-europe-russia-242273



This drawing illustrates how troposcatter communications can carry voice and data at beyond-line-of-sight distances.

PS Magazine, The Preventive Maintenance Monthly, Issue 761, Apr. 2016, Pages 48-51. https://www.logsa.army.mil/psmag/archives/ PS2016/761/761-49-51.pdf.

There are many reasons why a GPS receiver may malfunction, but there are even more misconceptions surrounding what can impact the GPS signal. For example, believing that a poor GPS signal results from inclement weather is a common misunderstanding. The GPS signal is an Ultra High Frequency within the "L Band." While this frequency is subject to ionospheric disturbance (think of the aurora borealis), it is not typically impacted by terrestrial weather. It is unlikely that GPS would be significantly affected by cloud cover, so a local storm should not be blamed for degraded GPS capabilities. Operators need to continue to troubleshoot a poor GPS connection regardless of the local weather.

If GPS is degraded or denied, the first step an operator should take is to check their PSN-13 Defense Advanced Global Positioning System Receiver (DAGR). If GPS is jammed, the DAGR will display a message stating that a jamming environment is detected. Unfortunately, if the DAGR is not encrypted and is actively being jammed, the next step an operator must take is to resort to manual position finding. Once an unencrypted DAGR is jammed, the DAGR will not receive accurate positioning information until the jamming ceases. If a DAGR is encrypted before entering a GPS-denied environment, the DAGR will retain positioning capability. Encrypting DAGRs is an easy solution to mitigating the effects of a D3SOE and, if properly loaded, they only need to be filled with crypto once every calendar year.[5]

Many of the space-based capabilities that were taken for granted during counterinsurgency operations may potentially be the Achilles' heel of the modern Army. Similar to how a DAGR needs to be encrypted before entering a D3SOE environment, the Army needs proper training on D3SOE mitigations before entering a near-peer conflict. Training on troposcatter communications and encrypting DAGRs are two easy steps that Air Defense units can take to improve resiliency against enemy jamming. The current trajectory of Air Defense modernization suggests that Air Defense and space operations will grow increasingly intertwined. A basic understanding of space-based capabilities will be required of every Air Defender. There is no better time than the present to start incorporating space fundamentals into the Air Defense curriculum.

CPT Josh Fergel currently commands Delta Battery, 6th Battalion, 52nd Air Defense Artillery Regiment at Osan Air Base, Republic of Korea. He graduated from the Space-200 course at the National Security Space Institute in 2019 and spent 49 months serving in a space-cadre billet.

5 *Operating in a denied, degraded, and disrupted space operational environment.* Center of Army Lessons Learned (2018). Fort Leavenworth, KS.

Good News!

GETS is still available to the warfighter!

Picture from the Circuit Card division which shows the GETS 2 station. LEAD is fielded with the most up-to-date equipment for testing parts.

You could potentially cut your Diagnostic Mandatory Parts List (DMPL) replenishment in half saving an average 60% of those funds and restock your shelf twice as fast!

By CW3 Frank S. Konya

Due to lack of use, the decision was made to shut down the General Electronics Test Set (GETS) facility in Fort Bliss, Texas. The Integrated Fires Mission Command (IFMC) funded a program to continue the support of testing DMPL spares at Letterkenny Army Depot (LEAD). LEAD is the sole provider of the GETS to the Continental U.S. force since May 2020.

Even though the program has been up and running for over a year, zero items have been received for testing. According to Bill Hengst, LEAD Circuit Card branch chief, LEAD is ready and available to start testing immediately. Despite the ready capability, LEAD has not received any assets from the field as of yet. So, why hasn't anyone sent anything? Why isn't this program widely known? Why hasn't this capability been historically used more often?

Some of the responses received from the field indicate a lack of trust in providing IFMC with parts; it's easier to simply reorder, or that it takes too long to ship and receive items. Others claim they were never told about the program or that they just didn't know the process. We hope to set the record straight and address each of these concerns by outlining the simple and effective process to save you time and money.

What does this mean for the warfighter?

With readiness being one of the Army's top priorities and the reality of shrinking budgets, the most obvious benefits of using this program are enabling readiness by reducing unnecessary Class IX part consumption. When using parts to troubleshoot a system failure, you have the option to send it for testing, validation, and repackaging. This is done in lieu of reordering a spare where you may pay full price for the item or face a supply shortage resulting in extended Not Mission Capable Supply times. Not only does the practice of reordering a part solely because it is unpackaged or the validity is questionable cost units thousands of dollars, but this also strains supply lines on already critically managed parts specific to Patriot equipment.

How does it help?

No Evidence of Failure (NEOF) screening will increase useable parts stocked in your DMPL inventory and significantly decrease required Class IX funds and the time to order and receive requested spares. As we have all witnessed over the years, we sometimes operate in an environment with restricted assets, low funds or both. GETS can alleviate some of these burdens by verifying the operability of parts and repackaging them to Class A standards.

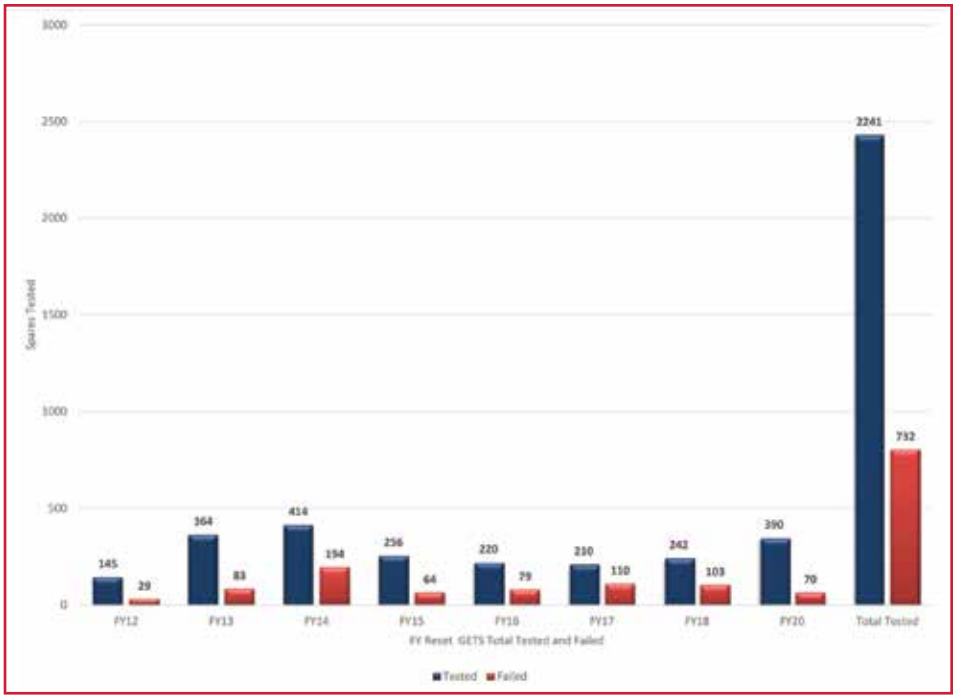


Figure 1: Chart and data show the trends of parts sent vs. failed over the last eight years. (Courtesy of IFMC)

Having long lead times for items to restock our DMPL is nothing new. These lead times are a result of high demands in the supply system, the lower priority used to order these parts, and of course, funding. Instead of just reordering a part 04 priority at full price, you have the option to send the items to Letterkenny to be screened for NEOF.

Some data collected from the LEAD Circuit Card branch states that over 50% of items sent to the lab come back with NEOF. That's a pretty high number! But is it accurate? We compiled the information and analyzed it for ourselves. We crunched the numbers from the last three fire units that went through Reset, and they speak for themselves. Out of three battalions, 390 items with a total value of $6,799,753 were sent for testing and only 70 showed evidence of failure, which means 82% of items showed NEOF! Based on this data, 320 items valued at $4,801,330 were Class A repackaged and returned to the units (see Figure 1.)

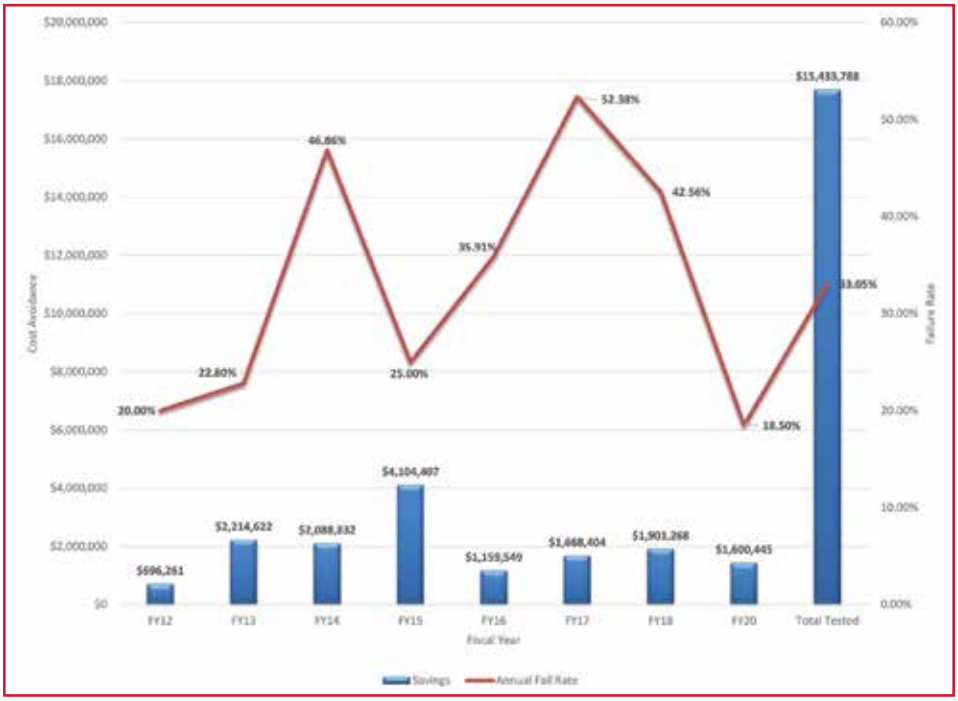


Figure #2 Data shows trends in cost avoidance over the eight years. (Courtesy of IFMC)

The information gathered from the three units gives us an average cost avoidance of $1,600,445 per battalion. Although the quantity and frequency of the items sent vary from unit to unit, if the average continues, and we consider Reset as an annual interval and multiply that number across the branch, it gives us an average cost avoidance of $16,004,453 annually. Maintaining GETS testing at regular intervals versus consolidating everything via Reset leads to even higher estimates in savings: by increasing the frequency of parts, you will increase the number of parts sent (see Figure 2.)

What is the process?

The testing stations at LEAD are exact replicas of the system used by the manufacturer to test items after refurbishment to fulfill your requisition. This process returns a Class A packed, tested item to you to restock your shelf. The question of the history of that part and status is removed as a result of this

process. Nothing is perfect, but the same goes for items ordered that could produce out-of-the-box failures — something we have all experienced.

Regardless of what you have previously heard, the process is simple. From your home station, gather items that need to be tested and fill out the paperwork in accordance with the GETS Standard Operating Procedure, published July 2020. These items should be packaged to prevent further damage and sent to the IFMC Field Office. The IFMC Field Office will receive your assets and conduct an inventory. From there, your items will be sent to the appropriate LEAD screening shop where technicians will determine the operability of the receipted GETS items. The GETS shop will return tested assets to the IFMC Field Office, which are then returned to the unit representative. The unit will be provided with a tracking number and notified when received by IFMC.

Ship the items to:

IFMC-FO-C (W90WYC)
ATTN: GETS Coordinator
4750 Technology Ave.
Chambersburg, PA 17201

There are a couple of factors that affect the timeline of your parts: the shipping time and the number of items sent. According to Hengst, the assets could be tested within a few days after receipt. You can reach out to them for updates or to help expedite the process if necessary. The good news is that you have a representative from the field here in the Training with Industry position at LEAD to help you keep track of these items.

One way to streamline this process is to designate a unit GETS representative. It is highly recommended that each battalion establish a GETS program and designate representatives from each battery on appointment orders. Each unit should provide the IFMC Field Office with a copy of the GETS appointment orders as well as the unit commander's assumption of command orders. The battalion GETS representative should establish shipping intervals and request the Transaction Account Code to ship GETS spares for the entire battalion. The battalion representative can gather all items from the batteries and send them once a month or as needed. Working this into the battle rhythm would simplify this process and still receive all the benefits of the program.

Another great opportunity to send parts for GETS screening is prior to deployment. During the time leading up to deployment, ordering has to stop to clear DODAACs, which are normally shut off. If you send your parts to be tested, not only are they validated just prior to deployment, but are also Class A repackaged to prevent any damage during shipment.

So what is the takeaway?

The negative reasons identified as to why Soldiers are not using this valuable resource are far outweighed by the added benefits GETS provides. Despite the reasons for not using the program, none of them challenge the significance of what GETS screening provides the warfighter. This very simple process, if used correctly, will save time and money. If items can be tested, they should be tested. This, in turn, will improve readiness by decreasing spares' lead times while increasing our inventory and saving significant Class IX funds in the process. I hope this short article will help familiarize warfighters with this simple process and encourage units to take advantage of this great resource. Remember, we are all stewards of the Army's funds, responsible for the conservation of resources and outcomes of our decisions. Be responsible. Save your unit's budget and use GETS!

CW3 Frank Konya is an Air Missile Defense technician with over 16 years of operational experience. He has served the Air Defense Artillery Branch as a technician and maintenance manager for over seven years to include multiple deployments and strategic missions. He is currently at Letterkenny Army Depot participating in the Training with Industry program learning industrial-level operations and management.

Building **partner capacity** *through* **interoperability**

By MAJ Justin Ruholl

The U.S. constantly faces evolving threats across the multi-domain sphere. Near-peer adversaries in the air domain are a constant problem for Air Defense operations. Partner building and integration is key to U.S. success in the Air and Missile Defense domain against threats in the European Area of Operations (AO). The 10th Army Air and Missile Defense Command (AAMDC), located in Sembach, Germany, is leading the charge in Europe.

On a routine basis, the 10th AAMDC engages in Integrated Air and Missile Defense (IAMD) exercises and key leader engagements that have strategic effects across Europe. One strategic engagement occurred in September 2021 with the country of Latvia. The 10th AAMDC sent technical and planning experts to build on existing relationships with Latvian leaders to advance the progress of AMD operations with NATO allies. This engagement represents just one example of 10th AAMDC executing its IAMD Engagement Strategy, which seeks to build robust human, technical, and procedural interoperability to ensure all IAMD allies and partners are ready and well-equipped to respond—*together*—to a range of possible contingencies.

The 10th AAMDC advised Latvian forces on integration of their AMD platforms and forces into the broader NATO community. Latvian armed forces understood the aerial threats they may face and the need for fully integrated AMD. During the visit, the 10th AAMDC team observed Stinger/Avenger and RBS-70 units positioned to protect the maneuver force from aerial threats (fixed wing, rotary wing, and unmanned aircraft system).

(From left to right): U.S. Army CPT Craig Mainhart, CW4 David Bonds, Latvian Army Col. Masulis Viesturs, U.S. Army MAJ Justin Ruholl, Latvian Army Capt. Gints Rasa-Gravitis, U.S. Army SSG Denzel Allen and SSG Isabell Martin (MAJ Justin Ruholl/ U.S. Army)

Both units demonstrated their identification techniques, engagement measures, and reporting procedures when faced with an aerial threat. During the demonstration, the 10th AAMDC team provided tactics, techniques and procedures (TTP) from years of experience conducting short-range air defense operations. Following the visit, the 10th AAMDC team observed the mechanized infantry brigade's (MIB) battle update brief, the main fighting force for the Latvian Army. The MIB is continuously improving its operation's processes for Air Defense at the brigade level and higher. Latvian air defenders were eager to benefit from the experience and TTPs provided by *Team 10th*. The integration of Latvian Air Defense will offer an additional layer of protection for critical assets and maneuver forces, enable freedom of movement for NATO allies and partners, deter aggression, and promote regional security and stability. For this to occur, Latvia and other NATO forces must establish a stable network of sensors and shooters that can ensure full coverage of the AO against air and missile threats.

The U.S. has recognized the requirement to have an established persistent network that allows sensor data from the Baltics and Poland to ride across the Mission Partner Environment (MPE) Network. Congress has provided funding through the Building Partner Capacity Program for command and control systems, communications systems, and sensors for the Baltic Nations to enable interoperability between the U.S. and the Baltics. The 10th AAMDC is closely working with U.S. European Command, U.S. Air Forces in Europe & Air Forces Africa, and U.S. Army Europe and Africa to ensure the Baltic Region receives the equipment needed and has the mentorship required for a secure region through building relationships for success. The MPE network will provide sensor data from the Baltics to U.S. forces running parallel to the current NATO Secret wide area network. This action will assist coalition mission management prior to a declaration of NATO Article 5. The parallel MPE network will facilitate faster integration and interoperability times between the U.S. and the coalition weapon systems.

All told, the efforts in Latvia provide an excellent example of the great work the Soldiers from *Team 10th* do every day to deter potential aggression and contribute to the collective defense of Europe. In one short week, the team in Latvia made significant strides in developing its human, technical, and procedural interoperability with a key Baltic ally. The 10th AAMDC will continue to attack this crucial line of effort across the entire theater as the unit builds partner capacity through interoperability.

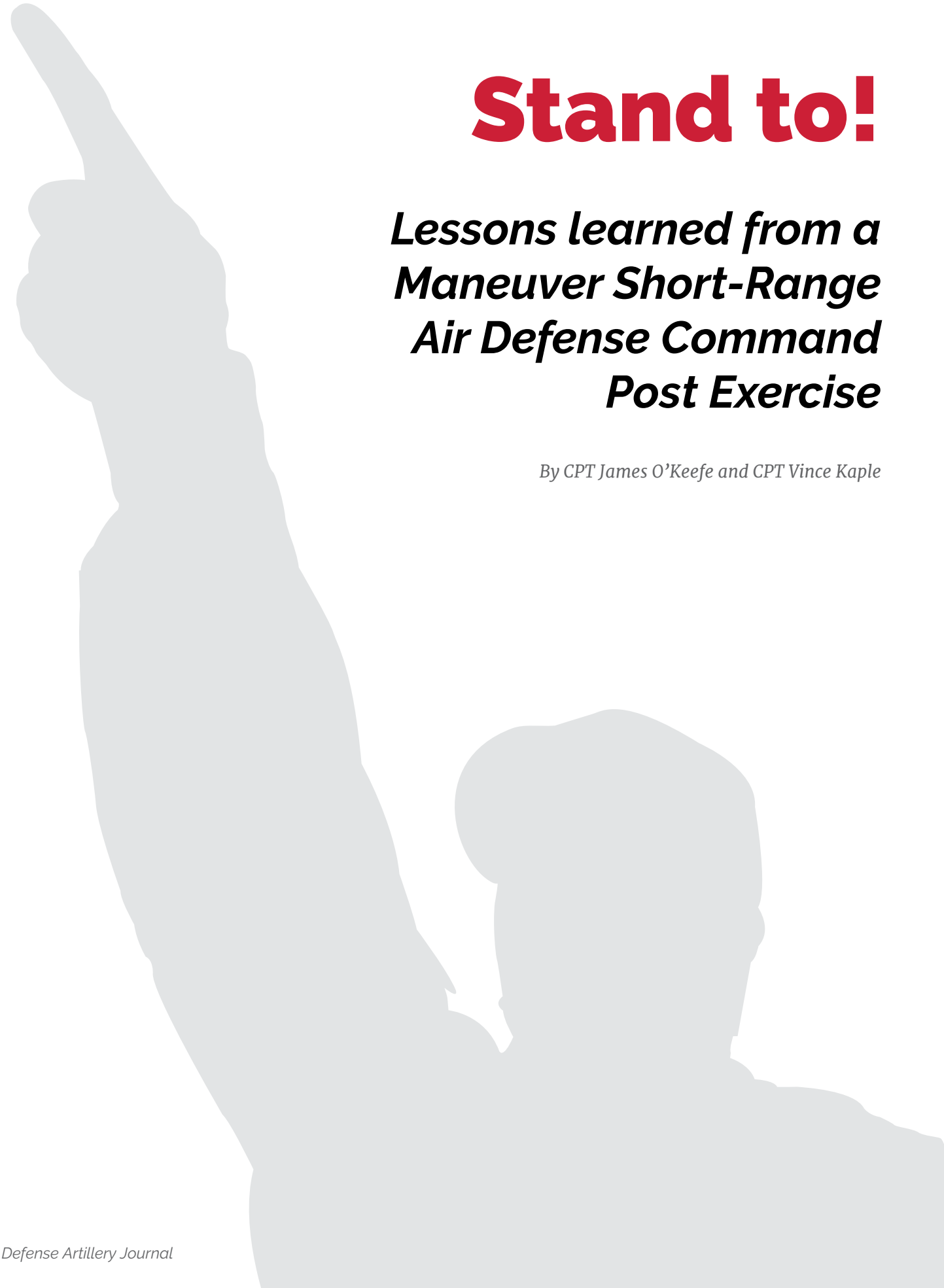
MAJ Justin Ruholl is a post key development major that served as a battalion executive officer and brigade S3 in South Korea under the 35th Air Defense Artillery Brigade. After serving as the brigade S3, he attended the School of Advanced Military Studies (SAMS) and graduated in the spring of 2021. Ruholl currently serves at 10th AAMDC G35 and as the SAMS planner.

Latvian Army Capt. Gints Rasa-Gravitis briefs the 10th AAMDC team on tactics, techniques and procedures their units conduct during Air Defense missions. (MAJ Justin Ruholl/ U.S. Army)

Stand to!

Lessons learned from a Maneuver Short-Range Air Defense Command Post Exercise

By CPT James O'Keefe and CPT Vince Kaple



The return of large-scale combat operations (LSCO) to the center of U.S. Army preparations has great implications for the Air Defense Artillery (ADA) Branch. The armed forces of other states possess potent fixed-wing (FW), rotary-wing (RW), and unmanned aircraft system (UAS) capabilities which were mostly absent from the counterinsurgency battlefields of Iraq and Afghanistan. To counter these threats, the Army reintroduced short-range air defense (SHORAD) battalions, beginning in 2018 with the establishment of the 5th Battalion, 4th Air Defense Artillery Regiment (5-4th ADAR) in Ansbach, Germany.[1] The 5-4th ADAR is also the first unit to field the newly developed M-SHORAD system, which is a Stryker-based firing unit equipped with radar, Stinger missiles, a 30 mm chain gun, and a 7.62 mm machine gun.[2] This article will explore the challenge of preparing a SHORAD battalion headquarters (BN HQ) in the modern force structure and how the 5-4th ADAR overcame that challenge through a command post exercise (CPX) facilitated by Mission Training Center Grafenwöhr (MTC-G). The article will describe lessons learned from the CPX in the areas of current operations (CUOPs), tactical standard operating procedures (TACSOP), and simulation design with recommendations for the benefit of future SHORAD battalions.

The principal training challenge for the 5-4th ADAR BN HQ is the lack of a habitual relationship with a division. Until 2005, the Army typically assigned each division one SHORAD battalion, which facilitated the regular integration of the battalion into division operations.[3] Leaders today still generally assume that a SHORAD battalion will support a division in combat. However, there are too few SHORAD battalions for the Army to assign one to each division. The Army instead organized 5-4th ADAR under the 10th Army Air and Missile Defense Command (AAMDC) and will assign the battalion command and support relationships as necessary during combat operations.[4] This organization is a commonsense solution to managing a limited asset, but it also creates training challenges. The 5-4th ADAR spends most of its time training internally or responding to the requirements of the 10th AAMDC, which is proper but does not represent how the battalion will fight. As a result, 5-4th ADAR has few opportunities to develop the integrated standard operating procedures or the face-to-face relationships with the division staff which 5-4th ADAR will support in combat. One solution to this training problem is to conduct a CPX rehearsing integration into a division during combat operations, which is exactly what the 5-4th ADAR executed at MTC-G in April of 2021.

The 5-4th ADAR prepared for the CPX at MTC-G by conducting three internal CPXs. Each CPX lasted one week and focused on the military decision-making process (MDMP). These preparatory CPXs allowed the staff to gain confidence with MDMP and refine their tools. The 5-4th ADAR began the culminating CPX on 12 April with a tactical road march from Ansbach to MTC-G. After arriving at Grafenwöhr, the unit conducted five days of MDMP planning followed by five days of battle execution. MTC-G supported the CPX with a custom-made decisive action training environment (DATE) scenario simulated in the Low Overhead Training System (LOTS).[5] The DATE scenario

1 Gary Sheftick, "Army rebuilding short-range air defense," Army News Service, July 3, 2019, https://www.army.mil/article/224074/army_rebuilding_short_range_air_defense.
2 Jordan Allen, "M-SHORAD system bolsters Army's air defense capabilities," Army News Service, April 23, 2021, https://www.army.mil/article/245530/m_shorad_system_bolsters_armys_air_defense_capabilities.
3 U.S. Army Air Defense Artillery School, Field Manual 44-63: ADA Battalion in the Heavy Division (Washington, D.C.; Department of the Army, March 1992), page 1-1.
4 Army Air Defense doctrine envisions that AAMDCs will task organize air defense assets in combat and states that "SHORAD forces are positioned with division or brigade maneuver formations in the close area…" See U.S. Army Air Defense Artillery School, Field Manual 3-01: U.S. Army Air and Missile Defense Operations (Washington, D.C.; Department of the Army, December 2020), paragraphs 1-50, 7-11, and 7-31. However, not all SHORAD BNs will be organic to AAMDCs. The Army is in the process of establishing a total of four SHORAD BNs. 5-4 ADAR is an organic unit of the 10th AAMDC. The Army plans to organize 4-60 ADAR and 6-56 ADAR, two SHORAD battalions which are currently standing up, as organic units of the 32nd AAMDC and the 1st Cavalry Division Artillery respectively. Plans for the organization of the fourth SHORAD BN are not settled.
5 MAJ Morgan E. Montgomery, Exercise Planner at Joint Multinational Simulation Center, email message to authors, June 14, 2021.

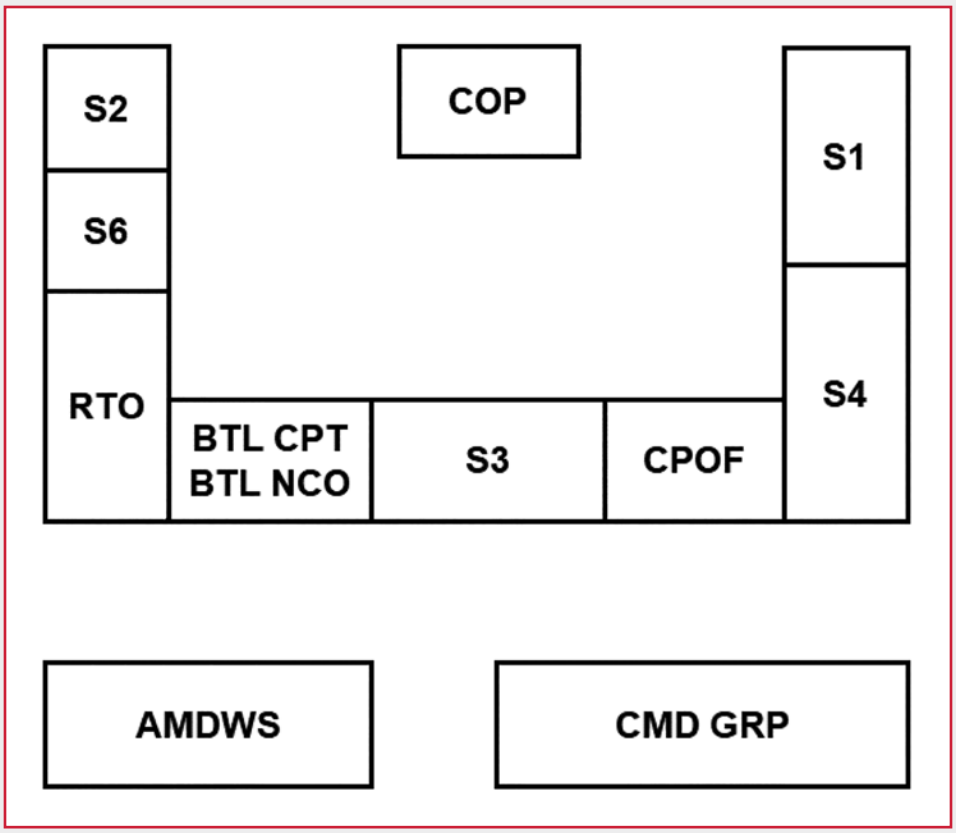


Figure 1. 5-4th ADAR CUOPs layout during battalion CPX.

featured 5-4th ADAR integrating into the 1st Cavalry Division while the division conducted LSCO against a fictional, near-peer adversary in northern Poland. The LOTS simulation allowed 5-4th ADAR to practice MDMP and Mission Command in a live and dynamic environment while using common Army computer systems, such as the Air and Missile Defense Workstation (AMDWS). The 5-4th ADAR conducted the CPX using only unclassified information and systems. Overall, 5-4th ADAR successfully completed the training event, which certified the unit as trained on its mission-essential tasks.

Although successful, 5-4th ADAR still experienced significant challenges during the CPX. The next three paragraphs will describe those challenges, identify the underlying causes, and provide recommendations. First, 5-4th ADAR initially struggled to perform CUOPs and future operations (FUOPs) functions simultaneously. The preparatory CPXs featured no CUOPs training, which meant the staff had to learn CUOPs duties on the job during the culminating CPX. Some staff leaders also attempted to simultaneously perform CUOPs and FUOPs duties due to the small size of the battalion staff. Although possible in theory, this practice led to an over focus on CUOPs at the expense of FUOPs. To avoid these issues, SHORAD battalions should incorporate CUOPs training into their CPX preparation. Even limited CUOPs training, such as battle tracking a battery field training exercise in a local training area, would benefit units by giving junior staff members an opportunity to learn CUOPs functions, practice CUOPs duties, and refine their tools. Additionally, the command post (CP) manning roster should deliberately assign staff members to either FUOPs or CUOPs to ensure both receive adequate staff attention. These two recommendations, when implemented, will allow a SHORAD battalion staff to begin the culminating CPX ready to refine, rather than learn, the balance between CUOPs and FUOPs.

The 5-4th ADAR operations also suffered from the lack of a sufficient TACSOP. The existing TACSOP did not specify any standardization for announcements in the battalion CP. Common announcements, such as aerial contact reports, often disrupted the staff due to inefficient phrasing and the inclusion of unnecessary in-formation. The TACSOP also failed to specify reporting standards from subordinate batteries. As a result, many batteries under communicated aerial contact reports or engagement reports, because they assumed the common tactical picture (CTP) on AMDWS communicated all necessary information. Finally, the TACSOP CP layout made it more difficult than necessary for the staff to battle track. The AMDWS operator, who produced the majority of CP reports, worked away from the intelligence and operations sections, who were the primary consumers of the reports (see figure 1). Battalion leaders should review their TACSOP prior to a CPX to ensure it includes standardization of common CP announcements and requirements for batteries to send verbal or digital reports in addition to data provided by

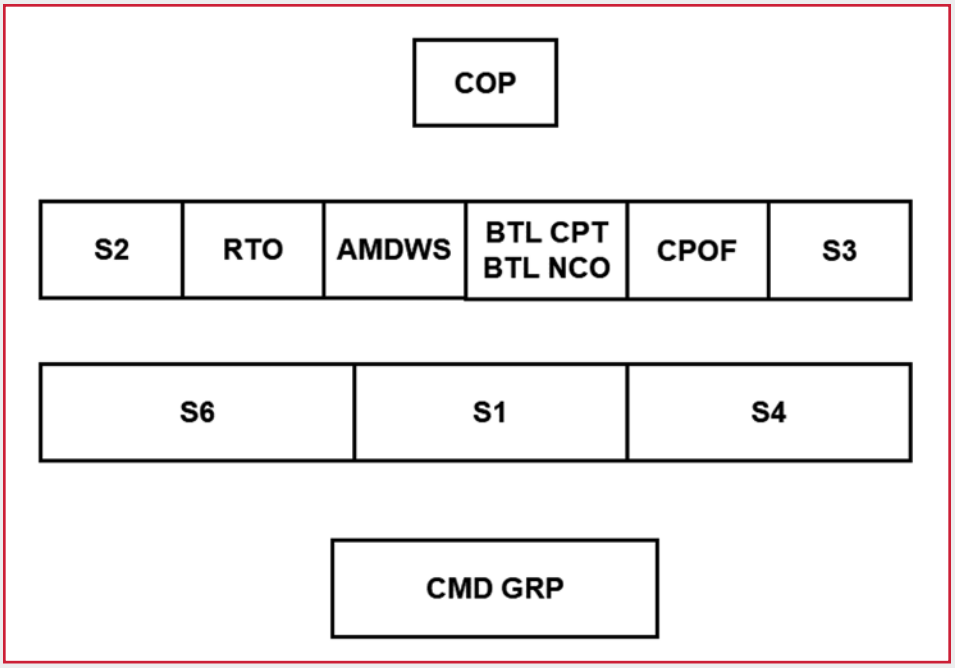


Figure 2. Recommended battalion CUOPs layout.

the CTP. The TACSOP CP layout should also position the AMDWS operator and RTOs between the intelligence and operations sections, who are the primary consumers of reports (see figure 2). Overall, implementation of these recom-mendations will allow a SHORAD battalion to efficiently battle track and devote more energy to assessments and decision-making.

Finally, 5-4th ADAR did not maximize training value by fully influencing the exercise design. The S4 section, the S6 section, and especially battery representatives acting as lower-level commands stated that training value was low during the after action review. Additionally, the simulation initially featured wildly inaccurate speeds for threat aviation assets, with some UAS traveling in the simulation at three times their actual maximum speed. To avoid these issues, all battalion staff sections should invest in CPX planning conferences and the master scenario event list conferences to maximize and diversify training value. BN HQs should instruct subordinate units to view the CPX as a training exercise for the subordinate units and not just a "puckster tasking." SHORAD battalions should also provide MTC-G, or other training support personnel, with detailed threat kinematics and other threat information so that the simulation accurately reflects the threat. In short, the overall quality of a CPX is a near direct product of the preparatory effort the training unit puts in and SHORAD battalions should invest heavily.

As long as 5-4th ADAR remains unassigned to a division, simulation facilitated CPXs provide good and readily available means to rehearse integrating into and supporting a division. The 5-4th ADAR has conducted two CPXs with MTC-G since the establishment of the unit. These CPXs enabled the battalion to train its mission-essential tasks each year and generated the lessons learned described in this article. When implemented, those lessons will enable other SHORAD battalions to conduct CPXs with a better balance between CUOPs and FUOPs, with improved battle tracking, and with an insight into how large investments into exercise design benefit the unit. Still, simulation facilitated CPXs have some limitations that units and training support personnel will never fully overcome. Simulations model a division, but cannot fully represent the complexity and depth of division planning as well as the human factors involved. To fully incorporate those factors into training, senior commanders should explore incorporating SHORAD battalions assigned to AAMDCs into division warfighter exercises (WFX) as a training audience and not just as a response cell. For example, U.S. Army Europe-Africa could integrate 5-4th ADAR into the WFX of the European regionally aligned forces division HQ. Live training between SHORAD battalions and a division staff would provide the best means to ensure that SHORAD battalions are ready to defeat FW, RW, and UAS threats in LSCO.

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Air Defense fundamentals *in the* National Capital Region

By 2LT Chard Phebe

It has been a unique privilege to mobilize to the National Capital Region (NCR) within a year of completing the Basic Officer's Leadership Course at Fort Sill, Oklahoma. We learned that while much of what is taught about Air Defense in school was important, it may not translate well into the operational force; especially on a rotation to defend our nation's capital. I beg to differ. Many Air Defense fundamentals are at play in the NCR, perhaps the foremost being Intelligence Preparation of the Battlefield (IPB), Air Defense principles, Data and Communications Architecture, and Soldier morale. These factors are practical not only for the service members on this mission but for all members of the Air Defense Artillery (ADA) community.

Intelligence Preparation of the Battlefield

After two decades, it can be easy for both civilian and military personnel to forget that on September 11, 2001, our nation's capital became the scene of a terrorist strike. We suffered incredible losses at the hands of an enemy who had carefully planned and executed their attack. ATP 2.01-3 describes *Intelligence Preparation of the Battlefield* as "the systematic process of analyzing the mission variables of enemy, terrain, weather, and civil considerations in an area of interest to determine their effect on operations." In 2001, no one expected Washington, D.C., would be a scene of a terrorist attack. In the same way, we today are unaware of where our next battlefield may be, but IPB gives us tangible factors to consider.

In the NCR, we practice IPB by analyzing the type of attack we experienced on 9/11, as well as "thinking Red" on how the enemy might wish to attack in the future. We consider the coastal weather effects on both aircraft and our weapon systems. We research emerging threats, such as unmanned aerial systems (UAS), which have greatly developed in the past 20 years. Finally, we consider the large civilian populace of the NCR and likely enemy targets. All this IPB is conducted to allow the enemy the least opportunity of ever launching a successful offensive in the future.

Following the work of those who enacted the NCR mission after 9/11, it is clear IPB was and still is, very present in this mission. Just as it is vital in the NCR, aspects of IPB will play a crucial part in winning at Air Defense in the future. Historically, our "battlefields" have been static defended assets. Examples include major political areas such as the demilitarized zone in Korea, sporting events like the Super Bowl, and military bases such as Bagram Airbase in Afghanistan. However, as our operational landscape shifts to address near-peer threats such as China and Russia, we must adapt toward maneuver short-range air defense. ADA officers and NCOs alike must begin to learn how to perform IPB "on-the-move" in conjunction with our supported maneuver forces. Excellent resources for this include ATP 3-01.16: *Air and Missile Defense Intelligence Preparation of the Battlefield* and ATP 3-01.8: *Techniques for Combined Arms for Air Defense*.

Air Defense principles

FM 3.01 describes the role of the ADA to be "to deter and defeat the range of aerial threats in order to assure allies, ensure operational access, and defend critical assets and deployed forces in support of unified land operations." To accomplish this mission in the NCR, joint leaders utilize foundational Air Defense principles (mass, mix, mobility, integration, flexibility, and agility) as well as employment tenets (mutual support,

overlapping Fires and coverage, balanced Fires, weighted coverage, early engagement, defense-in-depth, and resilience). This area, perhaps more than any other, is the most striking in its application in the NCR utilizing multiple forces.

The joint capabilities and efforts of the U.S. Army (USA), Air Force (USAF), Coast Guard, and local law enforcement provide the mix, mass, and integration principles in this mission. This synergy creates the NCR Integrated Air Defense System (NCR-IADS). In the NCR-IADS, no one branch ever stands alone. Many USA and USAF sensors integrate to provide early warning of possible threats to the NCR from outside the region. Within the NCR, multiple weapons systems and methods to deter and defeat enemy threats combine to provide balanced coverage, overlapping Fires, mutual support, and defense-in-depth to the area.

The opportunity to work with and learn about joint forces is an opportunity all Air Defenders should exploit at every opportunity. Of particular interest is the USAF, as these Airmen can be subject matter experts regarding flight tactics, UAS technology, suppression of Air Defense, and how a near-peer force would fight its air force (See JP 3-01, *Countering Air and Missile Threats.*) Also study the Air Defense capabilities of the U.S. Navy, including its Aegis Ballistic Missile Defense system and phalanx weapons system (adapted into the U.S. Army's C-RAM mission in Afghanistan) which gives Air Defenders coverage from "mud-to-space." Finally, understand the U.S. Marines' use of their Advanced Man-Portable Air Defense Systems, as this can be instructive to both maneuver forces and the Air Defenders supporting them with "close-in, low altitude, surface-to-air fires" (MCRP 3-25.10A). It has truly been an honor and an excellent learning experience to see multiple military and civilian personnel escape our operational silos, coming together in defense of the NCR.

ADA data and communications architecture

Data and communications architecture is one of the most underrated keys to a successful Air Defense mission. The reason is simple: when all is as it should be, there will be nothing to report or fix. However, keeping the data architecture secure and operational in the NCR is no small feat. FM 3-01, Chapter 12 describes how these networks "span ADA echelons and joint, inter-organizational, and multinational links," and notes "personnel who perform this mission have extensive experience and detailed technical training." This personnel, from cyber and signal operators to radar and equipment maintainers, are the often-unsung heroes of the NCR-IADS.

Just as communication technology can be underrated, the personnel to support it can be understaffed. This presents a shortage relevant to the NCR mission and the ADA community at large. Radar operators allow joint forces to detect the slightest threat from well beyond the borders of defended assets. Signal operators implement redundancies in the communication architecture to ensure if one system is not mission capable, another is ready to take its place. Cyber personnel aid in defending against electronic countermeasures, hacking, and other cyber-attacks against the U.S. and its allies, common tactics from near-peer threats such as China and Russia. Suffice to say, the importance of our data and communications personnel cannot be overstated.

The Army has begun to place great importance on the skill set of those who launch and maintain our data and communications architecture. There are large bonuses given to Soldiers who branch or reclassify to 14G or 140A. The Department of Defense recently invested $600 million in 5G communications technology testing at five installations. As well, many private sector companies such as Raytheon Missile and Defense and BAE Systems are currently experiencing a shortage of skilled professionals who understand data/communications systems. These factors offer veterans attractive post-military employment opportunities. Air Defenders should explore these topics, support communications personnel, and at the very least, have a working knowledge of this field to be successful in our career, both in and after the military.

Soldier morale

Dwight D. Eisenhower once said, "Morale is the single greatest factor in successful wars." Though the NCR is far from the traditional battleground or mobilization most would consider when thinking of the Army's mission, Soldier morale is nonetheless crucial. This is a 24/7, 365-day, no-

fail mission in a very high visibility location with the pressure of continual training and faultless execution. Those facts weigh on even the most junior private serving on an Avenger team in the NCR. Add in the effects of COVID-19, racial tensions, extremism, and political dissonance all currently affecting the NCR area of operations, and morale can quickly decrease, leading to decreased readiness in our ADA mission.

All leaders must be engaged in addressing these issues head-on, wherever we are. As always, the backbone of all this engaged leadership is the NCO corps, but officers must take responsibility for morale in their units. By discussing issues such as racial and political differences in open and respectful ways, we develop environments of trust and honor. We may combat destructive behavior and build resilience in our units with training such as Master Resiliency Training. Leaders can utilize opportunities unique to their missions to highlight and promote Soldiers' contributions. For example, one of our Soldiers recently had the opportunity to receive a coin from SMA Michael Grinston, at her promotion ceremony to sergeant! In both our Active and Guard units, leaders must prioritize Soldier morale and seek to combat the often unseen enemies that attack our most vital resource: people.

In conclusion, the NCR mission may be very different than the tactical operations against insurgent and near-peer threats emphasized in the institutional schoolhouse, however, the fundamentals of effective active and passive Air Defense are still in play. Joint forces integrate to allow commanders even greater freedom of action. Soldiers are empowered and instructed on the commander's intent to the lowest level to ensure mission command. The result is the assurance of the American people that a day such as September 11 will never happen again.

2LT Chard Phebe enlisted in the Army National Guard in 2017, as an 09S. Phebe attended State OCS (Class '58) and earned his commission from the Florida National Guard in August 2019. He attended BOLC-B and received the Distinguished Honor Graduate award, Equal Opportunity Leader Course, and mobilized in support of Operation Noble Eagle in the National Capital Region. Phebe has served in the position of platoon leader, Tactical Control officer and currently serves as the executive officer of Alpha Battery 3-265th ADA.

Screened background photo by SSG Bernardo Fuller, U.S. Army.

ADA NEWS

94th Army Air and Missile Defense Command conducts successful Joint live-fire exercise at Pacific Missile Range Facility

By CPT Nicholas Chopp

The 94th Army Air and Missile Defense Command and U.S. Navy conducted a Patriot and Avenger live-fire training exercise Sept. 1, 2021, at the Pacific Missile Range Facility (PMRF) on Kauai Island. This was the first Patriot missile live fire from Hawaii and resulted in two successful intercepts which further demonstrates the proven reliability of the Patriot missile system.

Soldiers and equipment from the 1-1st Air Defense Artillery Battalion from Kadena, Japan, deployed to the PMRF and executed the live fire to further train proficiency in deployment of expeditionary systems, logistics, and Air Defense Artillery operations.

"Deploying our forces across the Indo-Pacific Theater and then integrating them into a joint fires architecture with the Navy is vital to our mission of ensuring peace and prosperity across the Indo-Pacific," said BG Mark A. Holler, 94th AAMDC commanding general. "Our ability to fight and win our nation's wars rests on our capacity to function as a team of teams, leveraging our unique strengths to ensure a free and open Indo-Pacific."

The joint exercise involved integrating targeting data from the U.S. Navy destroyer Curtis Wilbur (DDG 54), linking Aegis radar targeting into Army Air Defense Artillery systems.

"Curtis Wilbur continues to demonstrate the proficiency of its crew and the agility we offer the joint force in a wide variety of roles," said Cmdr. Anthony S. Massey, commanding officer, USS Curtis Wilbur. "I am proud of my crew's vital contribution in this critical mission area."

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A team tests their accuracy with the MANPAD after the ribbon-cutting ceremony for the new 360-degree Stinger Dome Training facility at Fort Sill, Oklahoma on Oct. 12, 2021. *Photo by Monica Wood, Fort Sill Tribune.*

An Avenger Air Defense System from 1st Battalion, 204th Air Defense Artillery Regiment, Mississippi National Guard, fires a Stinger air-to-ground missile during a live fire exercise at Oro Grande Range Complex on March 24, 2020. *Courtesy photo, 5th Armored Brigade, El Paso, Texas.*

The 2022 submission deadlines for the Air Defense Artillery Journal:

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