

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

# AIR DEFENSE ARTILLERY



Journal





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## Air Defense Artillery Journal

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### Purpose

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

### Cover

An Avenger air defense system from 5-4 Air Defense Artillery Regiment, part of the 10th Army Air and Missile Defense Command, scans the skies from a hidden position on Sept. 21, 2021 during exercise Saber Junction 21 at Hohenfels Training Area. (U.S. Army photo by MAJ Robert Fellingham)





**GEN James C. McConville**

*Army Chief of Staff (R)*

## Ensuring War-Winning Future Readiness for AMD Forces

*“We are getting it done. In the future, we are not going to be outgunned, we are not going to be outranged and we are not going to be outmaneuvered on the battlefield.”*

*GEN James C. McConville  
Army Chief of Staff (R)*

### Perspective

While it has always been an exciting time to be an air defender, the present day challenges the Army faces in air defense require, rapid, persistent transformation as never before. The Army has made great strides the last few years in terms of enhancing our modernization and readiness efforts across the range of doctrine, organization, training, materiel, leadership and education, personnel and facilities (DOTMLPF) functions. Technology has matured to the point where we are now able to physically manifest the vision of integrated air defense pioneers 40 years ago were only able to conceptualize.

This is the greatest and most complex modernization of our air and missile defense capability since the Cold War, centered on connecting sensors, shooters and a common mission command system. Ultimately, it is about giving our warfighters capabilities sooner and increasing the options available in order to keep pace with our adversaries, making their challenges more complex.

### Designing the Army of 2040

The Air & Missile Defense Cross Functional Team focuses on transforming our air and missile defense force and developing new capabilities supporting the Army modernization priorities. Our competitors have been investing in unmanned aircraft and missile systems, requiring us to rapidly modernize and transform our air and missile defense capabilities. While our progress and our efforts have been significant, they are one piece of the overall Army Futures Command’s (AFC) focus to build the Army of 2030 and design the Army of 2040. AFC is transforming the Army to ensure war-winning future readiness. Guided by the AFC imperative to design the Army of 2040, we are partnering with Army, multi-service, and multinational military partners as well as our industry partners to transform air and missile defense capabilities to better enable our forces to maintain a



significant edge over our adversaries in the future.

With essential input and feedback from our warfighters, we are creating capabilities that will remain relevant well into the next decade and beyond. The value of Soldier-centered design is that it deliberately brings Soldiers into the development process in regular and meaningful ways. These events provide an opportunity for Soldiers who are in formations now, and may be on the battlefield tomorrow, to provide valuable input to industry representatives, testers, researchers and acquisition experts on the capabilities the force will need to fight and win. Soldier engagements help pinpoint overlooked end-user issues and confirm or dispel the need for development teams to address real or perceived technological challenges. Soldier touchpoints inform requirements, facilitate rapid iteration of prototypes and ensure the Army is meeting Soldiers' tactical and operational needs.

We are strengthening a legacy of excellence that will underpin warfighters' ability to win anytime, anywhere, against any foe. We continue to be well supported by our military and industry partners from higher headquarters, Army Futures Command, our Army Senior Leaders and Army Staff/Secretariat. In the trenches, we continue to work very closely with Program Executive Office Missiles & Space, as well as Army Capability Managers, the Rapid Capabilities and Critical Technologies Office, and Army Test and Evaluation Command. With a common vision in mind, we have partnered to develop and refine the requirements that allow the Program Managers to mature those systems that best meet warfighter needs.

### **Army Integrated Air and Missile Defense (AIAMD)**

AIAMD remains our top priority. The IAMD Battle Command System (IBCS) is the material component of the overall AIAMD system. IBCS provides common mission command across all Army AMD echelons, improves combat identification, provides flexibility in task organization, and improves joint integration. AIAMD replaces multiple disparate command

and control systems, enabling improved coordinated engagements, positive control of sensors and weapons, friendly protection, and shared situational understanding. IBCS open architecture enables the rapid integration of both legacy and developmental sensors/shooters, providing the force with capabilities to defeat emerging threats in a Multi-Domain Operations scenario. IBCS completed Initial Operational Test & Evaluation in 1st Quarter FY23 that will inform the Initial Operational Capability and the Full-Rate Production decisions. Additionally, IBCS participated in Project Convergence 22 with U.S., other service, and multinational partners.

### **Lower-Tier Air and Missile Defense Sensor (LTAMDS)**

LTAMDS delivers sensor capability to counter advanced threats and take full advantage of the Patriot Missile Segment Enhancement (MSE) capability. LTAMDS serves as a sensor node on the Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS) network. LTAMDS provides a significant increase in range and coverage capability over current Patriot Radar. The development of a new 500kW large tactical power system is an integral part of the LTAMDS solution in order to enable it to meet full radar performance requirements. In 2023, initial prototypes were delivered to the test range (White Sands Missile Range) for contractor testing and the U.S. Government is conducting a technical analysis on the test data. The LTAMDS program is on path to meet legislative requirements.

### **Maneuver Short-Range Air Defense (M-SHORAD)**

Our Army's M-SHORAD development efforts have continued on schedule and are producing results. As a system, M-SHORAD supports warfighters at the tactical level. It provides air protection to maneuver formations to counter a wide range of air threats, from unmanned aerial systems to rotary- and fixed-wing aircraft. M-SHORAD is about developing challenges or complexities for our adversaries, while creating options for tactical and operational commanders in a ground fight. As of this publication date,



we have fielded all or most of a full battalion of M-SHORAD to 5th Battalion, 4th Air Defense Artillery Regiment in Germany. This unit has been putting a platoon of vehicles through its paces the past two years and is ready to complete its fielding this year. Directed Energy M-SHORAD (Increment 2) prototypes are being fielded in 2Q-3Q FY23 to 4-60 ADA at Fort Sill (and Yuma Proving Ground) for testing and training.

### **Indirect Fire Protection Capability (IFPC)**

Our Enduring IFPC system provides the capability to defend fixed and semi-fixed assets against sub-sonic cruise missile and UAS threats, with a residual capability against fixed and rotary wing aircraft. The system provides 360-degree protection to support and protect maneuver formations and the ability to simultaneously engage threats arriving from different azimuths. The IFPC system fills the gaps between tactical short-range air defense and strategic air and missile defense such as the Patriot and the Terminal High Altitude Area Defense System. In 2022, the first Iron Dome battery shipped to Joint Base Lewis-McChord. We anticipate the initial fielding of Enduring IFPC (Increment 2) in 2023. The enduring IFPC program will be compatible with the Army's Integrated Battle Command System (IBCS) and the Sentinel Radar.

### **Counter-small Unmanned Aerial Systems (C-sUAS)**

In 2022, C-sUAS became part of our AMD portfolio our portfolio as a fifth signature effort. Our competitors have invested heavily in unmanned aircraft, so U.S. forces require capabilities to perform C-sUAS missions to deny threat sUAS (groups 1-3) the ability to detect, surveil, target, attack, and disrupt U.S. forces across all domains. C-sUAS is a combined arms requirement requiring combinations of technologies and TTPs, developed and refined through experimentation, analysis, and collaboration. Our capability development efforts focus on providing a networked, scalable,

and tailorable suite of capabilities to the force commander (for mounted, dismounted, fixed and semi-fixed operations) that support a layered defense and incorporate active, passive, and deep sensing. Such capabilities enhance the ability of our warfighters to integrate C-sUAS capabilities with kinetic and electronic warfare to successfully operate across the full range of military operations. In 2022, the CFT developed a near-term funding strategy prioritization plan to support research, development, test and evaluation requirements for the (fiscal) years 2023-2025.

### **Way Ahead**

Our efforts to transform air and missile defense capabilities today and in the future are a critical piece of the larger Army transformation efforts to build the Army of 2030 while designing the Army of 2040. The solution set requires that we develop and provide a tiered and layered mix of capabilities that enables our warfighters to defeat the complex threats posed by our adversaries. We must revisit longstanding doctrinal and organizational constructs which may be rendered irrelevant by new capabilities and rigorous analysis. Likewise, we must aggressively continue to explore new opportunities that are created by the promise of modernized equipment as a part of the data centric joint force. There is no silver bullet solution to building this air and missile defense capability for our forces. It is a challenging, demanding problem set that requires keen minds, new ways of thinking, collaboration, and a warfighter focus. I encourage you to seek out opportunities to participate in this tough but rewarding challenge to transforming YOUR air and missile defense force!

Five of our systems mentioned above—AIAMD, M-SHORAD, DE M-SHORAD, IFPC and LTAMDS-- represent the air and missile defense community's significant contribution to "24 in '23", the Army's vision to get 24 systems into the hands of Soldiers in 2023. It is truly a great time to be an air defender in our Army!





# WHAT ARE YOU GOING TO DO ABOUT IT?

## The Effect of Air Defense on Morale During World War II

By 2LT Alex Angelopoulos

**Abstract:** During World War II, air defense played a prominent role in safeguarding against bombing raids and enemy planes. However, those defenses were just as useful, if not more, for keeping up morale as they were for shooting down planes. This project examines how anti-aircraft artillery affected morale and argues that the unintended consequence of air defense was the preservation of morale among civilians and soldiers alike. This project asks to what degree did air defenses lessen the panic experienced by enduring aerial bombings. This analysis brings up the ethical and technological implications of air defenses during World War II and beyond.

A sound like thunder rolls over the skies. In the pitch black of night, the sky is illuminated by the explosions and flash of anti-aircraft guns. A distant “pop-pop-pop-pop” fills the air as they take shots at the whir of aircraft; a rumble of explosions as bombs reach their target or miss completely. The ground shakes and smoke obscures your vision as you cough from the acrid smoke. How do you fight back against this threat from the sky, so far above your head? This trauma was far too common as both soldiers and civilians alike experienced constant bombings in their homes, cities, and battlefields.

Much like the fear of gas and chemical warfare during World War 1, bombings were a looming specter to both civilians and military alike during World War 2. Every country involved in the conflict faced and feared air raids and bombings. Even countries that were far from the front lines of the conflict, such as the United States, dreaded this specter from the air, and when it would strike. This fear was so prevalent that the United States government made films depicting how to survive air raids in order to quell possible panic. In an attempt to allay this terror, countries sought to grow the anti-aircraft defenses on the ground. But how effective were those defenses really? Did the anti-aircraft artillery help lessen the frequency or impact of aerial bombings? Or was it simply a morale measure to help prevent panic? Air defense was war changing by helping preserve morale as the technology served its intended purpose. The primary sources analyzed in the following pages paint a picture of a contemporary technological marvel that raised morale while also happening to shoot down and deter bombers



and planes. Some sources discussed here paint a clear picture of the effect on morale, while others talk around it or simply imply that outcome. The anti-aircraft artillery of World War 2, while it had its weaknesses, was a powerful tool that influenced both civilian and soldier morale during bombings. Air defense was integral against the bombings campaigns of World War II and the rise of air warfare, but the effect on morale is buried under the story of technological advancement.

Air defense got its start long before it the bombing campaigns of World War II with the use of aerial balloons during the American Civil War. At the time it was mostly just theoretical, as aviation was limited to the balloon's ability to go up and down. The fear of the skies was not prominent or considered much of a threat. The only thing lurking above your head was a bird and the occasional bomb they would drop. This all changed during the conflict to end all conflicts; the Great War, or as we know it today, World War 1. As planes became more reliable and more value was placed in their ability to observe the trench lines and fight other enemy planes, those on the ground felt the increasing need to develop weapons to combat them. The Germans were the first to turn to artillery as a defense against airplanes. It was their name for artillery that was shortened to flak, which became a universal term for anti-aircraft fires.<sup>1</sup> The primitive artillery and machine guns used were not incredibly effective in shooting down airplanes but it forced observation planes to fly higher and be less accurate. The theories on air defense that sprang from the experiences in World War I didn't get tested until the interwar period between World War I and World War II, when many thinkers understood both the need for air defense and its potential capabilities. When World War 1 broke out in 1914, the use of planes was far more prevalent and so was the need for protection against them, yet the danger posed by airplanes was not as strong as in World War II. In the beginning of World War II, anti-aircraft artillery relied mainly on sight and searchlights to spot planes and adjust the artillery fires from there. Later, Britain introduced

radar which provided an early warning system for planes approaching mainland Britain. While the advancement in technology is an important part of determining the effectiveness of air defense, the specific details are not the most important part of the scholarship on air defense. Instead, there is considerable debate on how it changed and what prompted said change.

The conversation on air defense during World War II by prominent scholars is focused almost entirely on the technological advancements made before, during, and immediately after the war. Most experts examine air defense through the lens of technological advancement due to mistakes in doctrine, and view the improvements as the result of adaptation to those faults. The other school of thought views air defense through the lens of doctrinal change due to technological advances, which argues that the upgrades in technology is what caused the popular conceptions of air defense to change. No matter the school of thought, both sides agree that military commanders and thinkers tended to only focus on the technological aspects of air defense rather than its effects on population. The response to technological adaptations in air defense, as well as the existence of anti-aircraft artillery as a whole, is undervalued when compared to the technological analysis. This technological argument is the main focus of almost all scholarship on air defense, especially that which is focused on World War II. Many scholars are blinded by the idea that the technology and advancement of such is the only thing that matters to advance the narrative of progress.

Nothing explains how prominently the United States's late start to the war affected air defense like "Learning to Fight from the Ground Up: American Anti Aircraft Artillery in World War II" by Bryon Greenwald. The article discusses how the United States soldiers made costly mistakes due to their inexperience. Greenwald argues that "no single theory—top down, bottom up, middle out, inter or intra-service rivalry, or single or double loop learning—is sufficient to understand how innovation and adaptation occurs

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<sup>1</sup> James Crabtree. On Air Defense. 13.



in combat.”<sup>2</sup> Instead, change occurs in many dimensions, in multiple ways. He argues that the main areas of change were in technology, resources, training and doctrine, and from the “top down” in leadership. Greenwald uses the example of Chief of Staff at the time, General George C. Marshall, meeting with other top leaders to encourage officers to take responsibility for training as well as lengthening training time with anti-aircraft crews and practicing with real equipment and live fires, using live ammunition. It was this change in both doctrine and resources that molded U.S. air defenses into an effective fighting force. This change was prompted by the necessity for advances in technology, as anti-aircraft units were shooting down more friendly planes than enemy planes.

Greenwald argues that this change was a natural progression of making mistakes and learning from them, and so was driven by how anti-aircraft artillery affected the people around it. In the book “On Air Defense” by James Crabtree, the main argument was that air defense improved through responses to advances in aviation technology. During World War 1 “... air defense would prove not only practical but necessary in the new ways of waging wars, new ways that would just begin to touch on a separation in air defense between the tactical battle of the field armies and the strategic defense of home cities”.<sup>3</sup> The change in air defense was as a reaction to innovation in other fields of aviation and warfare, rather than the result of anticipating threats from aviation. Crabtree documents the changes made to air defense from its birth in the late 1800’s to the modern usage in 1990’s, and in each stage documented the specific technological changes that caused air defenses to adapt. He relies on evidence mainly from maps and plans from the eras he studies, as well as an analysis of the technology itself. These pieces of evidence further support his technological argument, as the upgrades to air defense batteries only came about as a reaction to attacks, mainly bombings.

The article “Fighter Defence before Fighter

Command: The Rise of Strategic Air Defence in Great Britain, 1917–1934” by John Ferris, also contains a technological argument, however this one differs slightly from “On Air Defense”. “Fighter Defence Before Fighter Command” argues that instead of air defense changing due to technology, technology changed due to air defense. Ferris says “FAHQ had solved every other problem in air defence. It began to solve the remaining problems in 1933–34, through the development of radar, high performance cantilever monoplanes with eight wing mounted machine guns, and the systematic improvement of air tactics.”<sup>4</sup> proving that Britain’s Fighting Area Headquarters (FAHQ) had developed air defense technology to preempt any technological advancements in aviation. This highlights the interdependence of technology and air defense, suggesting that the relationship between the two is the most important facet of the advancement of air defense and the primary indicator of what trends will play out in the progress of air defense.

Most, if not all, academics on air defense during this time period agree that technology was either influenced by adaptations or was the cause of adaptations, or both. However there is some disagreement on the extent that technology played on this. An example of this is in “On Air Defense” and “Learning to Fight From the Ground Up”. Both sources agreed that technology helped adaptation, but there was a disagreement on the role technology played in that adaptation. “On Air Defense” used various technological advancements to emphasize that technology was the most important force in the evolution of air defense. Its consecutive upgrades asserts that technology was the driving factor in overall progress. “Learning to Fight from the Ground Up” instead suggested that the technology came second to the training on said technology, and that by increasing time spent with the weapons systems, pushed air defense further than just technology alone.

Any historian of air defense during World War II would agree with the idea that technology played

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2 Bryon Greenwald. Learning to Fight From the Ground Up: American Antiaircraft Artillery in World War II. 37.

3 James Crabtree. On Air Defense. 11.

4 John Ferris. Fighter Defence before Fighter Command: The Rise of Strategic Air Defence in Great Britain, 1917–1934.

at least some part in the evolution of air defense, that much is clear. The source of the argument lies in exactly how great of a part technology actually played and to what degree. This distinction, while from the outset appears to be just semantics, is crucial for showing how effective air defense was thought to be, at least from a historical point of view. In modern times, scholars can use statistics and documented casualties to prove that air defense did something, in terms of fighting bombers and other aircraft. These “hard facts” were unavailable to the people who lived in that time and could only rely on what they saw and heard. The disagreement among historians then lies in how it affected morale and civilians, as well as to which degree air defense helped prevent and protect cities and populations. It is this focus on technology which obscures the broader, unstated argument about morale.

The primary handbook that detailed explicitly how the United States air defenses worked in a technological sense was the “Army Air Forces Field Manual”. It was published in 1943, as the United States joined the fight in World War II. The manual was created in order to “present a general statement of the organization for air defense”<sup>5</sup> and lay out the organization and principles for the U.S. Army air defenses in World War II. This source was published by the War Department and while it can be considered fact, it shows how air defense should have been, not how it actually was. The information inside was laid out plainly with little to no emotion, yet it is possible to infer the effects on morale these instructions provided. The instructions in the manual advised to keep minimal interference on communities and civilians, in order to win over attitudes towards anti-aircraft batteries. It also contains a section entirely devoted to civilian defense and assisting the surrounding civilian population.<sup>6</sup> Why would soldiers care about the fears and attitudes of civilians, especially ones in countries that were not their own? Even as inexperienced as the soldiers of the United States were, they understood the effect air defenses

and bombings would have on civilians and they wanted to have as much of a positive influence as possible.

This source implies the boost to morale that comes from air defense, rather than explicitly stating it, like some others in this analysis. In contrast to the next source, the “Army Forces Field Manual” seemed to care more about the civilians it defended rather than the soldiers themselves and their attitudes and morale. It placed the initiative on the commanders and officers to motivate their soldiers while also protecting the morale of civilians.

The source IX Air Defense Command: Historical and Statistical Summary 1 Jan 1944– 1 June 1945 shows that the air defenses in Belgium had the morbid outcome of destroying more friendly planes than enemy planes. This particular unit reported 36 enemy fighters shot down and 69 friendly shot down.<sup>7</sup> While the defenses mentioned did shoot down enemy fighters, it shot down nearly double the amount of friendly aircraft.<sup>8</sup> This source is one of the few that shows a loss in morale as the unit was forced to reckon with the friendly casualties it caused. The unit in the summary was one of many in Europe at the time, and it paints a picture of technological failure that was all too common among air defense units, especially the new United States ones.

This source paints a picture of technological and doctrinal failure by using statistics and “hard facts” to summarize the performance of the unit as a whole. The report was created by Brigadier General William Richardson, later Major General, who was in charge of organizing and training the Ninth Air Defense Command of the Ninth Air Force, and planned the air defense operations for the continental invasion of Europe during World War II. He compiled all the data on his unit into a report to be analyzed and was likely motivated by a desire to learn from his mistakes and better his unit. He assumes, when writing and compiling this that it would be for

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<sup>5</sup> United States Dept. of the Army. Army Air Forces Field Manual. 1.

<sup>6</sup> United States Dept. of the Army. Army Air Forces Field Manual. 23.

<sup>7</sup> William Richardson. IX Air Defense Command: Historical and Statistical Summary 1 Jan 1944– 1 June 1945.

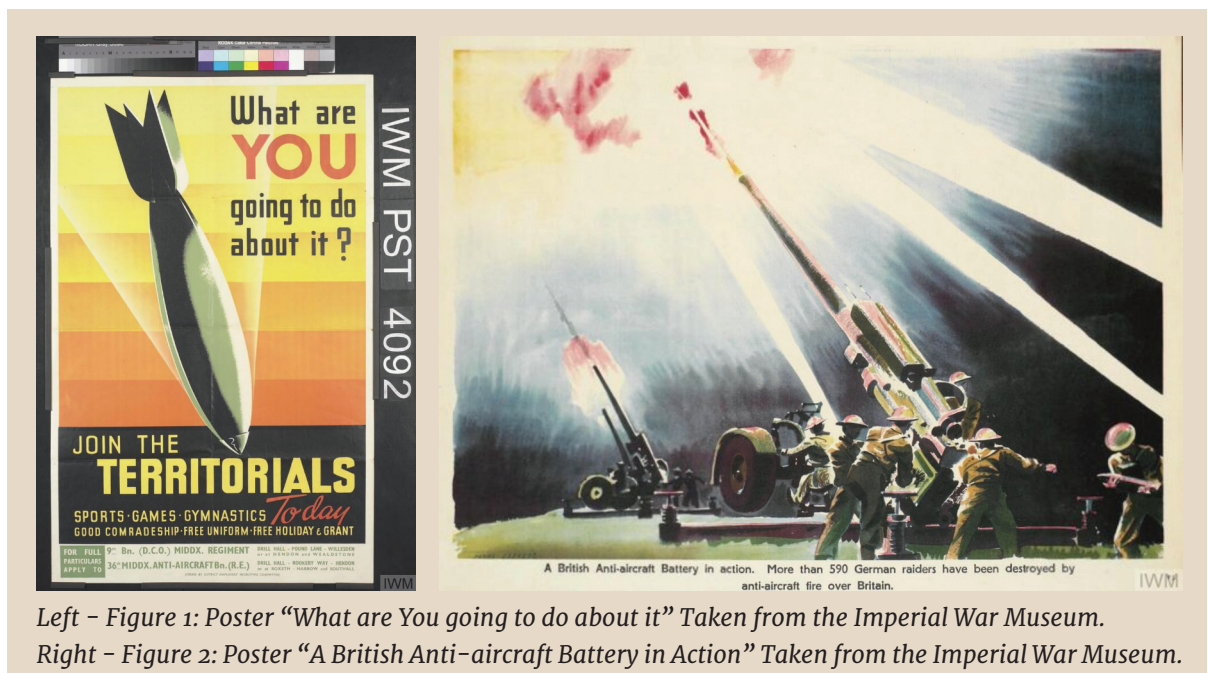
<sup>8</sup> William Richardson. IX Air Defense Command: Historical and Statistical Summary 1 Jan 1944– 1 June 1945.



a military audience, namely his commanders. It is likely he is biased in reporting failures as it would make his leadership look bad. There is a possibility there are more friendly casualties than reported or less enemy casualties than reported. The report is representative of many other air defense units, specifically U.S. ones, and paints a picture of what air defense during World War II in the U.S. Army was like as a whole. The secondary source “Learning to Fight from the Ground Up: American Anti Aircraft Artillery in World War II” also describes the same problems this particular unit ran into which was that anti-aircraft artillery often shot down more friendly planes than enemy.<sup>9</sup> Shooting down friendly planes would affect morale in a negative way rather than the positive boost to morale that is found in other sources. Soldiers manning these sites would feel incredibly guilty about friendly fire and would be less likely to fire on aircraft as a whole, decreasing effectiveness and continuing to lower morale. They would be forced to live and continue with the knowledge that they were responsible for the killing of other Americans. Did this shock to morale cause soldiers to be less eager to fire on planes or did the heat of battle and fear of death override any guilt they had? This report provides a view from the very top of the command chain, and so misses any picture of the soldiers on the ground. This source and the one before it give a glimpse of the American view on morale and air defense, yet America only spent about three years in the

war and joined at the very end. The British joined the war three years before the Americans did and bore the brunt of the bombings as one of the last holdouts in Europe to the German war machine. The sources from the British point of view paint a far greater picture of their struggles to maintain and increase morale through years of bombings.

One such source was a poster with the title “What Are You Going To Do About It?” which shows a picture of a falling bomb on a yellow, orange, and red background, made using a lithograph. The date of origin is unknown but it was sponsored by the 9th Battalion Middlesex Regiment and the 36th Middlesex Anti-Aircraft Battalion (Royal Engineers) of the Territorial Army. The poster is an advertisement for joining the “territorials,”<sup>10</sup> the territorial army of the British. The use of the bomb as a recruiting tool shows the fear created by the constant bombings by the Germans. Even though the poster itself is advertising “sports, games,” and “good comradeship”<sup>11</sup> which are arguably positive and pleasant things, the main draw is the lurking threat that every person in Britain feels. The recruiters who sponsored and published this wanted to use a “carrot and the stick” type of



Left – Figure 1: Poster “What are You going to do about it” Taken from the Imperial War Museum.

Right – Figure 2: Poster “A British Anti-aircraft Battery in Action” Taken from the Imperial War Museum.

9 William Richardson. IX Air Defense Command: Historical and Statistical Summary 1 Jan 1944– 1 June 1945.

10 Territorial Army, 9th Battalion (the Duke of Cambridge’s Own) Middlesex Regiment, What are You going to do about it?

11 Territorial Army. What are You going to do about it?

draw to the territorial army. There were good things to gain by joining the territorials, but there was also the feeling of accountability to protect yourself, your family, and your country from the German bombs. The poster was clearly aimed at the British public and was broad in nature in order to capture the attention of as many people as possible. The use of language in the title almost seems accusatory by forcing the viewer of this poster to ask themselves what they are doing to help both the war effort and fight the Germans. The color of the bomb as pitch black in contrast to the light background evokes a feeling of dread, as you can't see any detail to the bomb itself, just the silhouette. The encouragement to essentially band together in the face of a threat would encourage morale through shared struggles and bonds, by fighting back against said threat. The British government wanted to resist the feelings of helplessness and doubt and would use propaganda such as posters like this source and the next one.

The poster "A British Anti-aircraft Battery in Action" shows two British anti-aircraft guns in the foreground, taking up most of the space. The rest of the image shows the light emitted from the guns as they fire, breaking the darkness surrounding the guns. The text of the poster says "A British Anti-aircraft Battery in action. More than 590 German raiders have been destroyed by anti-aircraft fire over Britain."<sup>12</sup> The poster was created by James Gardner, a prolific poster maker who's artwork spanned the entirety of World War 2 and a few years beyond. Most of his posters displayed British aircraft or the war effort during World War 2. In this poster, Gardner clearly wants to show the might and effectiveness of the anti-aircraft guns. Though the number of planes shot down shows that the technology was effective,<sup>13</sup> the main purpose of this poster was to raise morale. The poster showed that the guns were doing something against the bombers that attacked Britain, which meant that the British were not helpless, or at least didn't

feel helpless, which is far more important than the numbers of planes shot down. The use of language describing the Germans as "German Raiders"<sup>14</sup> evokes imagery of barbarians who are cruelly attacking Britain. It paints a very clear picture of "Us" normal people versus "them" savage and aggressive people. The symbolism of the bright light of the guns firing, reflected on the dark skies shows how the anti-aircraft artillery was the bright light in the darkness of the bombing raids, and would bring people hope when they saw it. Both the air defenses and the picture of the air defenses were important tools to withstand apprehension and dread that derived from the constant bombings. Not only would joining anti-aircraft batteries physically repel bombings, it would also provide opportunities to showcase this resistance to the public.

Another example of photographs being used to increase morale is a photo that juxtaposes the princess royal, who we know as Elizabeth II with air defenses. This photograph illustrates air defenses being used for morale purposes by showing the current queen of England Elizabeth II, though at that point only a princess, visiting a mixed anti-aircraft battery. The photo features HRH surrounded by her entourage and other soldiers standing next to a large 3.7 heavy anti-aircraft gun. The gun is about double her size and stands in the foreground while in the background soldiers wearing MK II helmets demonstrate how it works. The caption on the back reads "Gunnery officers explaining points of interest to H.R.H. about a 3.7 Heavy A.A. gun."<sup>15</sup> The back of the picture also reveals the photo was "taken by Lt. O'Brien"<sup>16</sup> dated 5.8.44. This photo was taken exactly a year before V-E day and while the threat of bombings had faded with the Allies on the offensive, it was important to continue to preserve morale for both soldiers and civilians. The royal family of England acts as a cultural head of state, and photographs of them observing important defenses and visiting soldiers would boost the spirits of both soldiers and civilians alike. It

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12 James Gardner. A British Anti-aircraft Battery in Action.

13 Gardner. A British Anti-aircraft Battery in Action.

14 Gardner. A British Anti-aircraft Battery in Action.

15 Lt. O'Brien. H.R.H. THE PRINCESS ROYAL VISITS MIXED HEAVY ANTI-AIRCRAFT BATTERY.

16 O'Brien. H.R.H. THE PRINCESS ROYAL VISITS MIXED HEAVY ANTI-AIRCRAFT BATTERY.



would also show that everyone in Britain, from the lowest level to the highest, was doing their part for the war effort. While this photograph combines both the Royal Family and air defenses to raise morale, the next photograph focuses solely on air defenses.

The photograph “The Auxiliary Territorial Service At An Anti-Aircraft Gun Site In Britain, December 1942” looks very similar to the poster “A British Anti-aircraft Battery in Action”, in that it features two anti-aircraft guns firing at night and lighting up the sky. The picture was taken in December 1942, which was after the Blitz. With hindsight, we know that the threat of bombs had subsided, but the fear remained and with it the constant training against it.

This photo demonstrates how bombings at this point were so engrained in life in Britain and provides an example of showcasing resistance in the public sphere. The photo may have been demonstrating technological capabilities but it was created with morale in mind. The display of power would have bolstered public morale and shown that Britain was still prepared and ready to fight the threat from the sky. The bright lights of the guns are providing the light needed to take the photo, symbolizing how the air defenses lit up the skies and provided hope for citizens living through the constant bombings. These bombings were engrained in public life and so photos like these were created for the benefit of public morale. In writings and discussions from the time period, British commanders and soldiers state as much, often explicitly or indirectly.

The RAF narrative on the Air Defense of Great Britain Vol III, Night Air Defence, June 1940–December 1941, paints a different picture and focuses on the technology and how that supported RAF operations. From the text the RAF states “The problem of air defence is well conceived in

three subsidiary but interrelated phases. Simply stated, these are early detection of the enemy, his continuous and accurate location and, finally, engagement and destruction. In broad terms, these are the prerequisites of successful interception both by day and by night, with the important difference that by night the limitations of human vision had somehow to be made good.”<sup>17</sup> This shows that anti-aircraft artillery was limited by technology and human error, and had many limitations to be effective at shooting down aircraft. The tradeoff for accuracy was the impact on both civilian and military populations. The goal was to alleviate feelings of helplessness and defeat by providing a visual counteroffensive to German planes. The RAF were far more concerned about the technological failings than the impact on the public<sup>18</sup> that other government officials were, and so often ignored these impacts. Much like the American “Army Air Forces Field Manual” this source implies the effect on morale, rather than stating it directly. They were focused on air defense’s primary objective which was the defense against aircraft. In contrast, air defense’s secondary objective to provide a source of morale is stated more explicitly in the next source, which is a film.

The video source “When Air Raids Strike “ is an American propaganda film created in 1942, after the US had entered World War 2. The film



Left - Figure 3: Photograph “H.R.H. THE PRINCESS ROYAL VISITS MIXED HEAVY ANTI-AIRCRAFT BATTERY” Taken from the Imperial War Museum. Right - Figure 4: Photograph “The Auxiliary Territorial Service At An Anti-Aircraft Gun Site In Britain, December 1942” Taken from the Imperial War Museum.

17 Air Historical Branch Air Ministry. Air Defense of Great Britain Vol III, Night Air Defence, June 1940–December 1941. 7.

18 Air Historical Branch Air Ministry. Air Defense of Great Britain Vol III. 8.

describes what to do when an air raid happens. While the United States had only experienced the attack on Pearl Harbor, the fear of bombings was just as present in the minds of the public. The United States designated certain coastal areas as “target areas” and the population living in those areas started preparing for what they felt was an inevitable attack. They too had to adjust to the fear of bombings prevalent in Europe and Asia, though they were slower to adapt as they “long imagined that it was well out of war’s reach.”<sup>19</sup> The film helps boost morale as it not only informs the viewer what to do in the event of an air raid but also gives the example of Great Britain as a grizzled veteran of air raids. By showing the anti-aircraft batteries of Britain, the film shows that the people of England have gone through it and so can the Americans. Just the use of the imagery of anti-aircraft boosts morale and provides comfort against the threat of bombs. The film also brings up the point that “Whether or not the anti-aircraft gunners actually shoot down the enemy, their curtain of fire has time and again made precision bombing impossible.”<sup>20</sup> By directly stating that the use of air defense is not primarily in how many planes it shot down but how it prevented accuracy and saved lives and industry like factories for armaments and hospitals exemplifies the argument that air defenses increased and effected morale. Less bombs on target often means less destruction of homes, cities, and important infrastructure. Less destruction means less recovery and more of the things you need and want in day to day life. This film, much like the film in the next source, shows Britain as a war-hardened and determined people, though it emphasizes anti-aircraft artillery as a primary defense for several reasons. In the film “When Air Raids Strike” its purpose is to show that Britain is fighting back. In the film in the next source, its purpose is to show that Britain can withstand any bombings launched at it.

The film “London Can Take It” was a propaganda film released by the British government in 1940 with the aim of being released in the United States to raise support for Britain. Despite being made

in Britain, specifically by the British government, it is narrated by an American war correspondent Quentin Reynolds. This was meant to try and influence the American public by presenting a familiar voice, one with an American accent. This was meant to be filmed like a documentary, though there is some question as to how much of it is accurate or representative of the whole population. The title “London Can Take It” evokes imagery of a bomb-hardened London citizen who isn’t asking for pity from the American people but support for the war against the “barbaric” Germans. The title is itself a challenge to both the British and the Germans. It shows the Germans that Britain would withstand anything that was launched at them and it asked British people to demonstrate a deeper resolve and morale to remain strong.

The film demonstrates how continuous anti-bombing propaganda was a part of maintaining morale, along with air defenses and anti-aircraft artillery. This source is one that implies an effect on morale rather than stating it. The film does not want to portray the British public as weak or doubtful, and so it pushes a narrative that everyone was doing what they can to fight back. This anxiety is also shown through the oral history of a woman who worked in a mixed anti-aircraft battery.

I turn now to the oral histories, an important yet often overlooked piece of the story of air defense. While they tend to be subjective, it provides a firsthand account of morale during the war. These are the testimonies of the people who lived and experienced bombings and worked on the antiaircraft batteries. Their stories and experiences working on these batteries are arguably the most important pieces of evidence for the effect of air defense on morale because they often explicitly state how air defenses increased their morale during the war. The experiences and stories of those who lived provide the closest glimpse into what actually happened that academics can get without physically being there themselves. This personalizes the story and completely illustrates the human factor of war.

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19 Westbrook Van Voorhis. *The March of Time: When Air Raids Strike*. 0:01:35.

20 Van Voorhis. *When Air Raids Strike*. 0:04:26.



The story of Rosemary Sylvia Shea demonstrates how the fear of bombings pulled those who weren't necessarily the first to join the fight. The desire to fight against the bombings was strong enough to persuade women to join the Auxiliary Territorial Service and man the air defenses. The bombing campaigns against the British provided an indiscriminate enemy that could unite everyone, regardless of their background. This led to the creation of mixed [gender] batteries which were often used as propaganda pieces on top of their duties as air defenses. They were often used to show that all of Britain stood united which increased morale of civilians who couldn't fight and simply had to endure. Shea remarks how she was "very proud"<sup>21</sup> of how the batteries did and it gave you "satisfaction or pride"<sup>22</sup> in what you did for the war efforts. Her pride in the batteries exemplifies the morale boost that air defenses provided. Rather than remember and discuss the bombings and the feelings those evoked, she instead recalls her efforts on the battery itself as her main memories of the war. This idea, that civilians would be more influenced by air defenses than the bombings itself was hypothesized in the years leading up to World War II, as shown by the next source.

Even from the beginnings, theorists of air power knew the affect planes and bombs would have on those stuck on the ground. One of those theorists, William C. Sherman, one of the first Army Air force instructors foresaw this effect and wrote about how civilians suffered more from bombings than military personnel. "Air Warfare" by William C. Sherman was published in 1926, around 15 years before the start of World War II. Sherman was a premier thinker and strategist of air warfare and air defense. His writings in the book predicted how air warfare would be fought and what affects air defense would have on warfare. By writing this, Sherman wanted to predict and influence future conflicts and be better prepared for any coming wars.

William Sherman ended up dying in 1927 as an aviation instructor at Fort Leavenworth, Kansas, so he never saw how correct he would end up being during World War II. Most of what Sherman wrote ended up being reliable though he admits that it was influenced by many others and was purely personal opinion, not an official publication. Sherman clearly values aviation as a viable method of study for future wars. This source is not directly tied to World War II but it accurately predicted how aviation and air defense would be used. Sherman knew, years before air warfare was truly a threat, that there would be a human factor that affected air power.<sup>23</sup> Fear is a powerful psychological motivator, and bombings would instill that fear. He knew that people on the ground, essentially helpless from destruction raining from the sky, would affect morale and the people's view on war. Sherman explicitly states "For the nature of man is the same today as of old, and his reactions to physical stimuli remain essentially unchanged."<sup>24</sup> (page 6) While he didn't explicitly say that air defenses would be the answer to this "reaction to physical stimuli"<sup>25</sup> it is implicitly stated. Sherman's writings were an accurate predictor of bombings in World War II and beyond, and are supported by several oral histories, including this next source.

A testimony of how air defenses increased morale came from the oral history of Herbert Stanley Grove, who worked as a spotter on an anti-aircraft site called Chigwell Rise in Essex, England. As he describes his experiences training and operating on one of these sights he mentions that there "Wasn't enough anti-aircraft firing going on to build up the morale of the civilian population"<sup>26</sup> and so the British government and head of the British Army had them fire more rounds during raids. Clearly, the decision makers of the time knew about the effect of the air defenses on the morale of the civilian populations. Almost as a result of this, he also noted that there was "very little defeatism about

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21 Rosemary Sylvia Shea. Interview by Conrad Wood. 2002.

22 Shea. Interview by Conrad Wood. 2002.

23 William Carrington Sherman, Johnson, and Air University (U.S.). Press [1926] 2002. Air Warfare.

24 Sherman. Air Warfare. 6.

25 Sherman. Air Warfare. 6.

26 Herbert Stanley Grove. Interview by Conrad Wood. 1992.

the blitz”<sup>27</sup> and that most British were willing to fight their way through. This relationship between the British morale and air defense was interconnected throughout the war. The British were ready and had the morale to fight against bombings and so turned to air defenses to protect their homes. The air defenses provided morale and caused the general population to be far more willing to withstand the constant bombings.

Even if the defenses weren’t incredibly effective against the aircraft solely by aiming, they could provide fields of fire that made the bombings inaccurate, while providing a spectacle for the civilians stuck experiencing the bombings. Even a soldier on the ground understood the need for air defenses and the morale boost it provided, as shown in both this oral history and the next one.

The oral history of Helen Constance Cousins who worked on a gun site provides a similar narrative on working on anti-aircraft defenses. She remarks on how they were encouraged to join due to the need for air defenses and people to man them. There was an increase in fear as the threat changed from aircraft bombings to long range rockets which were almost impossible to hit by anti-aircraft defenses. Cousins describes her battery as very effective against German aircraft but was shocked by seeing German pilots who seemed very young. However, she realized that “it was us or them”<sup>28</sup> and was less perturbed by doing her job. Her narrative provides another look at British who felt gratified by manning air defenses and it provided them something to do against the Germans, rather than experience the helplessness of being unable to fight back. Cousins’ testimony provides evidence for both a positive and negative effect on morale. On one hand, she was proud of her battery and what it did for the people around her. On the other hand, she felt somber and mournful for the lives of the German pilots that she felt responsible for killing. Despite this, it was the hopefulness and camaraderie that the anti-aircraft battery provided that won out, showing the positive impact that it had on both her and the British public.

Much like the thoughts on the war itself, there was a divide in how both the British and the Americans thought about air defense. The British had the advantage of having both experience with being bombed and defending against bombings, and they had the ability to test what worked and what didn’t over several years. The Americans had the ability to learn from others’ mistakes as they had joined the war in the last few years. However, they did not do that and often ended up repeating the same mistakes as others such as not having the ability to distinguish friendly planes from enemy planes. Nonetheless, they were able to make use of radar and other technological advances in air defenses and use that to their advantage. Due to this divide in thinking, the Americans were often behind on how to use air defenses and how effective they could be.

With the increase in both air defenses and bombings in modern warfare, the effect on morale will be a crucial influence on civilian and soldier’s morale. It determines how willing these people were to fight a long, hard war which required sacrifices and strong resolve. The major effect would be deterrence against bombers but the secondary effect is on morale. Morale is chased and far more necessary than many believe because it influences if people will fight a war. Low morale often means low support for war, which causes lost battles and low public support for war. Even in today’s military, morale is crucial to soldier readiness and productivity. Anti-aircraft artillery worked both to shoot down bombers and make their bombing raids less accurate along with the unintended consequence to prevent panic from the threat of bombings. The research suggests that people of the time understood the effects on morale and how they helped or hindered the war effort, but that conclusion seems to have been glossed over in subsequent scholarly research. So often the human aspect of military history has been lost or ignored to chase flashier aspects of technology, strategy, and tactics. This issue is one that should bear more weight moving forward in this field of research, as the human aspect is arguably the most important. History is easy to perceive as only words on a page and it is easy

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27 Grove. Interview by Conrad Wood. 1992

28 Helen Constance Cousins. Interview by Conrad Wood. 1996.



to forget that real people lived through these real life experiences. The field of military history would benefit greatly by expanding into how the people experienced and felt, not just what they did. This opens up a rich perspective and gives a far greater understanding to history as a whole.

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# LEVERAGING THE CLOUD TO DEPLOY, FIGHT & WIN

By COL (R) Dave Shank



*The IBCS provides a common mission command and sensor/weapon integration network for all Army AMD echelons that improves protection against threats in complex integrated attack scenarios. (Photo Credit: Nathaniel Pierce, U.S. Army)*



In an ideal warfighting environment, the Department of Defense joint forces' integrated air and missile defense (IAMD) capabilities would expand the globe providing a secure, cloud-based architecture framework with an unlimited number of effectors. A series of microservices would serve as the backbone to this network of layered, multi domain sensors and weapon systems supported by a cloud environment, capturing and filtering data at speed. Focusing on a U.S. Army problem set, this article will take a detailed look at the current U.S. Army IAMD laydown using my company grade years of service as examples followed by a more capable framework of an integrated, modernized air and missile defense structure leveraging existing Army cloud infrastructure; in essence, an evolution in command and control. By decreasing the time and physical resources required, a secure cloud infrastructure will not only provide the speed of information for leaders to act, but also provide a combination of human and technical means to sense, make sense, and determine the best possible outcome of a high demand, low density capability of critical air and missile defensive fires (and protection in some cases) to defend maneuver formations, semi-fixed, and fixed locations.

During the late 90's and early 2000's, I had the privilege of serving in U.S. Army Short Range Air Defense (SHORAD) Artillery units responsible for providing defensive fires in support of maneuver formations; these included two divisions and an armored cavalry regiment. This is important to note because ultimately the kill chain was similar across all three organizations located on three different continents. The threat (variety of rotary wing and fixed wing aircraft) was fairly simple during this period, our weapon systems and sensors were very capable (Stinger, Bradley, Patriot, and Sentinel), formations were commanded at the Battery level, and procedures controlled at the Battalion echelon or higher; this included both positive (e.g., positive identification by way of systems or other identification capabilities) and procedural controls (e.g., airspace control measures such as coordinating altitudes).

Communications in a tactical setting for ADA operations over extended ranges cannot be understated. Since the post-Vietnam War era,

the challenge of sharing critical information has become even more important since the days of the Airland Battle doctrine to how the fundamental principles adhered to today in Unified Land Operations. From manned and unmanned airframes to ballistic and cruise missiles to hypersonic, the ability to communicate through a series of voice and data messages in a timely manner is critical to decision making and defeating adversary capabilities. Undoubtedly these joint and multi-national communications networks must be resilient and secure, and leverage present day technology such as cloud services in an effort to provide real time, actionable data at the tactical edge.

As a company grade officer leading SHORAD formations, the priorities of ADA coverage were more often than not: maneuver forces, command and control nodes, and logistical hubs. As a platoon leader providing direct support ADA fires to a maneuver battalion/task force (BN/TF) and as a battery commander providing ADA fires in support of a brigade combat team (BCT), tactical communications were always a challenge; the greater the battlespace, the greater the challenge. As a platoon leader and battery commander, I had between two to four Single Channel Ground and Airborne Radio Systems (SINCGARS) in each of my vehicles (and command post as a battery commander). Monitoring a minimum of four frequencies at each of these echelons is challenging, and even more challenging when data networks are part of the communications plan. Ensuring SHORAD assets are positioned in accordance with the maneuver commander's mission, intent, and directed ADA priorities was paramount. In doing so, a constant flow of voice and data communications were necessary at all times to ensure the right weapon system(s) was positioned at the right time and location to defeat any the enemy.

As mentioned, a SHORAD battery commander by way of his tactical vehicle and command post (typically integrated with the maneuver formation's command post) is required to monitor several voice and data frequencies. Data system networks in this case include the Air and Missile Defense Work Station (AMDWS), Forward Area Air Defense Command and Control (FAAD C2), and



Force XXI Battle Command Brigade and Below (FBCB2) later replaced by the Joint Capabilities Release (JCR)) which is the 'parent system' to the Blue Force Tracker (BFT). AMDWS and FAAD C2 was configured and networked thru an internet protocol (IP) backbone, physically located in a command post architecture (static), provided a constant air picture. BFT, using a global positioning system (GPS) established through satellite connectivity, enhanced situational awareness at echelon across the battlefield providing near real time status of both friendly

contribution to the Department of Defense' Joint All Domain Command and Control (JADC2) concept, has been an annual experiment since 2019 hosted by the Army Futures Command (AFC). In short, PC is intended to experiment and develop capability to deter future adversaries during large scale combat operations (LSCO). Directly focusing on the Army 's six modernization priorities, AFC combines joint and multinational forces while integrating both offensive and defensive capabilities across all domains to achieve overmatch.

## Change is determining ways to leverage these legacy systems to transform and modernization capability in a multi domain and contested environment to be ready to defeat any adversary in 2025 and beyond.

and enemy locations. AMDWS / FAADC2I is one of the U.S. Army's legacy systems, derived from the Army Tactical Command and Control System (ATCCS) family of systems. Another system of the ATCCS family of systems is the Advanced Field Artillery Tactical Data

System (AFATDS). The AFATDS is used to support field artillery planning, coordination, control, and execution of fires and effects; this also includes the U.S. Navy's long range naval gunfire systems, close air support, and attack aviation. These two legacy systems, and a number of others require extensive manpower and resources to maneuver, position, and emplace, to become operational. Couple these requirements with the technical expertise and time needed to enter the network architecture, and you have a pre-9/11 tactical recipe. In the words of former Secretary of Defense Donald Rumsfeld, "you go to war with the Army you have." That being said, change is a must now, and part of that change is determining ways to leverage these legacy systems to transform and modernization capability in a multi domain and contested environment to be ready to defeat any adversary in 2025 and beyond.

Project Convergence (PC), the Army's

Some of this recent testing and experimentation has included AFATDS in a cloud environment. Put simply, Cloud AFATDS (C-AFATDS) is the name of the currently fielded version of AFATDS within a virtual machine vice the standard 'miltope' laptop that is issued and used throughout the Army today. Through continuous experimentation, C-AFATDS has been tested during a number of theater level and above exercises, the most recent being PC-22. Additionally, 18th Airborne Corps, three subordinate divisions, and 56th Theater Fires Command in U.S. Army Europe have also recently experimented with C-AFATDS, embracing the speed, sustainability, resilience and agility of this capability through continuous modernization. In so doing, continuous modernization provides an edge to cloud (E2C) infrastructure and services to deploy a consistent cloud stack from the enterprise to edge nodes through the development of microservices to connect, enhance, and modernize the deployed legacy applications.

Like the testing, experimentation, and familiarization being accomplished with AFATDS in a cloud environment, the opportunity to do the same with AMDWS exists. Placing AMDWS in a cloud framework will have no impact to other existing systems, and place emphasis on the

benefits of using cloud as a service while vastly speeding up both voice and data communications, and providing leaders at echelon the information, intelligence, and decision space required to make sound and timely decisions. E2C, as mentioned above, is an infrastructure ecosystem which unites the hardware, software, and cloud to securely connect sensors, mission software, services, and data via vendor- interoperable infrastructure aiding in bridging the gap between legacy systems and new capabilities across diverse environments. Leveraging recent and ongoing experiments and exercises, combining legacy systems with modernized capabilities in a cloud environment will afford Army senior leaders to focus in greater detail on joint and multinational offensive/ defensive integration of fires, ultimately bringing the effects necessary to deter and when required, defeat an adversary.

In conclusion, it is time to begin testing and experimenting with AMDWS in a cloud environment, moving away from the legacy ways aforementioned during my company grade years. By doing so, this will enable the rapid deployment of legacy systems and applications, extending capabilities by way of microservices in an effort to enhance the command, control, and coordination of ADA formations throughout the battlespace. It will allow users to leverage developed microservices and build a pipeline of information at speed from the enterprise cloud to the edge providing a more resilient, sustainable, and survivable capability. This speed of data, intelligence, and decision making is exactly the recipe needed to continue to maintain pace with evolving adversarial capabilities while operating in challenging, and at times, contested environments.

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# 11<sup>th</sup> ADA BDE *Leads the Way* with Tactical Data Link University

By CW3 Travon Graves

**A**rmy Air Defense Artillery brigades continue to face significant challenges synchronizing training across the brigade, Army Air and Missile Defense Command and installation. A well-developed training initiative increases combat effectiveness by producing safe, proficient and flexible Soldiers who can operate and win on the battlefields of today and tomorrow. With the creation and implementation of Tactical Data Link University, the *Imperial* Brigade is now able to foster an effective training environment within the brigade and continue to extend our influence across the AAMDC and the installation. During FY22, the *Imperial* team coordinated and executed a series of tactical data link training events that included elements from the 1<sup>st</sup> Armored Division, 32<sup>nd</sup> AAMDC, and units organic to the 11<sup>th</sup> ADA BDE. These events are aimed primarily at 14-series Soldiers and leaders as it is an Air Defense-driven glide path. Still, it was necessary to incorporate maneuver elements into the training with the resurgence of large-scale combat operations.



Left: CW3 Travon Graves, 11th Air Defense Artillery Brigade Systems Integrator, is pictured teaching the basics of communication troubleshooting in his Tactical Data Link University class. Center: Tactical Data Link University students from 1st Armored Division, 32d Air and Missile Defense Command, and 11th Air Defense Artillery Brigade are pictured learning about establishing a secure connection. Right: Tactical Data Link University students from 1st Armored Division, 32d Air and Missile Defense Command, and 11th Air Defense Artillery Brigade gather for a picture upon completion of the challenging course. (Photos by 1LT Mariah Love, HHB 11th ADA BDE)

## ***Train as You Fight***

TDL-U arrived through the 11<sup>th</sup> ADA BDE commander's priority to train as you fight. Often within the ADA ranks, our command post nodes are not properly trained and lack the emphasis necessary to mitigate training barriers. Such is the observation throughout Patriot organizations wherein Soldiers within the Tactical Control Stations and battery command posts are often task-saturated with requirements outside their organic job responsibilities. This issue, coupled with a vague understanding of interoperability, leads to insufficiently trained CPs. Based on these observations, the 11<sup>th</sup> ADA BDE Air and Missile Defense Systems Integrator incorporated a series of training seminars and opportunities to fill those training shortfalls. The training focused mainly on integrating tactical data links and mission command information systems.

Additionally, the training extended hands-on experience of legacy tactical data links such as Tactical Data Information Link J or Satellite. SAT J is a protocol primarily used by the U.S. Navy in maritime operations but still relevant to the U.S. Army platforms in a joint environment. Air Defenders often deploy to joint environments that are difficult to replicate in garrison. With the Army's Global Agile Integrated Transport (GAIT), the 11<sup>th</sup> ADA BDE could extend its tactical network to facilitate a lab environment for Soldiers to practice operating within a live network. GAIT was established to facilitate distributed mission command for Army organizations to help establish a "train-as-you-fight environment." It is critical that units exploit all available resources such as GAIT, home station mission training center capabilities, and units available across the installation.

## ***Fight to Train***

Without a replicated home station training experience, ADA BDEs and subordinate units would continue laboring through training roadblocks that degrade the graduate level of mastery that the *Imperial* Brigade is pursuing. Commanders must understand the importance of fighting to train, along with the second and third-order effects of not training to support

the evolving, complex warfighter environment. The more units incorporate digital sustainment initiatives such as TDL-U into their training glide paths, the better prepared that organization will be to integrate into a joint, interagency, intergovernmental and multinational environment. The 11<sup>th</sup> ADA BDE witnessed the benefits of utilizing TDL-U during Roving Sands 22, one of the most extensive CONUS Air Defense-centric exercises. During Roving Sands, the Patriot units who had completed TDL-U were noticeably more effective and efficient in executing Air Battle Management and establishing and maintaining tactical data links. It is critical to note the focus of the fight is not solely on tactical data link-equipped systems but a fight to ensure ADA units maintain the requisite knowledge to exploit their organic capabilities regarding mission command information systems.

## ***Summary***

During subordinate units' evaluations, the BDE AMD Systems Integrator saw firsthand an increase in operator proficiency. TDL-U also provided more contacts to Air Defenders considering transitioning into the Warrant Officer Cohort. The 11<sup>th</sup> ADA BDE 140A also noticed a direct correlation between TDL-U implementation and an increase in packet submission for 140A. Several potential 140A candidates felt after participating in TDL-U, they were more engaged in their job and wanted to pursue more opportunities for responsibility. This article aimed to share lessons learned from 11<sup>th</sup> ADA BDE during our recent Roving Sands 2022 iteration and highlight the TDL-U digital sustainment initiative. Interoperability and the pursuit of shared situational awareness will continue to be integral to the 11<sup>th</sup> ADA BDE's ability to fight and win. The proper integration of TDL-equipped systems and missile and space intelligence training can dramatically impact operations at the BDE level and beyond.

CW3 Travon Graves is currently the 11<sup>th</sup> ADA BDE 140A Air and Missile Defense Systems Integrator. Before joining the Warrant Officer Corps in 2014, Graves was a 14S Air and Missile Defense Crewmember. He became a 140A due to his interest in tactics and desire to have more impact.





## 10th Army Air and Missile Defense Command ANSWERS THE CALL

*MAJ Justin Ruholl and LTC Rosanne Clemente*

**"The expertise and professionalism demonstrated by our ADLT's has been invaluable to reassuring our Allies and Partners."**

**– BG Barnett,  
10th AAMDC Commander**

**W**hen Russian forces invaded Ukraine in February 2022, Partners and Allies across Europe looked to the United States to lead the response to Russian aggression. As it became clear that the U.S. would spearhead efforts to support Ukraine with lethal aid and critical supplies through logistical transfer hubs in Poland, senior leaders recognized that these pre-staging locations would become high-value targets. To bolster confidence in the alliance, reinforce U.S. commitment to Allies and Partners, and protect equipment and personnel, U.S. European Command leaders called upon the 10th Army Air and Missile Defense Command (AAMDC) to defend key logistics and support areas from enemy air and ballistic missile threats.

Team 10 envisioned three key components critical to mission success. First, Air Defense Liaison Teams (ADLT) pushed forward into Poland, Romania, and Slovakia proved to be vital to the success of integrating air defense capability along the Eastern Flank. Second, planners from across the Joint Force and the NATO alliance established a joint kill chain and

integrated various air defense systems built upon a robust communications and data link architecture. Finally, logistics and movement control teams were instrumental in coordinating and synchronizing the movement of all equipment into multiple positions located in various NATO countries along the Eastern Flank.

## **Air Defense Liaison Teams**

Multiple capabilities were identified as essential to establishing layered air defense protection of designated defended assets. Counter-unmanned aerial system (cUAS) systems – which have never operated in EUCOM before – and short range air defense (SHORAD) systems were integrated into the defense design to provide low level detection and engagement capability of enemy UAS and aircraft. The U.S. Patriot weapon system provided an additional layer of cruise missile and tactical ballistic missile defense. Recognizing that agreements would require a special team to adjudicate on behalf of the U.S. government, the 10th AAMDC created three Air Defense Liaison Teams (ADLT) consisting of air defense officers and planners, Judge Adjutant General (JAG) officers, and Air Force planners with expertise in air defense capabilities, policies and legal authorities, and command-and-control systems. Each team traveled to Poland, Romania, and Slovakia to connect with representatives from the host nation's Ministry of Defense, Air Force, Army, and Civilian Aviation Authority. All teams were charged with establishing relationships and developing the policies and agreements required to deploy and operate various air and missile defense systems within their respective countries.

The ADLTs spent weeks in their respective countries working with the military, government and civilian authorities to establish the agreements that would allow the US air defense units to operate in their countries.

Team 10 faced a major challenge to deploy air and missile defense assets across NATO countries while under peacetime conditions. Russia had not directly threatened military action against any sovereign nation other than Ukraine. European political leadership cautiously assessed Russia's next moves and did not want to risk the conflict

spilling over into NATO countries. Partner nation engagement and planning required a balancing act of deploying both US and host nation military assets along the Eastern Flank while simultaneously operating under each country's peacetime laws and civilian control. As in most countries, laws and regulations for civilian air control authorities are not postured to support military operations. Host nation civil laws severely restrict the use of UAS and often fail to address the use of kinetic and non-kinetic cUAS capabilities. Additionally, host nation civilian air authorities do not have the processes or means to divide the air space to support military Airspace Control Measures (ACM) or clear airspace promptly to enable air defense engagements. The initial and most pressing objective of the ADLT was to coordinate with U.S. Embassy and host nation civilian and military authorities to develop bilateral agreements to allow the deployment and operation of U.S. cUAS and air defense systems. These bilateral agreements included the use of host nation land for U.S. unit positions, identification and engagement authorities, use of military capabilities in civilian airspace, rules of engagement (ROE) to include self-defense, reporting requirements, the host nation's responsibilities to support U.S. units, and the development of a shared common air picture to coordinate engagements.

## **Implementing a Joint Kill Chain and a Data Link Architecture**

As NATO forces rushed to the flank, air defense planners led efforts to build the joint kill chain for each country hosting any air and missile defense systems. Significant efforts went into establishing the voice and digital means by which an air defense unit coordinates the identification of an unknown track and receives the command to engage a target as a part of the joint kill chain. Furthermore, planners needed to develop military air space control measures inside civilian apportioned airspace to clear, de-conflict, and coordinate potential aerial engagements. As the conflict in Ukraine progressed, U.S. planners and NATO Allies confronted challenges in new and creative ways by working through each country's distinctive policies and authorities. Some countries deployed air defense capabilities under a NATO command and control structure like in Slovakia



while others established multilateral agreements as was done in Poland between U.S., U.K., and Polish air defense units. If rules of engagement were more restrictive in certain countries, the authorities for an engagement were held at a higher level and lengthened the time to communicate and adjudicate a track within the established joint kill chain.

Overall, the efforts of the ADLTs established a new standard for deploying to Ally and Partner nations and develop bilateral and multi-lateral agreements enabling air defense operations. Ultimately, the teams established technical and procedural interoperability, reporting procedures, and command chains to provide tactical units the guidance they needed to conduct operations. Throughout the deployment, ADLTs continued to work with Polish, Romanian, and Slovakian leaders to further refine how the U.S. units defend critical assets within their countries.

A secure and reliable data link and communications architecture is critical to creating a shared air picture and providing early warning to all NATO Allies and Partners. Team 10's tactical data link experts and G6 personnel tirelessly worked alongside U.S. Army Europe – Africa (USAREUR-AF) communication professionals to tackle the link architecture problem resident in all three locations. Technical solutions were unique to the different countries. Data link subject matter experts worked to identify options for connecting various systems within each country and establish the means of making all the systems “talk,” eventually leading to a robust network that created a combined Common Operational Picture (COP) for all organizations.

The 10th AAMDC G6 worked closely with USAREUR-AF G6 and the 2nd Theater Signal Brigade (TSB) to establish redundant communications plans for subordinate units positioned along the Eastern Flank. Team 10 leaned heavily on external communications support and self-procured communications systems to ensure data was shared among a multitude of systems and sensors while effectively managing spectrum frequencies to deliver the air picture to all participants. As the communications architecture matured, the Signal community introduced a direct

commercial fiber optic connection for units in Poland which significantly improved track quality and expanded bandwidth on the deployed data link and communications network.

Tactical Data Link and Communications professionals also focused on spectrum management due to the heavy use of frequencies for radars and air defense communications equipment. Host nations must ultimately approve and provide these frequencies at the international level. The 10th AAMDC G6 Spectrum Management Office (SMO), with support from USAREUR-AF G6 SMO, was able to request and provide over 200 radio and radar frequencies to support operations on the Eastern Flank. During a stressful period of high operational tempo to push units into position along the flank, the collaborative efforts of the Signal Community ensured consistent and reliable communications throughout the deployment and continues today over a year later.

## **Logistics and Sustainment**

In order to maintain operations, transportation of equipment and personnel was crucial to success. 10th AAMDC logistics and sustainment elements played a vital role in the short-notice deployment of air defense assets to protect key logistics hubs and command and control nodes along the flank. The G4 Mobility team worked with higher echelons to secure 24 strategic airlifts for the Patriot Minimum Engagement Packages (MEP) and four strategic airlifts for Patriot munitions within 72 hours of notification. The mission also required utilizing 483 commercial line haul assets to move 503 pieces of general cargo rolling stock, sensitive items, and HAZMAT from the point of origin to the final destination across three various countries.

Throughout all phases of the deployment, the 10th AAMDC G4 exercised numerous logistical initiatives to improve the readiness posture and standards of living for the Soldiers. In coordination with USAREUR-AF and 21st Theater Support Command, Team 10's G4 successfully deployed the 5-7 ADA Supply Support Activity (SSA) from home station to the deployment site where they served as the initial reception and transfer point of all lethal aid to Ukraine. Additionally, the SSA's



forward deployed Additional Storage Lines (ASL) drastically reduced Customer Wait Times for the Patriot units and 17 other external customers.

The last year has proven to be both historic and extraordinary for the 10th AAMDC. As U.S. European Command's theater air and missile defense leader, Team 10 answered the call to defend critical assets and protect U.S. and partner nation maneuver units against any enemy air and ballistic missile threats. The Leaders and Soldiers in the organization faced many challenges requiring professional performance in a manner outside the normal scope of their duty descriptions. While the mission along the Eastern Flank continues, the impact of the ADLTs, communications professionals, and logistics planners endures in the established policies, joint kill chain, link architecture, networks, and logistics nodes. 10th AAMDC and its units stand ready to provide the best air and missile defense capabilities to the Joint Force and the NATO Alliance – Team 10 will always **Answer the Call**.

### ***"Shield of Victory"***

MAJ Justin A. Ruholl is a native of Dietrich, Illinois. He attended Southern Illinois University Carbondale (SIUC) and earned a degree in Criminal Justice and commissioned in June of 2007. Since then he's been assigned to several duty stations to include, Fort Liberty, NC, with the 1-7 ADA and returning from CCC Fort Sill, Oklahoma to be with the 3-4 ADA, Fort Leonard Wood as a writer and obtained Instructor of the Year in 2017, 6-52 ADA, 35th ADA, & 10th AAMDC. MAJ Ruholl holds a Master in Military Operational Arts and Science. MAJ Ruholl's military decorations include the Meritorious Service Medal, Army Commendation Medal with 1 Oak Leaf Cluster, Army Achievement Medal, National Defense Service Medal, Global War on Terrorism Service Medal, Military Outstanding Volunteer Service Medal, Army Service Ribbon, Overseas Ribbon w/2, Meritorious Unit Citation Award, German Proficiency Badge and the Air Assault Badge.

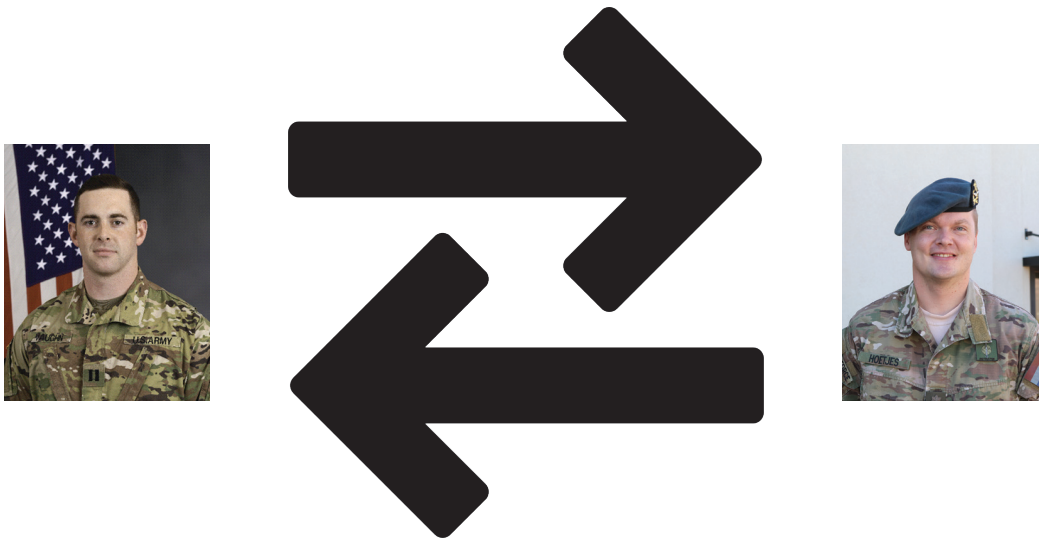
COL Rosanna M. Clemente is a first generation Filipino-American born and raised in northern New Jersey. She graduated from the United States Military Academy in 2002 with a degree in U.S. History and was commissioned as a Second Lieutenant in the Air Defense Artillery Branch of the U.S. Army. She graduated from the U.S. Army Air Defense Artillery Officer Basic Course (SHORAD Track) at Fort Bliss, Texas in 2003. She also holds a Masters of Military Science Degree in National Security and Strategic Studies and graduated from the Maritime Advanced Warfighting School at the U.S. Naval War College in Newport, Rhode Island in 2013. In 2022, Ro graduated from the U.S. Army War College and received a Master's Degree in Strategic Studies with an area of concentration in the Advanced Strategic Art Program. Ro has held unit leadership and command assignments from the platoon to the battalion level. She was one of the first female short-range air defense officers specializing in the Avenger and STINGER missile weapons systems before transitioning to the PATRIOT missile defense system. Deployments include Iraq and Afghanistan. She has held the positions of Commander (Patriot Battery), OPs, Director C-IED, JIDO Chief and in July 2022 was assigned to the 10th Army Air and Missile Defense Command in Sembach, Germany where she currently serves as the Assistant Chief of Staff for G3-Operations.





# Military Personnel Exchange Program

By 1LT Mariah Love



*Left: CPT Travis Vaughn of 11th Air Defense Artillery Brigade, who is currently serving as the Air Defense Exchange Officer with the Netherlands' Ground-Based Air Defense Command.*

*Right: MAJ Nick HoetJes of the Netherlands' Ground Based Air Defense Command is currently serving as the 11th Air Defense Artillery Brigade Deputy Brigade Operations Officer and Foreign Exchange Officer. (Photo by 1LT Mariah Love, HHB ADA BDE)*

**T**he Military Personnel Exchange Program is a one-for-one exchange of personnel between allied countries. This program was established to build and maintain positive relationships between coalition partners and allies. A successful exchange partnership will enhance relationships between militaries and prepare participants for multinational operations.

The 11th Air Defense Artillery Brigade has proudly participated in the MPEP since its start in 1996. Currently, CPT Travis Vaughn of the 11th ADA BDE serves as the Foreign Exchange Officer with the Ground-Based Air Defense Command in the Netherlands. While working with the

Dutch military, Vaughn says, "Primarily, I am responsible for planning and supervising brigade-level Patriot exercises for the GBADC. Whenever necessary, I work to ensure shared understanding between the GBADC, U.S. Air Defense Artillery units and U.S. embassy personnel." Here at Fort Bliss, the current Foreign Exchange Officer, MAJ Nick HoetJes, from the Royal Netherlands Air Force, is serving as the Brigade Deputy Operations Officer. In addition to typical duties of a Deputy Operations Officer like writing orders and planning exercises, HoetJes says, "I am always looking for opportunities to conduct joint training whether it be with my home country or another foreign ADA unit. I

am the lead for foreign relations, so my main objective is to better understand and utilize other militaries' capabilities and maintain international relationships."

Both officers had the opportunity to plan and execute joint, large-scale operations during their time abroad. For HoetJes, "I arranged for my brigade to participate in Roving Sands 2022 with 11<sup>th</sup> ADA BDE, but, unfortunately, they had to deploy a few weeks before due to a real-time mission. It was a higher priority, but I am hopeful that we will conduct Operation Shining Star exercise again with the Japanese, Dutch and American Air Defenses soon." Vaughn completed several joint operations with another operation on the horizon, "Over the summer, I participated in a binational Patriot live fire exercise at the NATO Missile Firing Installation. My colleagues and I are currently preparing for Joint Project Optic Windmill in spring 2023. One of the most obvious differences between Dutch and U.S. Army operations is the strong focus on building interoperability during certification events like the live fire."

The Royal Netherlands Air Force is comprised of 6,500 active-duty Soldiers, with about 800 of those making up the ADA branch. The Netherlands' ADA branch is organized differently: Short Range Air Defense is in the Army, while High to Medium Air Defense is in the Air Force. Vaughn says that the U.S. Army's size can be an advantage and disadvantage, "I've come to realize that the size of the U.S. Army has clear advantages in warfighting capability, but it also impacts our implicit attitude toward interoperability and integration with partner nations. Nations like the Netherlands are proficient in these tasks because multinational integration is often a necessity, and the importance of maintaining these unit-to-unit relationships is obvious." The size and operational style of the Dutch military compared to the American military is vastly different. When asked what challenges HoetJes faced integrating into a different military, he said, "The biggest growing experience here has been the planning scale that you have to work on; it still baffles me. I look out my office window here and see two battalion motor pools that would comprise all the Netherlands' air defense capabilities." Vaughn found that in addition to a

different mindset regarding joint operations, he struggled with the difference in tactics, "I would say that my biggest challenge was becoming familiar with NATO-centric planning processes found within the Dutch military. Understanding the roles and outputs of various syndicates and control groups added a layer of complexity that I did not anticipate."

Upon completing this two-year assignment, HoetJes will assume the equivalent of battalion command, and he plans to integrate a few American military practices into that command. "You have a set battle rhythm every week, like Maintenance Monday and Leader's Time Training Thursday. It may feel tedious at times, but Soldiers know exactly what is expected of them. I think that is valuable and will try to integrate that into my command." After Vaughn's experience with GBADC, he plans to incorporate lessons he learned about collaboration, "Military culture in the Netherlands prizes collaboration at all levels regardless of rank. I think it is important to remember that the quality of someone's feedback is not a function of their rank. The Dutch military demonstrates this constantly; that is certainly something I will work to emphasize in my future positions."

HoetJes applied for the MPEP because he wanted to grow both as a person and a Soldier. "I wanted the experience of living abroad and serving in a much larger Air Defense Artillery community. I knew there were valuable lessons to be learned by integrating into a different military and culture." Vaughn applied for the cultural experience and opportunity to represent his country. "If you have an interest in immersing yourself in another culture and becoming more knowledgeable about multinational operations, I highly recommend applying for any exchange position. As an exchange officer, you'll be viewed as a U.S. Army representative first and an Air Defender second." Both officers have greatly enjoyed their time in the MPEP. To American and Dutch Soldiers interested in MPEP, HoetJes simply says, "Do it. It is the experience of a lifetime."

*1LT Mariah Love graduated from Cedarville University in 2019 with a Professional Writing and Information Design degree. She is a former 14A Air Defense Artillery Officer who served as the 11<sup>th</sup> ADA BDE Public Affairs Officer.*



# Engagement Operations Center Modernization and Mobility



*By LTC Trey Guy and 1LT Ian R. Stanford*

**T**he Engagement Operations Center is the command-and-control node for all indirect fire protection capability operations. EOCs utilize a wide array of equipment to intercept rocket, artillery and mortars; counter-unmanned aerial systems and provide sense and warn capabilities in support of critical asset protection.

For over a decade, deployed IFPC EOCs have been housed in makeshift structures, improved and hardened over time while protecting vital static locations throughout the United States Central Command region. As the Army shifts its primary focus from

counterinsurgency operations to Large-Scale Combat Operations, mobility stands at the forefront of modern warfare. Reforming IFPC systems for the increased lethality and mobility in LSCO environments is vital. It is common practice for garrison units to establish EOCs in non-hardened structures, such as Deployable Rapid Assembly Shelters, presenting unique challenges not faced in a deployed environment. In their current configuration, IFPC units are incapable of sustaining the operational tempo required in LSCO warfare. In preparation for future LSCO operations, the onus is on the Air Defense Artillery Branch to adapt to the modern battlefield.

Two potential solutions exist and are already used by a myriad of Army units. The M1078 Expandable Van Shelters (See Appendix 1) and the Army Hardside Expandable Light Air Mobile Shelter systems (See Appendix 2) provide the necessary capability to modernize IFPC EOC operations for future combat. Utilization of either of these systems would not only enhance our mobility and the survivability of our Soldiers and equipment but would also allow our crews to train as we fight. Reconnaissance, Selection and Occupation of Position, followed by site setup and Full Operational Capability, could be standardized across the Air Defense Artillery Corps through the adjustment of equipment. Introducing the M1078 or HELAMS shelters to an IFPC Battery would also enhance training as the EOC can be driven to any location and would give units the flexibility to execute training and certification in any weather at any time, with reduced risk of environmental damage.

***Utilization of either of these systems would not only enhance our mobility and the survivability of our Soldiers and equipment but would also allow our crews to train as we fight.***

The main purpose of a DRASH tent for IFPC operations in a field environment is to provide housing in support of environmental control regulation for EOC equipment. The M1078 Expandable Van Shelter or “expando van” would negate the need for DRASH tents. Not only do DRASH tents prove unreliable at adequately protecting equipment from the elements in field environments, but DRASH tents also take approximately 30 minutes to set up and tear down. Expando vans can be pre-configured with all necessary equipment to provide a functioning EOC, cutting time to approximately 10 minutes. With its expanded capacity, it can easily accommodate a crew of four to six, depending on the configuration. With internal cooling and environmental control, all EOC electronics can be safely stored inside the expando van, bridging the gap between the hardened structures utilized in CENTCOM and the light field tents utilized in garrison training. Additionally, expando vans have a mobility advantage over the current setup due to their ability to be air loaded with all essential EOC components inside and ready to be connected once at its destination. This decreased timeline

enhances an IFPC unit’s ability to provide quick sense and warn capabilities to any supported unit, increasing the ground commander’s overall awareness and ultimately creating a force multiplier.

The Army Hardside Expandable Light Air Mobile Shelter system was previously utilized by IFPC units in Iraq and Afghanistan when hardened structures were unavailable. The Army HELAMS system can be towed with the appropriate wheel accessory kit or transported utilizing M1120 HEMTT Load Handling System vehicles. The HELAMS is a mobile hardened structure providing ample space for all necessary EOC equipment, internal environmental controls and increased protection for equipment against inclement weather damage. The M1078 Expandable Van Shelter and the Army HELAMS system provide increased benefits and protection to equipment, personnel and operational capability.

The addition of an M1078 Expandable Van, at approximately \$455,000 per unit, will decrease the year-to-year maintenance costs associated with EOC operations, resulting in less damage from environmental conditions or transit and setup. This streamlined EOC setup and tear-down also create an incalculable number of man-hours saved. Furthermore, utilizing a lockable vehicle in which equipment is stored and maintained will improve overall command supply discipline as the EOC operating through expandable vans would not require the removal and replacement of equipment during transit and setup.

The HELAMS system, at the cost of \$170,000 per unit, would provide a substantially lower initial bill and offer many of the cost-saving measures afforded by the expando van. The one major benefit of the HELAMS is its capacity to be Sling Loadable — external transportation of equipment by helicopter — the primary method of equipment transportation in Air Assault Operations. Due to the HELAMS capacity for sling-load operations, some equipment would require removal before the flight — sacrificing some of the benefits of pre-staged equipment.



The added benefit of sling loadable equipment drastically increases the EOC's capacity to support Air Assault units and provides sense and warn capabilities in farther-reaching and more austere environments.

IFPC units face daily challenges in an ever-changing environment. Any attempt to increase operational capability, force readiness, training value, and deployability must be evaluated to further refine the protection of friendly assets and the ability to engage threats in an LSCO environment. While further consideration and a full DOTMLPF-P breakout on the feasibility of M1078 Expandable Van Shelters or HELAMS systems as a DRASH tent replacement is warranted, one of these systems should be fielded, for testing, at the earliest opportunity. Application of lessons learned will increase the ability of EOC crews to integrate in any environment, at any time, faster and more reliably. As Integration of IFPC units into the maneuver force for training and deployment becomes more commonplace, IFPC units' ability to keep pace with Brigade Combat Teams becomes greater. Increased mobility enhances Soldier safety and lethality. As new and advanced enemy technology becomes more diverse, supported units will reap the benefits of an integrated, highly mobile EOC.

*LTC Trey Guy received his commission through Virginia Military Institute's Army ROTC program in 2003, commander of the 2nd Battalion, 44th Air Defense Artillery Regiment and is currently a student at the Army War College. He is a career Air Defense Artillery officer and has served in a multitude of C-RAM and SHORAD units as well as joint and combined assignments. He is a proud and loving husband and devoted father of four. He is active on Twitter @shoraddad.*

*1LT Ian R. Stanford received his commission through the University of Utah's Army ROTC program in 2020, the Adjutant for 108th ADA BDE and is currently the Assistant S3 for 2nd Bn, 44th Air Defense Artillery Regiment. His previous assignments include Counter-Rocket Artillery and Mortar Platoon Leader for Alpha Battery, 2-44th ADA Battalion and EOC Battle Captain. As one of 12 active-duty C-RAM platoon leaders, Stanford was an observer/coach trainer for the 1-101st Massachusetts Army National Guard's 2021 Mission Rehearsal Exercise. He is a proud Air Defense Artillery Officer who pursues his intellectual curiosity through professional reading, writing and travel.*



See Appendix 1



See Appendix 2

## APPENDIX 1

### M1078 Expandable Van Shelters

#### *Features:*

- Equipped with tie-down rings at four upper corners
- Securable interior emergency release built into double personnel door at rear
- 120/208V/3PH/100A/60Hz power distribution panel controls permanently mounted 120V electrical outlets placed along walls
- Standard lighting package includes 120V fluorescent lights and a 24VDC emergency and blackout light system
- Expansible shelter for the Family of Medium Tactical Vehicle (FMTV) 5-ton truck chassis
- The following are available options will enhance this product:
  - Dehumidifier
  - Environmental Control Unit (ECU)
  - Interior Workstations Interior Cabinets
  - Interior Equipment Racks
- This product is capable of being transported by the following means:
  - Land Vehicle
  - Cargo Ship
  - Rail
  - Internal Aircraft Transport (Requires Pallet, Net, Tie-Down Straps)

## APPENDIX 2

### Army Hardside Expandable Light Air Mobile Shelter systems

#### *Features:*

- 2-Way Forklift-able
- Rubber Membrane Threshold System
- Transport by High-Speed Mobility Wheel Set (not included)
- Removable Detent Rails for Air Transport
- Rail Transport (Max 11,000 lbs.)
- Tie-Down Rings (installed in floor)
- 120-208VAC/3PH/60A/60Hz Power
- 60A Input Power Connector
- 50-ft. Shore Power Cable Mates w/ Input (QTY 1)
- Ground Rod Kit (QTY 1)
- Air Lift Certified (MIL-STD-913) Max 15,000 lbs
- Helo External Air Transport (MIL-STD-913/209) Certifiable Max 13,240
- Eight windows with blackout shade
- One removable winch assembly per side to lower the side wall assembly
- Four main leveling jacks and six side leveling jacks
- Mobility wheel set adapter provision
- Two Pallet Position when stowed
- 100A/50-Ft. Long Shore Power
- 100A/50-Ft. Long Slave Power
- Aluminum Tread Plate
- 42K BTU-Cool/18K BTU-Heat/Slide In/Out
- This product is capable of being transported by the following means:
  - Internal Aircraft Transport Certified
  - External Helicopter Sling Certifiable
  - Land Vehicle
  - Cargo Ship
  - Wheel Set
  - Trailer
  - Rail





*Figure 1: Fire Base's ADA assets respond to an enemy night attack in Vietnam.*

## Air Defenders are Force Protectors

### *Rediscovering and Returning to Short Range Air Defense Historical Force protection Role*

*By 2LT Ian Murren*

#### SHORAD's "Do or Die"

With the proliferation of unmanned aircraft systems to state and non-state actors in the new era of warfare, Short Range Air Defense will increasingly need to counteract this emerging threat. Enemies, in the future, will use coordinated attacks with Class 1 or 2 UAS and ground units against frontline and logistical areas. To counteract this, designs for SHORAD units need to have the capability to engage and defeat both types of threats closely. Planners must consider the demands of urban environments when designing SHORAD vehicles. To do so, ADA must design SHORAD vehicles with cannons with the "three highs": high caliber, high velocity and high rates of fire. SHORAD vehicles with the "three highs" will help accomplish the primary task of defeating enemy air assets and make the platform flexible enough to fulfill the force protection role SHORAD has historically occupied. Force protection can defend assets, equipment and personnel from multi-dimensional attacks. ADA thrived when the force protection role was embraced in SHORAD design during the Vietnam War. When the force protection role was largely ignored in SHORAD design, specifically with the lightly armored Avenger vulnerabilities to small-arms fire, ADA suffered. Leaders must embrace the inherent Joint nature of ADA as it can be a potent force against targets both

on the ground and in the air on the future battlefield as it has been in the past.

#### Introduction

As LTG James Rainey said on Day Two of the 2021 Fire's Conference, the ADA "branch is in a sort of identity crisis." It is amid this "identity crisis" that has the potential to either make or break the branch not only on the battlefield but also in the budget rooms. Since the absence of a SHORAD branch has led to a break in institutional knowledge of a critical component of ADA, a reexamination of branch history will give insights as to what knowledge might have been lost. A look at the history of the branch, one can see an exciting opportunity that has gone unrealized for the past 20 years and, if recovered by the branch, will guarantee not only the security of forces and budgets but also a recovery of prestige that Air Defenders have been seeking since it has been largely forgotten in the Global War on Terror (GWOT). The ADA branch has long had a "force protection" role it has been uniquely suited for, and as LTG Rainey pointed out, Air Defenders need to "grab the role for the protection of the force" and "demand (our) seat at the maneuver table." To properly fulfill the "Protection" Warfighting function means not only protection from air threats but also using SHORAD vehicles cannons that have high caliber, high velocity, and high rates of fire (the three highs) in the War fighting function of "Fires" to engage and destroy enemy ground threats. The added capabilities will give broader flexibility to commanders to employ ADA in two War Fighting Functions that no other branch can provide.

#### Historical Context

##### *Vietnam: The War that Made the Modern ADA Branch*

Imagine the Americans at Fire Base Khe Sanh in 1968: being outmanned, outmaneuvered and out of options, forced to dig in their heels and dare the enemy to take the airfield from them. Those at home had heard the stories of the hard-fighting Marines, but few had counted on the Air Defenders. Few had fought next to them, never seen a "Quad .50" turn back an enemy assault or an M42 "Duster" rip apart an entire regiment of NVA in a matter of a few minutes, but everyone who had seen them in combat knew they were magnificent.

For months, Air Defenders such as 1LT Bruce Geiger secured the firebase at Khe Sanh and the surrounding areas. 1LT Geiger's detachment of "Dusters" armed with dual 40mm cannons positioned in dug-in positions was instrumental in adding precision firepower to the apexes of the Khe Sanh

airfield. “Dusters” were not only used in base protection but in convoy protection too. Just down the road from Khe Sanh, a few weeks earlier, a supply convoy of Marines was ambushed along the route that connected Khe Sanh and other nearby firebases, like the regional command center at Camp Carroll, along the Vietnamese DMZ. A Marine quick reaction force, including two tanks, was dispatched to relieve the convoy when suddenly the QRF became victim of a second ambush. Camp Carroll was now under threat of being cut off, their QRF was in danger of being overrun, and whoever they sent out next would have to rescue two pockets of Marines. CPT Vincent Tedesco and his complement of “Dusters” and “Quad .50s” pulled their vehicles off the line at Camp Carroll, rolled down to both sites, fought off the enemy, and got everyone from both pockets back before nightfall. What were these incredible machines of war that seemed to excel where others came short and what were they doing in Vietnam where there was no threat from the sky for the whole war?



*Figure 2: M42 Duster on the move in Vietnam*

The M42 “Duster” was an anti-aircraft turret with dual Bofor 40 mm cannons mounted on a Bulldog tank chassis (a light tank meant to replace the Chaffee tank of WW2). Firing 240 rpm out of each gun of proximity fused rounds that detonate after impacts at ranges beyond 88 feet. The “Duster” proved itself not only as a devastating anti-air weapon but also as an excellent anti-personnel vehicle. The M19 (which had the same turret mounted as the “Duster” but on a Chaffee chassis) had served in the Korean War in a similar role but as the Chaffee was phased out, so was the M19. The “Duster” had a typical crew of seven (one driver, one commander, one radio operator, one gunner and two reloaders) and was rather cramped and exposed in most cases. The small vehicle size, open turret, and need to keep feeding the hungry guns made the crewmembers dangerously exposed to

small-arms fire. Even the vehicle driver, as detailed in SGT Joseph Belardo’s book “Dusterman,” in his relative safety inside the driver’s hatch, would often have to expose themselves to enemy fire to deliver reserve ammunition to the turret crew.

As the name implies, the “Quad .50” was four M2 .50 caliber machine guns put together in a turret configuration and put on the back of a five-ton truck. While the “Duster” could trace its lineage to the Korean War, the “Quad .50” could trace it back to WWII. The Army needed to defend their motorized and mechanized formations with mobile air defense and mounted M2 machine guns onto M16 halftracks. When Soldiers realized the potential of four M2 machine guns suppressing and destroying enemy positions, it became very popular with ground forces. The configuration was so successful that it transitioned mostly unchanged, except for the half-track replaced by five-ton trucks through the Korean War and into the Vietnam War.

So, what was ADA doing in Vietnam? Officially, to combat possible low-flying North Vietnamese aerial attacks on U.S. bases in South Vietnam. Though that threat never materialized, the ADA batteries that deployed to Vietnam found great success in a force protection role assigned to guard convoys and firebases. The combination of the overwhelming fire of “Quad .50” and hard-hitting 40 mm cannons from the “Duster” quickly gained a reputation as a fearsome opponent to the insurgents. There were some limitations with ammunition capacity, crew exposure to enemy fire and the “Duster” struggled in off-road missions. The “Duster’s” 14-year-old design by the Vietnam War, though simple to maintain by crews, had difficulties finding spare parts. Nevertheless, Air Defenders were sought after as force multipliers by Army and Marine bases across Vietnam to protect valuable assets. Air Defenders allowed commanders to have a better economy of force and focus precious resources on other missions, such as search-and-destroy. Leaders could rest easy knowing their bases and convoys were well protected by their ADA units.

### ***Operation Iraqi Freedom: The War that Misunderstood Air Defense***

However, as the Cold War ended, the biggest threat to U.S. global air dominance was greatly diminished. The responsibility for air supremacy could be entirely shifted to the Air Force, U.S. planners thought. The U.S. moved toward a predominant missile-based system with the Avenger introduced in 1989. The main armament of the Avenger is two stinger missile





The U.S. Army brings back its Avenger surface-to-air missile systems mounted on a High Mobility Multipurpose Wheeled Vehicle, commonly known as the Humvee. (Photo: Georgios Mournoulidis: UAS Vision)

Pods with a total capacity of eight missiles and a single .50 (12.7 mm) caliber machine gun with only 200 rounds.

When Operation Iraqi Freedom began, especially once the counterinsurgency operation started, no air defense missions were left. SHORAD units found it difficult to adapt their equipment to the new environment of COIN and nation-building. The Avenger turrets' High Mobility Multipurpose Wheeled Vehicles were mounted on were too heavy to up-armor in an environment quickly becoming saturated with improvised explosive devices. There were attempts to adapt the Avenger with a "Heavy" variant that exchanged one of the two missile pods for 500 more rounds of .50 caliber ammunition to help return Avengers to the force protection role of guarding convoys and bases. However, it was found that the new variant did not prove itself well in the new mission. Faced with shifting priorities and budget cuts as the GWOT intensified, SHORAD units began to see their numbers dwindle until the decision to dissolve all SHORAD units was made.

### A Quick Aside on the "Three Highs"

While the "three highs" have been mentioned, there needs to be definitions and explanations for why they are essential. The three highs refer to:

**High Caliber:** SHORAD assets should have high caliber, usually above 20 mm, to engage air (especially armored Helicopters) and ground threat. 20 mm is also larger than most mounted weaponry on vehicles that rely on the .50 caliber (12.7 mm) M2. The higher caliber brings extra firepower that can help suppress or destroy enemy formations, especially when they ambush scenarios. In Vietnam, ADA units protecting convoys were intended to lay down suppressive

fire against the enemy while the rest of the convoy escaped the "kill zone."

**High Velocity:** Engaging airborne threats, it is important to flatten the projectile's trajectory in flight. The high velocity not only flattens trajectory but also reduces the amount of time air threats can maneuver out of the way of a projectile. High velocity also extends the guns' effective range as they can travel farther vertically before succumbing to gravity's pull.

**High Rates of Fire:** As any novice shooter knows, firing more rounds down range increases the probability of hitting a target, especially fast-moving targets. The ability to quickly gain fire supremacy on a ground target, especially when the allied force is ambushed, is key to regaining the initiative. Precious moments could mean the difference between significant or no friendly casualties in sudden attacks.

The "Three Highs" rule is not definitive but instead supposed to inform the development of SHORAD vehicles on what has historically been successful. The "Quad .50" is an exception as it has a lower caliber and lower individual rate of fire per M2 than later ADA equipment; however, it makes up for it in an impressive total volume of fire with four M2s. There is also an unmeasurable moral impact of both forces. Seeing four .50 caliber machine guns concentrate on an enemy position has an infectious ability to convince friendly soldiers that they can win a fight. Having a "Fire Dragon" evaporate comrades with thundering guns undoubtedly negatively impacts the psyche of an opponent's disposition on continuing an engagement. The conflicts of the future will also be broadcast on social media and other platforms. The impressive firepower of cannons with "three highs" might also be able to improve morale on the Homefront when images of tomorrow's "Fire Dragons" filter back into people's social media feeds.

### Vietnam versus Iraq: Comparison

While ADA equipment has been used in an anti-personnel role ever since it adapted machine guns to an air defense role in WW1, Vietnam and Operation Iraqi Freedom were chosen to be examined because they were both similar in the sense of being large-scale COIN wars that consumed a generation of American war planning and resources. So, why did the ADA branch fair so much better in Vietnam and not Iraq despite both being chiefly COIN conflicts? It is not the mission set, as both wars did not present any air targets for their ground-based systems to engage and saw ADA pressed into other force protection roles. The most significant difference is the equipment and

how well it conformed to the principles of Air Defense. There are six: mass, mix, mobility, integration, flexibility and agility. We can use some of these principles to judge the ADA platforms from both eras. Integration and mass will not be compared as those principles have more to do with how commanders use their force rather than comparing the platforms. Survivability will also be added because, in the force protection role, ADA systems should anticipate being closely engaged by enemy ground forces.

### Mix

Though in air defense, mix tends to refer to the ability to engage a mix of threats with a mix of engagement ranges, this mindset can be applied to a force protection role as well. The “Duster” and “Quad .50” brought their main armament and secondary weapons. Many “Duster” crews brought M60 machine guns to complement their heavier 40 mm cannons, whose ammunition needed 88 feet between muzzle and target before the impact fuse would activate. The mix of equipment and firepower allowed independent ADA units to have a variety of weapon systems to engage a variety of targets at various ranges.

In Iraq, however, the single .50 caliber machine gun left much to be desired as it could not depress its gun far enough in specific positions to engage ground targets. ADA units have little in the way of variety to fire at ground-based enemy personnel with their system. Still, there was no easy way to adjust the firing rate to conserve precious ammunition. The Avenger utterly fails in having the “three highs” in this regard. While having a significant rate of fire of 1200–1300 rpm, the Avenger’s single-stream 12.7 mm round firepower is not much compared to the Vietnam-era equipment. The “Quad .50”, though having a lower of 575 rpm (as it was a different variant) on each of its guns, made up for what it lacked in quantity totaling 2300 rpm with all guns blazing. The “Quad .50” could also overcome its smaller caliber, for ADA weaponry, with its volume of fire against ground and air targets.

### Agility/Mobility

The HMMWV chassis is the superior system compared to the aging tank and truck chassis used by the “Duster” in Vietnam. Though vastly different environments, deserts, and jungles are about as opposite as biomes get, the Vietnam-era vehicles usually clung to the single-lane roads. At the same time, the HMMWV had more flexibility to traverse

the open roads and Iraqi countryside. The Avenger turret did significantly limit the advantages of the HMMWV platform with its awkward turret placement. The Avenger turret threw off the center of balance, making the platform have difficulty getting over inclines in terrain and issues with speed as the turret substantially weighed down the system. Though mobility is not a strong suit of either ADA platform, this does not mean that systems like the “Duster” and “Quad .50” were not mobile enough for their role. Though not exceptional for their speed, the Vietnam-era equipment was only attached to QRFs if they could keep pace with other vehicles of the time. Agility and mobility are essential though understanding mobile needs to be put in context for the mission SHORAD systems are attached. If war planners of today are planning for the next large conventional land war, they should develop equipment that can keep pace with the maneuver forces. FM 3-01 specifically mentions the gap in capability in all ADA platforms to keep up with maneuver forces. The mountainous jungle terrain of Vietnam allowed time for the “Dusters” and “Quad .50” to keep pace with the mobility of mechanized forces in a way that a fast-paced war of maneuver in the Northern European plains would not have afforded either platform.

### Flexibility

First, the Vietnam era with its complementing systems of the “Quad .50” and twin 40 mm “Duster.” The ability of ADA assets to adapt to various missions, including base defense, convoy protection, and fire support in urban environments, gave commanders great flexibility in utilizing ADA assets. The combination of “Dusters” and “Quad .50s” was so impressive the Marine Corps requested to “borrow” ADA units from the Army.

In the Iraq War, the experience was very different. Even after a new variant was developed, the Avenger system had great difficulty adapting to a convoy protection role. The heavy turret made it impossible to up armor the vehicle, like the other HMMWVs were, without overloading the frame. The unarmored HMMWVs were, therefore, vulnerable to not only IEDs but also small arms attacks that could penetrate the cabins of the system. The bulky turret and the inability of the vehicle to depress its guns when facing forward severely limited its ability to engage enemies. The designers had intentionally created a dead space in front of the vehicle to prevent the turret from accidentally shooting or damaging the crew or vehicle on which it was mounted. Also, the minimal ammunition capacity, though an issue for all ADA vehicles, was highly apparent, with an



average of only 200 – 700 rounds on the system. The vehicle must also be dismounted to reload both the M2 machine gun and the Stinger pods. Limited engagement space and ammunition prevented this vehicle from being widely utilized in any role outside of its narrow mission set.

### *Survivability*

Though survivability is not one of the AMD principles, it would be an oversight not to include it. The “Duster” and “Quad .50” suffered from glaring gaps in armor to protect its crew from ground fire. Though the Duster had a half-covered turret, most of the crew was exposed. Only the driver and commander seats were partially in the hull, only leaving the head exposed when their respective hatches were open. Those in the turret had their torsos perpetually exposed. In the “Quad .50,” the crew fared worse as the four reloaders in the bed of the truck were totally exposed, and only the gunner was partially exposed as he sat in the armored turret.

The Avenger suffered from many of the same issues as the “Quad .50” as there is very little armor protecting the gunner and crew. However, the “Quad .50” had a few advantages over the Avenger. The turret of an Avenger severely restricts the freedom of movement of the gunner. With a very awkward plexiglass door to the operator’s cabin, The Avenger turret would prove much harder to dismount than the open platform the “Quad .50” had, which crew members could jump off if the turret area became too dangerous. Furthermore, the driving compartment of a “Quad .50” truck had been up-armored extensively to protect the crew inside from being killed by small-arms fire. The Avenger system, due to its heavy turret and light HMMWV chase, could not be up armored. The Avenger promptly became obsolete in the Iraqi theater, which quickly began increasing armor on everything from personnel to vehicles. The practically unarmored Avenger could not withstand even small-arms fire, let alone an increasingly sophisticated IED threat. While the Vietnam

equipment could rely on some armor and its awesome firepower to suppress the enemy, the Avenger boasted neither of these advantages.

### *Conclusion of Historical Analysis*

While capability gaps exist within both eras, the more flexible, mixed and survivable Vietnam-era equipment has the right ingredients for countering multi-dimensional threats. In this era wherein a force protection role of logistics, urban operations and firebases, the branch made a name for itself amongst its peer branches. Focusing solely on the Air Defense roles led to the creation of the Avenger, which failed to adapt, even when modified, to changing combat conditions. Further evidence of success or failure can be seen in the interservice relationship regarding the air defense mission. The Marines relied on the Army ADA components for their force protection. Through Operation Iraqi Freedom, the Marines had decided against adopting the Avenger in favor of an organic LAV-AD that embraces the Air Defense principles more closely. The LAV-AD could complete the same missions the Avenger could and in complex environments in a variety of roles. The LAV-AD also had eight stingers to complement its rotary 25 mm cannon, which could elevate higher than the regular HMMWV weapon mounts, which is advantageous for engaging targets on steep angles in urban or mountainous terrain. LAV-ADs were used in urban operations, much like how the “Dusters” were used alongside Marines in the fight for Hue City during the Tet Offensive.

### *ADA in Urban Environments*

#### *Maximizing ADA as Force protection*

One of the unique capabilities ADA brings to the maneuver table is that it is one of the few branches that can operate and thrive in urban environments. While the ADA in Vietnam is mostly remembered for operating in environments surrounded by either jungle or elephant grass, ADA also proved itself in



The M42 40 mm Self-Propelled Anti-Aircraft Gun, or “Duster,” is an American armored light air-defense gun built for the United States Army from 1952 until December 1959, in service until 1988. (Photo credits: Left, Mark Pellegrini, U.S. Army Ordnance Museum [Aberdeen Proving Ground, MD] Creative Commons CC-BY-SA-2.5; Middle: the Army Historical Foundation; Right: Bill Maloney, Pennsylvania Military Museum)

urban environments. In the battle for Hue City during the Tet offensive, M42 “Dusters” were brought in to provide fire support for Marines. The 40 mm guns could suppress and kill enemies hidden in tall buildings with their streams of fire better than their cousin, the M48 tank. Another advantage is that M42 “Dusters” had to have a high gun elevation that could be as high as 85 degrees, which proved extremely useful when shooting at the tops of buildings from close or awkward positions.

ADA should absolutely embrace operating in urban and complex environments in their force protection role. Whether in urban streets or on roads overlooked by cliffs, the unparalleled ability of ADA to put effective fire on enemies perched above friendly forces is indispensable. The mounts on a vehicle such as the HMMWV only have a 53-degree elevation is insufficient to engage enemies on higher floors, forcing their occupants to dismount to engage the enemy with small arms. With the added risk of class 1 UAS being used in urban environments, it will be more important than ever to have ADA assets capable of operating there. During the battle of Mosul, Iraqi security forces were consistently harassed by UAS that could drop munitions onto the thin armor of the tops of vehicles. With no way to counter the UAS and their presence so frequent, often Iraqi forces would become lackadaisical in seeking cover. Hostile UAS will operate in urban environments and so should SHORAD, as part of their force protection role.

### Recommendations

When designing an ADA vehicle, it is essential to ensure a force protection role is also envisioned for the vehicle. Not focusing on this dual role shows a lack of understanding of the history and principles of air defense. The ADA branch needs to take advantage of its current prioritization by the Army to turn the revival of SHORAD into a Renaissance. Successfully taking back the force protection role will make other branches realize the importance of ADA assets in the field and budgeting priorities for years to come. The “Duster” was built starting in 1952, and it had to wait a decade to prove itself in the jungles of Vietnam. Commanders in Vietnam, both Army and Marine, understood how ADA units could be force multipliers on escort and base duties, maximizing the economy of force. The ADA’s performance in such roles in Vietnam won the respect of other branches opening the way for the branch to become independent in administration and funding from Field Artillery.

Failing to take advantage of this window of opportunity we have now will eventually lead down

the same path that led to the death throes of ADA branch funding that led to the dissolution of SHORAD units in the early 2000s. Instead of having funding concentrated in Army ADA, it could be split, as it was in Iraq, between Army and Marine programs. The LAV-AD program was ultimately scrapped because there were only 12 examples, and the Marines decided they needed more conventional LAVs to replace losses. An ADA budget split between two branches could not prevent the dissolution of SHORAD’s place on the battlefield during the GWOT. Being sought after in a force protection role secured not only funding but also prestige, as ADA units were sought after through much of the Vietnam War. Being appreciated by fellow service members is extremely important to maintaining high levels of morale and, accordingly, combat readiness.

### Conclusion

The goal of any Air Defender is to protect its assets. If an asset is destroyed by a clever ambush, TBM volley or UAS, the mission fails. If the enemy will be thinking with multi-dimensional attacks in mind, combining UAS with ground-based ambushes, should SHORAD designers not be thinking similarly? SHORAD equipment will need to be able to repel a UAS swarm attack and then the enemy’s complementing infantry assault in quick succession in the very near future. The conflict of tomorrow has no frontline, friendly skies or single-dimensional. SHORAD has thrived or died in this environment depending on how close it has kept to its Air Defense principles when developing its equipment. If it designs, delivers, and deploys equipment that embraces the force protection role, it will secure its assets and budgets. The Air Defense principles and the “three highs” of having high caliber, high velocity, and high rates of fire provide guidelines for a successful SHORAD vehicle. There is little time to close the gap before the tides of attention and budget priorities shift to the next novel threat. The seeds of success must be planted and sowed now if we are to prevent a famine tomorrow.

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# Signalers Work *to* Change *how* Air Defenders Train, Certify *and* Fight

By MAJ Joshua Richey, CPT Charles Wilson,  
CW2 Lucas Coffman and WO1 Alexis Martinez

**A**s Signalers serving in an Air Defense Artillery (ADA) unit, it has been an eye-opening experience learning the importance of Air Defense and how to plan for the unique assets that Brigades (BDE) have. Unlike a typical Brigade Combat Team (BCT), ADA does not have any organic signal equipment but is very network communications heavy organization. This has fallen on the communications subject matter experts (SME) to come up with solutions to bridge the gaps to provide the Air Defender with the means to certify crews and ensure they are as prepared as we can get them. So, it starts with their training at home station and at the heart of that training, is how they communicate.

Patriot units have traditionally relied on the AN/GRC-245A radio at home stations as the backbone of their communication infrastructure. Establishing ultra-high frequency (UHF) radio links between their Information Coordination Central (ICC), Engagement Control Station (ECS), and Communication Relay Group (CRG), a Patriot unit can create their Local Area Network (LAN) with their UHF links known as Patriot Digital

Information Link (PADIL) to support passing data internally (Figure 1).

While this training style provides Patriot units the rinse-and-repeat training they have been used to for years, it doesn't simulate the real-world fight they would traditionally see in the U.S. Central Command (USCENTCOM) Area of Responsibility (AOR) or another future combatant commands. Updates to the current system, most significantly the Combined Crypto Modernization Phase 1 (CCMP 1), open the door to breathing new life into the training conducted at home. 31st Air Defense Artillery (ADA) Brigade is looking at ways to squeeze every ounce of potential the systems have to increase training value. They currently look at this as a multi-phased process. The first step in that process is understanding what increased capabilities CCMP 1 provides.

CCMP 1 provides routers and network connections for all Patriot shelters, allowing unclassified and classified networks to be connected to each ICC, ECS, and CRG. This network connectivity also allows for a Beyond-

Line-of-Sight (BLOS) PADIL capability enables Patriot units that are geographically disconnected to share information, commonly referred to as PADIL over IP (PoIP). Due to not having any organic communications equipment to support providing data and voice capabilities in Air Defense units, PoIP has traditionally only been used when deployed forward. This lack of organic

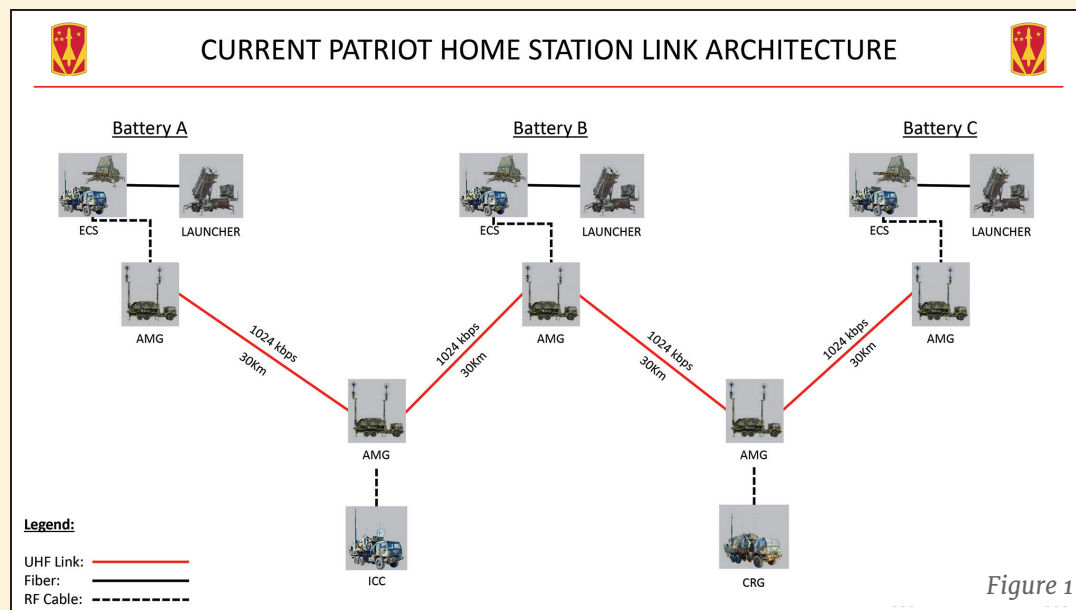


Figure 1

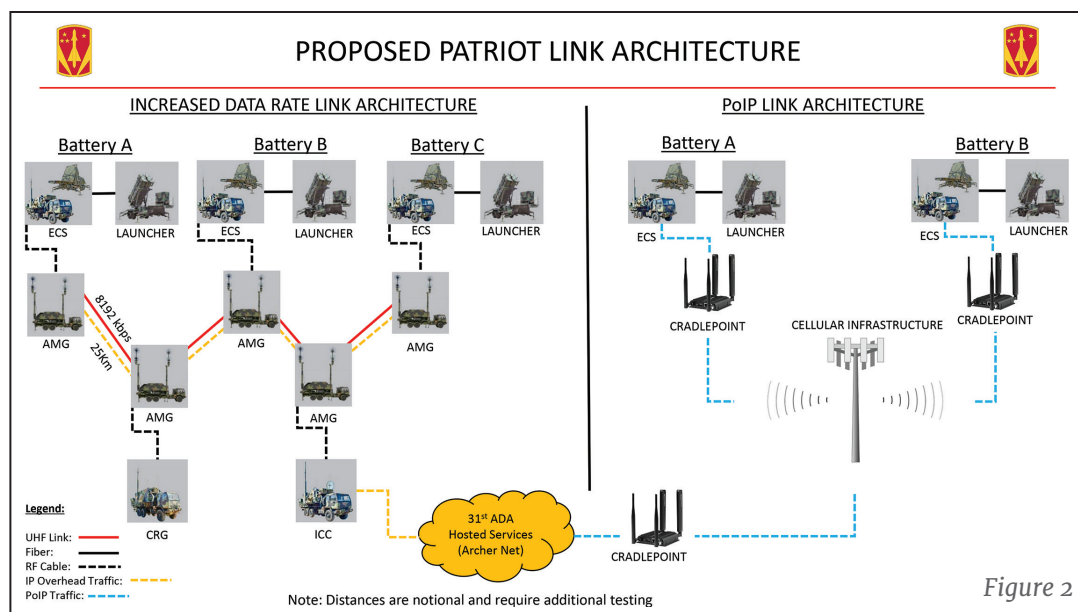
communication assets to provide a BLOS backhaul solution has forced Patriot units to effectively fire and forget the shelter configurations they use deployed forward and revert to the home station training configuration they've been accustomed to for years until they're called upon once more.

During Roving Sands '22 at Fort Bliss, Texas 3rd Battalion, 2nd Air Defense Artillery Regiment was able to lay groundwork for improving the future of Patriot training at the 31st Air Defense Artillery Brigade by being the only ADA unit in the training event to successfully push Secret Internet Protocol Router (SIPR) services provided by a Command Post Node (CPN) from 86th Expeditionary Signal Battalion over their UHF links. This allowed the subordinate Battery's to connect and use SIPR services during the exercise. Although successful, additional testing was needed to find the optimal balance between the amount of data passed over the UHF links, without impacting the Patriot radar data, while providing the maximum distance between Patriot assemblages for training purposes. Armed with success from Roving Sands '22, the 31st ADA BDE took those lessons learned and attempted to increase the organization's capabilities.

With the help of Global Agile Integrated Transport (GAIT), like many units, 31st ADA has established its classified network infrastructure, often referred to as its tactical network or Archer Net. GAIT allows tactical units to access the greater Department of Defense classified network infrastructure and services with their organic fielded equipment from their headquarters (HQ). Combined with GAIT, units can host and maintain the same services traditionally hosted by their local installation Network Enterprise Centers (NEC) and provide connectivity to Army SIPR for their units. 31st ADA has utilized its GAIT connection, with help from the local Fort Sill NEC, to extend its Archer Net into the Fort

Sill Mission Training Center (MTC). During Cumulative Training Event (CTE) 01-23, 31st ADA successfully conducted a training scenario that saw the Brigade HQ fight out of the Fort Sill MTC and its subordinate Battalions fighting out of the Brigade Operation Center (BOC), utilizing tactical services along with the Joint Training and Experimentation Network (JTEN) simulation feed to mimic the geographical separation they face when deployed forward. The next phase was to determine how to provide the same realistic training conducted during CTE to every Battalion during regular training events.

The current configuration Patriot units run in their shelters only tap into a small portion of its full potential. The current radio data rate configuration of 1024 kilobytes per second (kbps) allows for 512 kbps for their PADIL traffic and 512 kbps of overhead bandwidth to provide the path for their closed network IP services traditionally used while training at home. The AN/GRC-245A radio in the Patriot shelters can establish links with a data rate as high as 16,384 kbps providing up to 34 megabits per second (mbps) of full duplex traffic. Although the maximum operating distance of the radio is up to 40 kilometers (KM), operating the radios at higher data rates requires shorter distances between Antenna Mast Groups (AMG). Reconfiguring the radios to 8192 kbps will allow the optimal balance between maximizing the overhead bandwidth while, although shorter than they're used to, providing optimal distance between links for training. This increased overhead will allow Patriot units to





utilize their UHF links to provide additional IP services, such as Archer Net services hosted at 31st ADA HQ, access to Army Enterprise Secret Internet Protocol (SIPR) network via GAIT, and provide simulation data from the Reconfigurable Table Top Trainer (RT3) Lab at 31st ADA HQ to the Battalion firing units (Figure 2).



*PFC Harry Feliciano 25H of HHB, 3-2 ADA works on setting up the CRG for a pending certification exercise. Photo taken by CPL Yessenia Leahy 31st ADA BDE UPAR.*

To provide the Patriot Battalions with access to Archer Net in the training areas of Fort Sill, 31st ADA is utilizing fiber pedestals installed in designated Training Areas (TA) as well as ingesting Archer Net services into a CRG located at 31st BDE HQ, passing these services over the Patriot units UHF links utilizing the additional bandwidth overhead provided by increasing the data rate of the AN/GRC-245A radios. Further testing is required, but the goal is to increase bandwidth to allow full SIPR connectivity, including email, Voice over Internet Protocol (VoIP), and Global Video Services Video Teleconference (VTC) ability. Along with SIPR services, 31st ADA is attempting to push simulation data from the RT3 lab at BDE headquarters over the UHF links and into the ECS shelters to provide a more realistic and challenging training environment.

Once simulation data is verified to consistently and reliably reach the ECS shelters, Flight Mission Simulator/Digital (FMSD) will be installed in each firing units ECS to pull in the simulation feed and push it into the radars to enhance user training. The FMSD system provides real-time simulation radar tracks to all Patriot radar systems within the scenario. The FMSD provides Patriot crews with a dynamic air battle that simulates the crew's real-world scenarios and requires rapid engagement decisions. This addition will allow the Soldiers to partake in rigorous training designed to stress their skills while providing an environment to perfect their skillset.

An Air Defense Artillery Brigade has the

Air Defense Systems Integrator (ADSI) to provide real-time situational awareness in the AOR by integrating sensors on land, air, and sea sensors while delivering enhanced control of tactical units. Providing their common air picture in alternate ways enhances the ability to offer higher echelons timely, accurate information to assist decision-making. Since 31st ADA has enabled

the simulation feed to be fed into Command Post Computing Environment (CPCE), the simulation feed from the RT3 lab would additionally reach the firing units and ADSI. This allows for multiple avenues to view the air picture locally, and the air picture can be fed to higher echelons via CPCE to provide Commanders with near real-time situational awareness.

With the potential increase in bandwidth, the opportunity exists to apply additional internet protocol (IP) based services, specifically network monitoring. 31st ADA is building a Cyber Defense Initiative (CDI) to utilize better the Cyber Network Defenders assigned to the organization. The Air Defense CDI aims to use the open-source software Security Onion to enhance network monitoring. Security Onion is a network security monitoring suite that enables both proactive and reactive monitoring of network devices; providing situational awareness of network activity. The Security Onion suite of tools coupled with Assured Compliance Asset Solution (ACAS), which scans devices for known vulnerabilities to ensure they get mitigated appropriately, will provide both a passive and active presence in Patriot Cyber Security. By installing sensor nodes in either the ICC or ECS, Patriot units could be able to send active network monitoring data to help prevent a malicious attack. Using a simulated scenario, an insider threat were to gain access to the Patriot systems and alter the azimuth information of an incoming threat by 0.5 degrees without the operator knowing there's been any issue or

change. In that case, the result could be the inability to neutralize the incoming threat, leaving the defended asset open and vulnerable to attack. That gap is what 31st ADA is looking to close at home, to take forward to the fight.

Providing Archer Net and simulation services to Patriot units is only one part of the hurdle in providing training enhancements that mimic their real-world mission. The ability to simulate firing units being geographically dispersed communicating via PoIP is a long-term goal of 31st ADA. A potential solution to provide the ability to train via PoIP could be using Cradlepoint routers to tap into the surrounding cellular network. Utilizing the ability to point Cradlepoint routers together by creating a Virtual Private Network (VPN) connection, you could connect a Cradlepoint to the signal entry panel of the Patriot shelters that connects to the KG-175D encryption devices that are a component of the CCMP 1 upgrade. This would provide a secure connection to a remote Cradlepoint at 31st ADA HQ to allow access to Archer Net services. If successful, this would enable the ability to provide Archer Net services and simulation while allowing the firing units to simulate being geographically dispersed, requiring them to establish their BLOS PoIP links to communicate.

The level of advanced training would alter the way large scale training events like Roving Sands are executed. With a home station PoIP solution, Patriot units at Forts Sill, Hood, Bliss, and Bragg could conduct large scale exercises from home while receiving simulation feed that is being fed into their ECS, and send their portion of the air picture to higher HQ. This would open the door for more creative training at all levels that does not rely on all units being collocated to conduct operations.



*SPC Jonathan Colon 25H of HHB, 3-2 ADA turns on all the radios and equipment inside the CRG shelter for a pending certification exercise. Photo taken by CPL Yessenia Leahy 31st ADA BDE UPAR.*

These changes would allow each unit to tailor their training to the specific environment they are about to encounter. Whether the unit will rely on UHF links, be tied to a CPN team for backhaul, or fibered into their PAT site, the ability to train at home station and mimic the situation down range would be a first for Air Defense. In lieu of historical assessment methods, this enhanced capability package would also lead to changes in

the way Patriot crews certify. The new crew certifications could require ADA crews to certify based on the tailored operational environment, specific to mission variables and requirements allowing Air Defense to train as close as possible to how they fight while deployed, something they have only been able to partially replicate due to numerous limitations.

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# Growing a Brigade:

## *Five Lessons Learned from Activating a Next-Generation Combat Force*

By MAJ T. Justin Webb





***“First, the importance of a comprehensive strategic plan cannot be overstated.”***





**T**he shifting geopolitical terrain of Europe underscores the importance for unrivaled air defense capabilities, and the United States Army has taken a significant step to address this need by activating the 52nd Air Defense Artillery (ADA) Brigade. Spearheaded by the leadership of Colonel Bruce Bredlow, the inaugural commander, and Command Sergeant Major Charles Robinson, the brigade's first Command Sergeant Major, this momentous activation exemplifies the United States' steadfast dedication to NATO's defense. It signifies a crucial advancement in bolstering air defense operations throughout the region.

This article examines the nuances of activating the 52nd ADA Brigade in Germany, dissecting the challenges encountered and illuminating the strategies employed to surmount these hurdles. Presented are five essential lessons gleaned from the initial six months of the brigade's activation, offering invaluable perspectives that can inform and enhance future air defense activations. Moreover, we will investigate the ramifications of the 52nd ADA Brigade's activation for Large-Scale Combat Operations (LSCO) in Europe and its pivotal role in cultivating partnerships at the tactical echelons.

Five lessons to empower leaders to navigate the challenges of activating and growing an air defense artillery brigade:

1. **Envisioning the Brigade of Tomorrow: Crafting a 5-Year Masterplan**
2. **Harnessing Cutting-Edge Solutions: Unleashing the Power of Innovation**
3. **Unlocking Hidden Budgets: Tapping into the Army's Financial Reserves**
4. **Cultivating a Winning Culture: Uniting the Brigade through Shared Vision and Values**
5. **Powering Up with People: Leveraging Partners to Fuel Growth**

### **"Envisioning the Brigade of Tomorrow: Crafting a 5-Year Masterplan"**

*Lesson: Begin by imagining what your ideal Air Defense Artillery Brigade will look like five years from now, considering advancements in technology, potential adversaries, and new defense strategies. With this vision in mind, prioritize the resources you need and set a clear, yet tolerable roadmap for growth.*

In Air Defense Artillery, developing a forward-thinking approach is essential to excel and prepare for the next generation of combat. "It's not just about providing operational capability within year; it's about being the combat multiplier the combatant commander will need in five." To begin this transformative journey, leaders must envision the future with clarity and precision. By allowing themselves the freedom to dream boldly and visualize their ideal unit in five years, they can lay the foundation for their plans. This exercise calls for both ambition and attention to detail, considering potential technological advancements, adversaries, and defense strategies. For instance, a proactive approach to embracing technology might require the project manager to upgrade an AMDPCS to the latest version and provide new equipment training, ensuring that the brigade stays ahead of the curve and is prepared for the challenges ahead.

Once the vision is clear, leaders must identify the essential resources needed to make this vision a reality. They can achieve this by surveying each staff section to determine the essentials listed on their MTOE and additional resources that would make the section more effective. A thorough evaluation may reveal the need for conference room upgrades, establishing an operations center, and additional automation and communication requirements in the garrison and the field. By addressing these needs, the brigade can become a more cohesive and effective force.

Another crucial aspect of this process is fostering pride and unity within the brigade. By implementing elements such as boards, window decals, rugs, awnings, unit swag, and building signs, leaders can create an atmosphere that inspires dedication and commitment among their team members. This sense of unity is vital for maintaining morale and ensuring the brigade's success. With priorities outlined and the team engaged, leaders can create a detailed roadmap by breaking the 5-year plan into manageable milestones. Dividing these milestones into annual, quarterly, and monthly goals helps maintain focus, track progress, and facilitate adjustments as needed.

Finally, leaders need to remain adaptable and open to change. The dynamic world of defense requires agility and responsiveness, as even the



most meticulously crafted plans may require adjustments. By being receptive to new ideas and prepared to adapt to changing circumstances, the brigade can stay ahead of the competition and successfully achieve its long-term objectives. Adopting a proactive and forward-thinking approach is key to crafting a successful 5-year masterplan for an Air Defense Artillery Brigade. By embracing a clear vision, strategic planning, and adaptability, leaders can position their brigade as the combat multiplier the combatant commander will need in five years.

### **"Harnessing Cutting-Edge Solutions: Unleashing the Power of Innovation"**

*Lesson: Embrace emerging technologies and innovative approaches to transform your brigade's capabilities and maintain a competitive edge. Constantly evaluate and update your processes, ensuring your team remains ahead of the curve in modern warfare.*

***In Air Defense Artillery, developing a forward-thinking approach is essential to excel and prepare for the next generation of combat. To begin this transformative journey, leaders must envision the future with clarity and precision.***

In the ever-evolving landscape of modern warfare, it is essential for leaders to embrace emerging technologies and innovative approaches. "Just because the other divisions, brigades, and battalions have always done it this way, does not mean it is the best or most efficient way to do it." By harnessing the power of innovation, an Air Defense Artillery Brigade can transform its capabilities, maintain a competitive edge, and become the combat multiplier that the combatant commander will need in the future.

A key component of embracing innovation is fostering a culture of curiosity and continuous learning within the brigade. Encourage team members to stay informed about the latest developments in defense technology and provide opportunities for professional development through training, workshops, and conferences. By nurturing a mindset of growth and adaptability, leaders can empower their brigade to stay ahead of the curve in modern warfare.

One practical example of innovation in action is the adoption of Microsoft 365 to build live dashboards for the commander and staff to synchronize in person or across Europe. Building a dashboard that shows live unit data, accessible to a commander or staff member at any time or location, enables more effective situational awareness. This real-time information on the unit's current status, past trip report information, concerns, and projects enhances decision-making and overall operational efficiency.

Another essential aspect of unleashing the power of innovation is the strategic integration of new technologies. This involves not only identifying and acquiring cutting-edge solutions but also ensuring their effective implementation within the brigade. For instance, instead of using a centralized task tracker, the brigade can incorporate MS Teams lists, allowing leaders to assign tasks and deadlines to individuals or teams, check on their status, and receive notifications. Additionally, tasks can be closed out by the user

or supervisor. This tool has proven useful for the S3 Section to maintain track of subordinate unit or team tasks for all published OPORDs.

Collaboration is another vital aspect of harnessing the power of innovation. Units can gain valuable insights into emerging technologies and best practices by fostering strong relationships with industry partners, research institutions, and other military branches. These collaborative efforts can lead to the development of groundbreaking solutions that enhance the brigade's capabilities and contribute to the broader defense community. Embracing emerging technologies and innovative approaches is crucial for transforming an Air Defense Artillery Brigade's capabilities and ensuring its relevance in modern warfare. By fostering a culture of curiosity and continuous learning, strategically integrating cutting-edge solutions, and collaborating with external partners, leaders can unleash the power of innovation and position their brigade as a formidable force in the next generation of combat.



## **“Cultivating a Winning Culture: Uniting the Brigade through Shared Vision and Values”**

*Lesson: Before you can build combat capacity, it's crucial to establish a strong organizational culture that unites your brigade. Create a sense of purpose and shared values that foster camaraderie, accountability, and ownership within the ranks. This foundation will serve as the bedrock for your brigade's success in the years to come.*

Before embarking on the journey to build combat capacity, it is crucial to establish a strong organizational culture that unites your unit. A winning culture is built on a sense of purpose and shared values that foster camaraderie, accountability, and ownership within the ranks. This foundation will serve as the bedrock for your brigade's success in the years to come.

The brigade's vision focuses on protecting lives and promoting security through air and missile defense. This purpose inspires the brigade to provide world-class air and missile defense expertise, educate joint, allied, and partner forces at the tactical level on air defense employment and weapon systems, and cultivate a culture of continuous learning, all with the ultimate goal of providing air and missile defense protection wherever needed.

In line with the commander's priorities, the first step is focusing on sponsorship and Reception, Staging, Onward Movement, and Integration (RSOI). Ensuring a smooth and efficient integration process for incoming personnel is essential for setting the stage for a strong organizational culture. The brigade developed a YouTube page to assist with sponsorship, creating “sponsorship videos” that answer common questions for soldiers and their families moving to the brigade and Germany. Next, leaders must establish core values that align with the brigade's vision and American values. In the 52nd ADA Brigade, these values include Education, Innovation, Adaptability, Trust, and Empathy. These values guide the brigade's actions as they fulfill their purpose of protecting lives and promoting global security through air and missile defense.

With the foundation of sponsorship, RSOI, and

culture development in place, the next line of effort is building combat capacity. This involves investing in the professional development of the brigade's personnel, providing opportunities for training, education, and mentorship. By investing in the growth and development of their team members, leaders can enhance the brigade's capabilities and demonstrate their commitment to the well-being and success of the individuals within their ranks. Throughout this process, leaders must lead by example, embodying the brigade's vision and values in their own actions and decisions. By consistently demonstrating a commitment to excellence, integrity, and teamwork, leaders can serve as role models for their team members, inspiring them to adopt and uphold the brigade's cultural values.

Cultivating a winning culture is a vital prerequisite for building combat capacity within an Air Defense Artillery Brigade. By prioritizing sponsorship and RSOI, establishing the brigade's culture based on its vision and shared values, and focusing on building combat capacity, leaders can unite their brigade and lay the foundation for success in the years to come. As the brigade grows and evolves, this strong cultural foundation will serve as the bedrock for its continued success and its role as a combat multiplier for the combatant commander.

## **“Unlocking Hidden Budgets: Tapping into the Army's Financial Reserves”**

*Lesson: Don't be limited by current budget constraints. Learn the art of networking and strategically position your brigade to benefit from the Army's thrice-yearly budget adjustments. By communicating your needs effectively and showcasing the value of your brigade, secure the necessary funding for growth and development.*

A critical aspect for growing an Air Defense Artillery Brigade is effectively managing financial resources. However, leaders should not be limited by current budget constraints. One rule of thumb we have become accustomed to is, “it is far better to justify why you need 15% more added to your budget than to justify why you underspent by 15%.” The “so what” here is twofold. On one hand, by demonstrating a clear need for additional funds and effectively utilizing resources, leaders can make a compelling case for budget increases that



will enable brigade growth and modernization. This can lead to better-equipped and more capable forces that are ready to face evolving threats. On the other hand, underspending by a significant margin like 15% could raise questions about the brigade's efficiency and ability to manage its financial resources. This might lead to reduced funding in future budgets, as decision-makers may assume that the brigade can fulfill its mission with less financial support. By mastering the art of networking and strategically positioning the brigade, one can tap into the Army's financial reserves and secure the necessary funding for growth and development. This involves striking a balance between justifying additional funds when necessary and ensuring that current resources are used effectively to maintain credibility with decision-makers and stakeholders.

***Before embarking on the journey to build combat capacity, it is crucial to establish a strong organizational culture that unites your unit.***

Networking plays a crucial role in unlocking hidden funds. Developing strong relationships with key decision-makers within the military and other branches can provide valuable insights into funding opportunities and help build support for the brigade's financial needs. One of the most pivotal moments in securing funding for the brigade's major projects and requests was when the commander met with the USAEUR-AF G8 at the Winter Commander's Conference. There, he learned and shared with the team that the Army will correct its budget three times a year. If requests are submitted correctly and prioritized, funding is more likely to be secured. "Luck is the crossroads between opportunity and preparation."

Therefore, the first step in unlocking hidden budgets is understanding the Army's budgeting process. The Army specifically allocates funding through a system that critically adjusts its budgets thrice-yearly to meet its ever-changing needs. By becoming familiar with this process, leaders can identify special opportunities to request additional resources for their units and capitalize on these financial adjustments. Typically they fall in the months of March, August, and September which correspond with milestones in which 50%, 80%, and 100% of the budget must be attained.

A powerful example of strategically position your brigade to benefit from the Army's thrice-yearly budget adjustments is when the brigade was established in the POM cycle with \$2.4 million designated for its activation. Due to continual delays, there was actually \$0 designated for FY23 after activation since the unit was slated to be activated 2 years earlier. This led to Unfunded Requests (UFRs) being submitted for all the activation and renovation projects within the five-year plan, as discussed in the first lesson. After evaluating the brigade's current capabilities and aligning them with the vision for its future, leaders can create a strategic financial plan that focuses on the brigade's most pressing needs by identifying the most critical resources required for growth and development. Initially, the S4 section and AAMDC G8 were met with resistance.

However, the brigade persisted, leading to an analysis of the risk involved in not funding the requests and writing out the proper justifications.

Another significant example was when funding was granted by precisely articulating the risk to the DCG of the combatant commander's risk if the unit did not receive the proper equipment and funding needed to upgrade the components. By effectively conveying the brigade's needs and values, leaders can build support for their financial requests and secure the necessary resources.

In essence, unlocking hidden budgets is essential for the growth and development of an Air Defense Artillery Brigade. By understanding the Army's budgeting process, prioritizing the brigade's financial needs, communicating effectively, and building a strong network of allies, leaders can strategically position their brigade to benefit from the Army's thrice-yearly budget adjustments. With the necessary funding secured, the brigade can continue to grow and develop, becoming the combat multiplier the combatant commander will need in the future.



## **“Powering Up with People: Leveraging Partners to Fuel Growth”**

*Lesson: Recognize that participation in next-generation combat may come at a cost. Forge strategic partnerships and secure sponsorships to provide the financial backing necessary for your brigade’s growth. By aligning with the right partners, you’ll ensure your team is equipped and prepared to face the challenges of modern warfare.*

Recognizing that participation in next-generation combat may come at a cost, it’s essential for Air Defense Artillery Brigades to forge strategic partnerships and secure sponsorships to fuel growth. These partnerships can be broadly categorized into three main areas: inter-service collaborations, allied partners, and collaborations with NGOs and private industry partners. By aligning with the right partners, you can ensure that your team is equipped and prepared to face the challenges of modern warfare. In this section, we’ll explore how to leverage sponsorship and partnerships to empower your brigade’s growth and development, with a particular focus on

UK Group, which provides Sky Sabre, Rapier, and Starstreak capabilities, and engagements with Sweden during Aurora 23. By forming immediate ties with these allies, you can significantly enhance your brigade’s capabilities and position it as a leader in air and missile defense.

Finally, collaborations with NGOs and private industry partners can offer valuable resources, expertise, and cutting-edge technologies that can further empower your brigade. For instance, a few NGOs have visited the headquarters to demonstrate their capabilities or seek expertise to further develop their services. In May, the brigade is facilitating a Northrop Grumman demonstration of the Integrated Air and Missile Defense Battle Command System (IBCS) capability, inviting NATO allies to participate. Such demonstrations not only showcase advanced technologies but also foster relationships with industry partners, leading to long-term collaboration and mutual benefits.

Subsequently, leveraging sponsorship and forging strategic partnerships is an essential strategy for Air Defense Artillery Brigades

***This extraordinary journey has been enriched by five critical lessons learned, which now serve as the guiding light for the brigade’s continued growth and success.***

inter-service partnerships, allied partners, and NGOs, in that order.

First, inter-service collaborations are a vital aspect of your brigade’s growth. Organizations such as V-Corps and Armored Brigade Combat Teams (ABCTs) that are rotating on the eastern flank or conducting various missions and exercises can provide valuable resources and expertise. By collaborating with these organizations, you can strengthen your brigade’s capabilities and ensure it remains at the forefront of modern warfare. Prioritize visiting maneuver commanders slated to deploy to Europe this year, and work closely with their staff to inform and educate them about air defense assets and capabilities.

Second, fostering relationships with allied partners is crucial for bolstering your brigade’s capacity and expertise. Examples of such partnerships include collaborations with the 7th

preparing for next-generation combat. By prioritizing inter-service collaborations, building relationships with allied partners, and engaging with NGOs and private industry partners, you can secure the necessary support for your brigade’s growth and development. These partnerships will play a crucial role in your brigade’s continued success and its position as a combat multiplier for the combatant commander.

While the curtain falls on the first six months of the 52nd ADA Brigade’s activation in Germany, the organization stands tall, poised to shape the future of large-scale combat operations (LSCO) in Europe. This extraordinary journey has been enriched by five critical lessons learned, which now serve as the guiding light for the brigade’s continued growth and success. As we reflect upon the incredible journey of the 52nd ADA Brigade’s activation, it becomes clear that the lessons learned from this experience hold the



key to unlocking the full potential of air defense in Europe. These five transformative lessons provide a roadmap for the brigade to shape the future of LSCO and become a formidable force in the region.

First, the importance of a comprehensive strategic plan cannot be overstated. By developing a clear vision and charting a course for the brigade's growth, the 52nd ADA Brigade sets the stage for success in an ever-evolving geopolitical landscape. With this plan in place, the brigade is prepared to adapt and thrive in the face of emerging challenges and harness the power of cutting-edge technologies.

Second, innovation lies at the heart of the brigade's ability to support maneuver forces and adapt to the rapidly changing battlefield. By fostering a culture of creativity and continuous learning, the 52nd ADA Brigade is poised to develop groundbreaking tactics and solutions that will redefine the future of air defense in Europe. Third, by skillfully understanding budget processes and building strategic relationships, leaders can unlock hidden resources essential for their unit's growth and modernization. Embracing this approach ensures that the brigade remains prepared and adaptable, fully equipped to face emerging threats and challenges. Fourth, a winning culture unites the brigade and empowers its members to overcome obstacles with unwavering determination. By establishing shared values and fostering open dialogue among experienced professionals, the 52nd ADA Brigade creates an environment in which innovative solutions can flourish. This cohesive culture fuels the brigade's resilience, enabling it to face the challenges of LSCO with confidence and grit. Lastly, strategic partnerships are essential for the brigade's growth and development. By leveraging sponsorship opportunities and forging alliances with inter-service partners, allied forces, and NGOs, the 52nd ADA Brigade can unlock vital resources and build a powerful network of support. These collaborations will be instrumental in equipping the brigade with the tools and knowledge necessary to confront the challenges of modern warfare.

As we look to the future, we can embrace the invaluable lessons learned. Armed with this knowledge, we can energize and inspire activating

air defense forces worldwide, drive change and unlock the full potential of air defense capabilities. It's time to seize the moment, turning these lessons into a force for change that will redefine the landscape of air defense and ensure the safety and security of generations to come.

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#### *Photo Credits*

*Pages 44-45: U.S. Army COL Bruce Bredlow, 52d ADA Brigade Commander, passes the unit's colors to Command SGM Charles L. Robinson III, 52d ADA Brigade senior enlisted advisor, at 52d's first assumption of responsibility ceremony in Sembach, Germany, April 12, 2023. This ceremony also marked the first time that the brigade's new colors were uncased publicly. (U.S. Army Photo by SSG Robert P. Wormley III)*

*Background photo, pages 46-47: Patriot Missiles in front of McNair Hall set the scene and mark the start of the Remembrance Run on 9-11-23. (Photo by Angela Turner, Fort Sill Public Affairs Office)*

*Background photo, pages 48-49: Soldiers and civilians pause for a moment of reflection as BG Shane Morgan speaks of his experience on 9-11. (Photo by Monica Wood, Fort Sill Public Affairs Office)*

*Background photo, pages 50-51: The 2nd Battalion, 2nd Field Artillery Salute Battery fire ceremonial cannons in front of McNair Hall during the 9-11 Remembrance Ceremony at Fort Sill. (Photo by Monica Wood, Fort Sill Public Affairs Office)*





An Avenger air defense system from 5-4 Air Defense Artillery Regiment, part of the 10th Army Air and Missile Defense Command, scans the skies from a hidden position on Sept. 21, 2021 during exercise Saber Junction 21 at Hohenfels Training Area. (U.S. Army photo by MAJ Robert Fellingham)

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