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U.S. Army Soldiers conduct force-on-force exercise in Finland. U.S. Army photo by U.S. Army Europe and Africa.

The Command Corner



How the Combat Aviation Brigade Fights: A Commander's Perspective

Introduction

As an Army aviator who has spent some time strapped into the front and back seats of an AH-64 Apache over the skies of Iraq and Afghanistan, I know firsthand what air supremacy felt like. For 2 decades, our crews operated with near-total freedom of maneuver. We orbited high above insurgent small-arms fire operated with relative impunity from enemy air defenses, answered calls for close combat attacks, and faithfully evacuated our wounded within the sacred "golden hour."

I will tell you plainly today; that era of uncontested airspace is over.

Look at the battlefields of Ukraine, Nagorno-Karabakh, and the Middle East. These are not distant anomalies—they are real-time proving grounds in peer and near-peer warfare. Low-cost, commercial off-the-shelf drones, pervasive sensor swarms, dense electronic warfare, near-persistent surveillance, and layered integrated air defense networks have stripped away the sanctuary of the sky.

Yet, amid this technology revolution, an enduring operational truth remains: Wars are won on the ground. Ground forces must ultimately close with and destroy the enemy. And when our division commanders look at the operational map to achieve decisive advantage and impose our will across the depth of the operational environment, the combat aviation brigade (CAB) remains the maneuver force to make that happen.

Doctrinal Continuity in a Contested Operational Environment

Does a denied, degraded, intermittent, and limited environment that has more lethal, drone-saturated systems fundamentally alter how the CAB fights? The answer lies in separating our doctrinal foundation from operational execution.

Field Manual 3-04, Army Aviation's capstone doctrine (Department of the Army, 2025), defines how rotary-wing assets integrate into multidomain operations. While that foundational purpose remains constant, the environment in which the CAB maneuvers alters its tactical application. The modern battlefield demands that the CAB execute its traditional core competencies against an adversary possessing dense electronic warfare networks, long-range integrated air defense systems, lethal counter-air fires, and persistent surveillance capabilities.

To remain decisive, the CAB does not operate as an isolated air asset. Instead, it serves as the Army's connective tissue across the four operational elements of land power.

Executing the Modern Fight

On the contested, complex, and highly lethal battlefield, the CAB must execute its same missions and seven core competencies categorized as ***See/Sense, Strike, Move***, and ***Extend*** within the framework of the four elements of land power outlined in *How the Army Fights*, (LaNeve, 2026). Rather than acting as a mere supporting asset, the CAB serves as a decisive warfighting combined arms team member, projecting unmatched mobility, firepower, and reconnaissance to directly enable ***Convergence, Strike, Close Battle***, and ***Endurance*** during operational maneuver.

In heavily contested territory, massing traditional helicopters invites attrition from layered surface-to-air missiles. Instead, the CAB acts as a primary sensing and communications node. By employing manned aircraft using launched effects (LE), air mission commanders relaying mission orders to unmanned systems, and an integrated network enabling real-time collaboration, enables the CAB to push deep into contested corridors without risking aircrews prematurely.

Sensor feeds are routed in near real-time through the Integrated Battle Command System (IBCS), linking aviation recon with Army and joint fires, space assets, and cyber effects. This synergy strips away the enemy's concealment, creating localized windows of superiority that division commanders can decisively exploit.

Once operational pathways are identified, the CAB, in conjunction with division artillery and joint fires, delivers rapid, long-range precision fires. AH-64E Apache helicopters operating short of the forward line of own troops in dispersed, concealed tactical positions launch standoff munitions to degrade high-value targets, including long-range artillery, counter-battery radars, and tactical command posts. The CAB dislocates the enemy commander's operational timeline and creates immediate maneuver room for friendly ground forces.

When ground forces enter close combat, the CAB provides the critical edge in direct lethality and vertical mobility.

AH-64 aircraft work in synchronization with mechanized and infantry units to destroy high pay targets, enemy artillery, and interdict enemy armor and ground forces. Collaborative air LE offsets the ballistic gaps between organic sense and strike capabilities. Concurrently, UH-60 Black Hawk and CH-47 Chinook units insert assault elements into unexpected tactical flanks, bypassing complex obstacles and exploiting enemy disorganization, allowing ground forces to strike from dispersed locations and rapidly aggregate, concentrating forces at a decisive point. These assets continue to support the ground commanders in the close area with logistical resupply and medical evacuation support.

No maneuver force can achieve decisive results without continuous sustainment. Operating without defined lines of communication, sustainment operations are adversely degraded. Dispersing logistics nodes mitigate the threat's lethal effects. The CAB lessens this challenge, maintaining operational tempo by deploying agile lift capabilities while using dispersed command posts, maintenance areas, and forward arming and refueling points that present low radar and electronic signatures. This is a reality in today's fight. Detailed planning is required for positioning fuel, ammunition, maintenance, and recovery support enabling aircraft to operate from dispersed standoff locations without unnecessarily concentrating in vulnerable locations. As the Army fields autonomous resupply aircraft and uncrewed cargo logistics, the CAB can continually operate and deliver ammunition, fuel, and medical supplies across dispersed operational environments, enabling the endurance of division operations without outrunning its logistics tail.

The Strategic Road Ahead

The CAB must maintain readiness to win today's battles with the current fleet, while aggressively preparing for high-intensity, multidomain conflict.

Achieving this requires shifting from a platform-centric mindset to a formation-based, CAB-centric strategy. Upgrading individual airframes in isolation is insufficient; survivability in modern warfare depends on how seamlessly an entire aviation formation operates as an integrated system of systems. This requires open digital system architecture, modular mission payloads, resilient command and control data links, and hardened logistics. We must shift the focus from individual programs to how well they integrate as a system of systems.

It is crucial that we link air formations across data fabric. That linkage must seamlessly synchronize data from mission planning to the cockpit to the command post, providing relevant, timely, and accurate information for decision making.

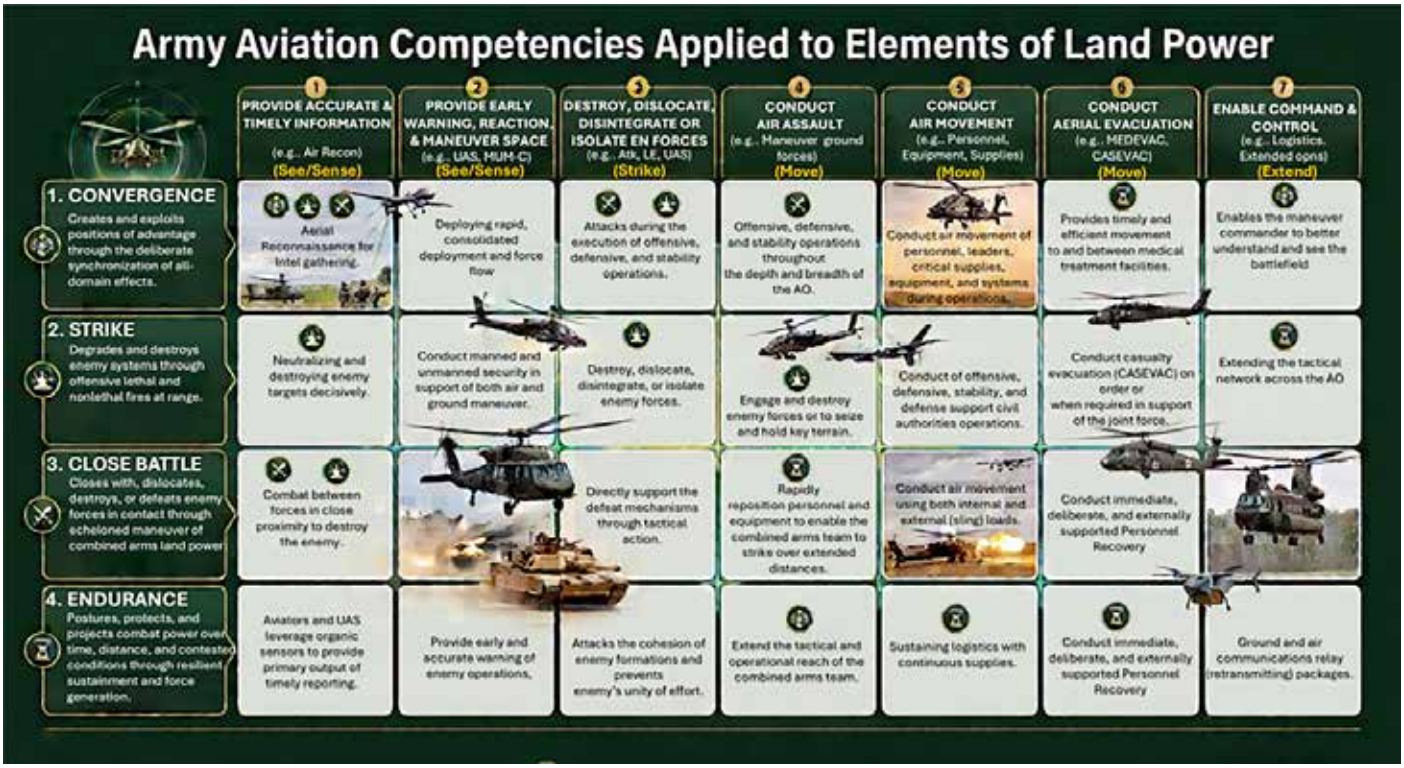
CABs will fly alongside advanced uncrewed teammates, launch autonomous decoys, and maneuver at greater depth and more rapidly than ever before. However, the role and impact of the CAB remains unyielding: serving as the division commander's most flexible maneuver formation capable of fighting across the depth of the battlefield, bypassing obstacles to provide decisive battlefield results.

As we transition, the future is bright for Army Aviation. Our mission remains decisive. Our Soldiers are empowered, and our center of gravity, the CAB, continues to provide the division commander with its seven core competencies essential to fighting and winning on the battlefield.

Above the Best!

This We'll Defend!

Phillip C. Baker
Major General, USA
Commanding



The graphic compares the four elements of land power to Army Aviation's seven core competencies. Graphic generated by artificial intelligence.

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An Idaho Army National Guard UH-60 Black Hawk helicopter departs during an exercise near Boise, Idaho. U.S. Army National Guard photo by SGT Rusty Rehl.

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C T S S B

Critical Task Site Selection Board

Name	Abr.	Last Board	Next Board	Location
Avionics Mechanic	15N	Jun 2025	29-23 FEB 2029	Ft. Eustis
Apache Pilot	AH-64	Jan 2025	9-11 Mar 2027	Ft. Rucker/MS Teams
MQ1 UAS Operator	15C	Jun 2021	7-11 Feb 2028	Ft. Rucker/MS Teams
Aviation Maintenance Tech WOBC	151A WOBC	May 2021	3-7 Aug 2027	Ft. Eustis
Blackhawk Pilot/NRCM	UH-60	Mar 2025	13-15 Apr 2027	Ft. Rucker/MS Teams
Aircraft Structural Repairer	15G	May 2025	20-24 Mar 2028	Ft. Eustis
UH-60 Helicopter Repairer	15T	Jul 2025	15-19 May 2028	Ft. Eustis
15 Series Common Aviation Maintenance	15 CAM	Jul 2022	16-18 Mar 2027	Ft. Rucker/MS Teams
Fixed Wing Pilot	FW Pilot	Jul 2020	1-3 Feb 2028	Ft. Rucker/MS Teams
Maintenance Test Pilot *(all airframes)*	MTP/FCP	Mar 2026	14-16 Mar 28	Ft. Rucker/MS Teams
Lakota Pilot/NRCM	UH72	Apr 2026	17-19 Apr 29	Ft. Rucker/MS Teams
Aviation Maintenance Tech WOAC	151A WOAC	May 2023	2-5 Nov 2027	Ft. Eustis
Aircraft Powertrain Repairer	15D	Feb 2024	8-12 Feb 2027	Ft. Eustis
Warrant Officer Intermed Course WOIC	151A	Mar 2022	15-19 Mar 2027	Ft. Eustis
Aircraft Pneudraulics Repairer	15H	May 2024	3-7 May 2027	Ft. Eustis
Air Traffic and Airspace Mgmnt Tech	150A	May 2024	10-14 May 2027	Ft. Rucker/MS Teams
Warrant Officer Senior Course WOSC	151A	Jun 2022	19-23 Jul 2027	Ft. Eustis
Aircraft Powerplant Repairer	15B	Jul 2024	20-24 Sep 2027	Ft. Eustis
Aviation Maintenance Officer	AMOC	Nov 2023	15-19 Nov 2027	Ft. Rucker/MS Teams

FY27– FY29



To realize MOS training modernization goals, we need our Aviation Soldiers, Senior Enlisted Advisors, and Leaders in the Field to respond to Aviation Critical Task Site Selection Board (CTSSB) Surveys distributed by DOTD, to help determine what Soldier MOS tasks should stay in training and what should go. Our leaders must also enable the CTSSB process by ensuring that their most talented and proficient Soldiers will participate in these boards when called, this is your opportunity to affect change in Army Aviation.

To contact and for more information, email: usarmy.novosel.avncoe.mbx.dotd-training-division@army.mil

U.S. ARMY

Back to Basics:
Survivability Starts With the Crew

By The Survivability Branch, Directorate of Training & Doctrine*

True Aviation Mission Survivability is a discipline of mind, tactics, and machine; yet, for decades, our default solution has been the hardware bolted to the airframe. Aircraft Survivability Equipment (ASE) has proven its effectiveness. Since the fielding of the Common Missile Warning System, no Army aircraft has been lost to a Man-Portable Air Defense System (MANPADS) threat. The APR-39 detects and classifies radar threats. Common Infrared Countermeasures direct modulated laser energy at incoming missile seekers. Flare and chaff programs counter specific threat types. Aircraft Survivability Equipment has saved aircrews and returned aircraft because it works within its design parameters. Equipment matters. New artificial intelligence (AI)-augmented planning tools, advanced sensors, next-generation survivability suites, and improved communications will be necessary for the next fight. These tools will give crews an edge, but equipment is not the problem we need to solve first.

The Army Azimuth, a strategic direction statement signed by the Vice Chief of Staff of the Army, identifies the priority, "Today we emphasize the fundamentals of Soldiering, ensuring a strong grounding in warrior ethos, individual Soldier readiness, and small unit tactical skills" (LaNeve, 2026). Not the next capability. Not the emerging technology. The fundamentals. Technology will not solve the next fight alone; it is not a magic bullet. The most capable survivability suite in the world is useless if the crew does not understand how to fly the aircraft, apply its mission equipment, grasp tactical planning and the reasoning behind it, and adapt the plan under fire. Prioritizing training, discipline, and practical application will provide the solid foundation required to achieve victory in the next fight.



An AH-64 Apache helicopter highlights its capabilities for the U.S. Ambassador and Minister of Defense 3D Combat Aviation Brigade air gunnery demonstration at Nadarzyce, Poland. U.S. Army photo by SPC Joshua Zayas.

The *Azimuth* is clear, "Leaders at all echelons see Soldiers as the decisive advantage and prioritize training mission essential tasks" (LaNeve, 2026). The decisive advantage is the trained Soldier. Equipment gives the crew tools. Training gives the crew the skill to use them.

Building that skill starts by stripping away distractions and returning to the foundational habits of tactical flight. The fundamentals of survivability are not complicated, but they require deliberate, repetitive training under the right mentorship:

- Threat recognition training must focus on the ability to identify, classify, and understand mission threats and their employment parameters across all domains.

- Route planning must account for threat geometry, not just simple point-to-point navigation. Flight routes that avoid threat rings on a map—but fail to account for detection envelopes due to improper altitudes and application of terrain masking—result in routes that are only survivable on paper.

- Formation spacing must give countermeasures room to work—too tight and a single engagement endangers the entire formation—too loose, and mutual support breaks down.

- Terrain masking must be a practiced skill instead of merely a classroom concept. The ability to draw a terrain mask on a map is only the first step. The crews who survive are the ones who have flown it, know where the masks break down, and have practiced the transition from masked to unmasked flight under the stress of a threat warning.

- Evasive maneuvers must be executed at altitude and under stress until the crew can perform them instinctively. A break maneuver that is briefed, but never practiced at altitude with a full combat load, is a maneuver the crew will hesitate to execute when the threat warning sounds, and hesitation in that moment is measured in meters of separation from a missile engagement envelope.

• Visual, audible, and electronic emissions control (EMCON) discipline must be trained into a routine habit and not just a briefing note. A crew who transmits at the wrong time and in the wrong place, because EMCON discipline was a briefing note and not a trained habit, has told the threat exactly where to look.

These are perishable skills. They degrade without repetition. A crew who flew a well-planned survivability route 6 months ago, but has not rehearsed since, is not a crew who can execute under fire today. The *Azimuth* states plainly, "Every shortcut in training and lapse in discipline will be paid for in blood" (LaNeve, 2026). For aviation survivability, the shortcuts that kill are shortcuts in threat training, route rehearsal, and cockpit time with the Aviation Mission Survivability Officer (AMSO).

Army Regulation 95-1, *Flight Regulations*, mandates the AMSO position at all echelons because survivability demands full-time expertise (Department of the Army, 2018). The AMSO is the subject matter expert for mission planning and survivability. Aviation Mission Survivability Officers all play an essential role, and the demands on their expertise increase at each level. At the company and battalion level, the AMSO is the tactical expert who specializes in ensuring the crew survives and the mission succeeds. That tactical expertise must be present throughout all phases of training, including in the aircraft.

Threat knowledge that the AMSO has trained in the air, corrected in real time, and validated through repetition is knowledge the crew can execute when the seconds are counting down. The AMSO who walks a crew through a threat overlay on a planning table has done important work. The AMSO who flies that route with the crew, watches them fly the terrain mask, corrects their formation spacing, and sees whether they break correctly when the threat warning sounds has done the work that actually builds survivability.

The AMSO cannot do it alone. The instructor pilot (IP) assists in building the foundation the AMSO trains on. Instructor pilots teach aircrews to fly the aircraft with precision, to maintain discipline under pressure, and to execute procedures correctly when the situation leaves no room for error. A crewmember who cannot hold altitude in a turn cannot hold the terrain mask. A crewmember who has not practiced aggressive maneuvering under stress will freeze when the threat warning activates because the cognitive load of processing the threat, executing the break, and managing countermeasures simultaneously is a load the crew has never carried in training.



Avionics maintainers prepare to run a maintenance operational check on the Common Missile Warning System of an AH 64E Apache helicopter on Katterbach Army Airfield, Germany. U.S. Army photo by SPC Grant Hockley.

Instructor pilots build the foundation through training basic aircraft handling, emergency procedures, and precision flying. However, traffic patterns do not win wars. The AMSO builds survivability on top of that foundation; skip the IP's work, and the AMSO has nothing to attach survivability training to. The IP ensures the crewmember can fly; the AMSO ensures the crew can survive. When both do their jobs, each member of the crew gets both layers. The *Azimuth* directs us to "Embrace a Warrior Mindset" where "Leaders at all echelons see Soldiers as the decisive advantage and prioritize training mission essential tasks" (LaNeve, 2026). For survivability, that means the IP prioritizes the mission essential tasks of basic airmanship, and the AMSO prioritizes the mission essential tasks of survivability. Both roles are essential.

This is what back to basics mean for survivability—not less capability but increased competency. While IPs focus on individual crewmembers' basic abilities, the AMSO serves as the critical integrator between fundamentals and tactical understanding. A crew who understands survivability fundamentals survives at a higher rate than a crew who does not, regardless of what equipment is on the aircraft. The evidence for this is in every after-action review identifying crew performance as the deciding factor in a survivability event. The equipment worked; the crew had to know what to do with it. The *Azimuth* makes this point without ambiguity. "The next war will not look like our last. Yet there are timeless truths in war. The battlefield does not forgive weakness" (LaNeve, 2026). Crew performance under stress is not a theoretical advantage; it is the margin between an aircraft that returns and one that does not.

Getting back to basics also means getting the AMSO back into the aircraft. Survivability training that happens only in a classroom or a briefing room has not been validated in the environment where it matters. The AMSO must be able to observe, correct, and train the crew throughout all stages of the mission.

That requires seat time. Commands must prioritize giving the AMSO the flight hours to do the job the regulations require. The regulations do not say the AMSO shall brief survivability; they say the AMSO shall ensure survivability, which requires presence. Presence is the difference between a survivability program and a survivability briefing.

Once the fundamentals are in place, technology amplifies them. The *Azimuth* states that we must, "Outpace our adver-

saries … by pairing our human ingenuity and judgment with advanced technologies like autonomy and artificial intelligence" (LaNeve, 2026). Note the sequence: human ingenuity and judgment first, then advanced technologies paired with them. The *Azimuth* does not say we outpace our adversaries by fielding AI. It says we outpace them by pairing human judgment with AI. Artificial intelligence-powered mission planning tools can process threat data faster and more thoroughly than manual planning. The AMSO ensures the machines and equipment are properly loaded with relevant information and the proper threat databases. Rehearsal tools can give crews more repetitions against more threat scenarios than training schedules alone allow. Artificial intelligence-augmented survivability equipment can characterize threats the library has never seen and recommend countermeasures in real time. Advanced sensors and improved communications will give crews better awareness and faster coordination. Each of these capabilities is real, and each of them will be necessary for the next fight.

The AMSO validates the crew's training, validates the AI's ability and understanding of the threat environment, and validates that the theater considerations are correct. That chain of responsibility already exists for static threat libraries and fixed countermeasure programs. When it scales to AI-augmented survivability, the tasks become more complex, but the role does not diminish. The AMSO can only validate what they have the training, the seat time, and the expertise to assess. An AMSO who has not trained survivability fundamentals with the crew cannot validate the crew's readiness. An AMSO who does not understand the AI's capabilities and the threat database it draws from cannot validate whether the AI's recommendations account for theater-specific considerations. The AI does not replace the AMSO's judgment. It demands more of it.

However, all of this assumes a baseline of crew competence. A planning tool produces a better route when the crew understands why the route is better. A rehearsal tool builds skill when the crew has the fundamentals to practice correctly. An AI system that recommends a countermeasure response gives the crew an option; the crew is still required to execute the maneuver, manage the expendables, and fly the aircraft through the engagement. Advanced tools will not win the next fight on their own. Training, discipline, and the ability to execute the fundamentals wins fights.

Survivability has always been a race between threat capability and crew capability. For 2 decades, equipment has closed the gap against MANPADS. The current gaps are in crew training, in AMSO presence in the cockpit, and in the fundamentals technology can amplify but cannot replace. The *Azimuth* provides the direction: Emphasize the fundamentals, prioritize training mission essential tasks, and pair human ingenuity with advanced technology—in that order.



U.S. Army Chief Warrant Officers perform pre-flight inspection of an AH-64E Apache helicopter at Mihail Kogălniceanu Air Base, Romania. U.S. Army photo by SGT Alex Romanack.

The answer is better-trained crews supervised by AMSOs who are in the aircraft doing the job the regulations require, supported by IPs who ensure the foundation is solid, and augmented by technology that works because the crews using it already know how to survive without it. Advances in AI, equipment, sensors, and communications will give us an edge, but none of it matters if the crew at the controls cannot execute the fundamentals under fire.

The sequence matters—fundamentals must be first. The AMSO trains the crew to apply those fundamentals to survivability, and technology extends the capability the trained crew already possesses. Reversing that sequence—fielding AI tools before crews master the basics, before AMSOs are in the cockpit training, and before IPs have rebuilt the basic airmanship that survivability demands—produces tools without users who can employ them. The Army has made this mistake before; it does not need to be repeated. One of the timeless truths the *Azimuth* warns about is that technology does not compensate for untrained crews. It amplifies trained ones.

Build the fundamentals. Train the fundamentals. Apply the fundamentals.

That is the sequence that produces survivable aircrews. That is back to basics. That is what the *Azimuth* demands.

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DECONFLICTING MANNED AND UNMANNED AVIATION IN THE BRIGADE COMBAT TEAM'S AREA OF OPERATIONS



By CPT Brian J. Patterson

An ADM4 drone is flown by 6th Squadron, 9th Cavalry Regiment, to perform reconnaissance of the battlefield. U.S. Army photo by SGT Collin Mackall.

Combined Resolve 26-07 presented 3D Brigade, 1st Cavalry Division (Greywolf), with a complex airspace environment requiring the integration of unmanned aircraft systems (UAS), Army Aviation, Air Defense, and Artillery. For the Brigade Air Defense Airspace Management/Brigade Aviation Element (ADAM/BAE), the challenge was not merely to manage airspace. It was to create an airspace command and control (C2) framework enabling multiple organizations to operate simultaneously while preventing fratricide, preserving freedom of maneuver, and supporting the commander's operational priorities. The exercise demonstrated that effective airspace management depends on more than doctrinal processes. It requires deliberate planning, trusted relationships, responsive C2, and a willingness to innovate before the airspace becomes congested.



The 3D Division Combat Aviation Brigade's TF Brawler operates a Forward Arming and Refueling Point for the AH-64 Apache. U.S. Army photo by SGT Scyrrus Corregidor.

The exercise provided an opportunity to test unmanned systems and associated tactical C2 processes. The brigade rapidly fielded several short-range reconnaissance and strike drones, along with a limited number of medium-range reconnaissance systems. A multinational partner also provided several hundred first person view UAS and repeater drones to expand the brigade's capabilities further. For manned aviation, the exercise aviation task force (TF) was TF Brawler from the 3D Infantry Division Combat Aviation Brigade. The TF was equipped with AH-64 Apaches, UH-60 and MH-60 Black Hawks, and CH-47 Chinooks. The British Army's 4th Regiment, Army Air Corps, also participated in the exercise with the AW159 Wildcat.

Execution

The Plan

The Greywolf ADAM/BAE, in collaboration with TF Brawler and the Joint Multinational Readiness Center, developed an airspace C2 concept that balances centralized coordination with decentralized execution. The goal was not to centrally control every aircraft or UAS. Instead, the brigade established procedures enabling subordinate units and supporting organizations to execute their missions while maintaining sufficient visibility at the brigade level.

The C2 plan was designed to maximize permissiveness for small UAS (sUAS) operations. This was intended to allow consistent UAS usage, providing continuous enemy observation and to feed multiple warfighting functions. The primary factor in deconflicting airspace between manned and unmanned aviation was sUAS' limited C2 capability. sUAS and their infantryman operators had varying means of acquiring and following the unit airspace plan (UAP), often relying on physical maps or, at best, preloaded Android Tactical Assault Kit maps and graphics, which are far less reliable and efficient than the systems aboard manned aircraft or an aviation TF's command post.

To simplify operations for UAS operators, a keypad system was the primary method for airspace management. The area of operations (AO) was divided into keypads measuring 1 km x 1 km. Each keypad consisted of a lower block from the surface to 500 ft and an upper block from 500 ft to 5,000 ft. The Medium-Range Reconnaissance (MRR) and some Short-Range Reconnaissance (SRR) operated in the upper block, while most UAS and manned aviation operated in the lower block. Due to safety concerns, UAS and manned aviation were not permitted to operate in the same keypad. Throughout the operation, the ADAM/BAE toggled keypads between UAS and manned aviation restrictions. The default setting for

each keypad was permissive for UAS and restricted for manned aviation. As operational requirements developed and air missions were requested, keypad statuses were adjusted. Instead of creating an air corridor or other airspace coordinating measures (ACMs) for a specific mission, the lower block of keypads were adjusted along the aircraft's planned flight path to establish a route and prevent collision with UAS.

Lessons Learned

Issues

Though the swivel chair method was a quick fix for the brigade's upper-tactical internet issues, it ultimately caused confusion and inconsistencies between the division and brigade air common operating pictures. This caused difficulties ensuring effective, accurate, and timely dissemination to squad-level sUAS operators. Mixing data solutions across echelons caused significant delays in both directions and reduced accuracy. Each time the UAP was recreated on a different system, information completeness degraded, and details were occasionally lost in translation. These issues were exacerbated during hasty missions, such as medical evacuations. While waiting for confirmation from the battalions that sUAS were cleared from the affected keypads, aircraft were often delayed by up to 30 minutes. This delay could have had immense consequences in an actual combat scenario. Though not experienced during this scenario, the lack of traditional ACMs for rotary-wing aviation could have caused issues with the integration of external Army, joint, or multinational air assets, which would not have access to or be familiar with our brigade-specific keypad system. Additionally, without these ACMs, indirect fire missions could have been affected.



The 3D Infantry Division Combat Aviation Brigade's TF Brawler conducts a medical evacuation of Greywolf Soldiers. U.S. Army photo by PFC Kaleb Lampkin.

Because most hasty air missions involved sustainment operations in the brigade rear area, phase lines served as benchmarks for shifting permissiveness between sUAS and manned aviation. As the operation progressed, phase lines were identified and declared as the boundary between sUAS permissive airspace (forward of the phase line) and manned aviation permissive airspace (rear of the phase line). This reduced



A CH-47 Chinook delivers personnel and supplies to the battlefield. U.S. Army photo by PFC Lilah Windle.

delays in airspace clearance for hasty missions while having minimal effect on sUAS operations, which primarily occurred forward of the phase line. The only exception was maintaining sUAS permissiveness at the launch sites for the longer-range SRR and MRR UAS.

Recommendations

Though using keypads to manage airspace is not a new concept, the extent to which manned and unmanned aviation will operate in the same area is an issue airspace planners must address. Though the keypad system worked efficiently for our brigade, it cannot be seamlessly integrated into the UAP due to the current 2004 message text formatting. Until updated, units must balance an internal keypad with existing ACMs to build the UAP.

The preferred option is to build UAS restricted operating zones (ROZs) over the brigade or battalion AOs to notify airspace users that sUAS are present. Instead of crowding the UAP with ROZs throughout the AO, one large ROZ can be created. However, the key distinction is emphasizing procedures that allow manned and unmanned systems to operate simultaneously within the ROZ. The ROZ is not meant to restrict manned aviation but rather to signal the need for additional coordination. Aviation TFs and other airspace users must follow the brigade's keypad system guidelines to fly through the ROZ. This requires deliberate coordination and planning between the requesting/supporting unit and the brigade, with the Air Ground Integration Element (AGIE) functioning similarly to a Kill Box Coordinator and executing detailed deconfliction to ensure safe operations.

Air control points (ACPs) may also be used to designate each keypad in the UAP. The ACPs can then be activated or deactivated to show where manned aircraft can fly. To mitigate confusion over the keypad, we recommend using the Global Area Reference System (GARS), developed by the National Geospatial-Intelligence Agency. Using GARS as the baseline for the keypads will allow joint or other aviation assets to understand the area without needing to learn a unit-specific keypad system many units or organizations currently use or for the managing unit to create a new system for every AO. Additionally, GARS allows scalability, permitting AGIEs to further divide GARS keypads based on mission requirements, terrain, and capability. At the same time, operations outside these ROZs, but still within the brigade's delegated airspace, will maintain the traditional methodology to ensure compatibility with higher echelon, joint, and multinational airspace users. Although these ACMs place a greater burden on AGIEs and manned aviation employment, they allow permissive and continuous employment of sUAS throughout the operation to maximize effects for the maneuver force.



A Greywolf Soldier prepares to launch an RQ-28 Skydeo X2D drone. U.S. Army photo by SGT Collin Mackall.

Conclusion

The central lesson from Combined Resolve 26-07 is that proliferation of unmanned systems is fundamentally changing how risk is managed in the brigade airspace. The answer is not to separate manned and unmanned aviation into increasingly restrictive airspace, but to develop the ability to safely operate both within the same operational environment without sacrificing tempo or combat power. Doing so requires treating airspace management as an active risk-management function rather than a procedural deconfliction exercise. Tactics, techniques, and procedures must establish predictable, easily understood rules for how manned and unmanned aircraft interact. At the same time, data-sharing capabilities must provide the timely, accurate, and common understanding necessary for those rules to work at the point of execution.

As UAS become organic to more formations and increasingly operate alongside Army Aviation, the decisive advantage will belong to units that can rapidly understand, communicate, and manage the risk created by their simultaneous employment. Therefore, the objective is not risk elimination, which is neither possible nor desirable in combat, but informed risk commanders can deliberately accept and operators can safely execute. Achieving that balance will be essential to preserving both the freedom of maneuver provided by manned aviation and the persistence, mass, and flexibility provided by unmanned systems.

Biography:

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Streamlining RELEVANT SMALL UAS TRAINING: THE AVIATION CATALYST TEAM'S COLLABORATION WITH THE AVIATION CENTER OF EXCELLENCE'S UNMANNED ADVANCED LETHALITY COURSE



A small unmanned aircraft system flies over Rodriguez Live Fire Complex, South Korea. U.S. Army photo by SPC Damilola Awe.

By MAJ Rachel J. Martin, CW4 Alphonso L. White, CW3 James L. Andreasen, SSG Alwyne A. Smith, and SSG Mario J. Rostran

Introduction

The exponential rate of technological and tactical evolution in modern warfare continues to widen the gap between the institutional pace of curricular validation. While the traditional program of instruction (POI) development process is designed to ensure standardization, safety, and doctrine-alignment across the force, it often functions on a multi-year cycle. This cycle struggles to explain the rapid proliferation of emergent systems like low-cost purpose-built attritable drones, launched effects (LE), and artificial intelligence to keep pace with the shifting dynamics of multidomain operations. Consequently, training curricula frequently reflect stabilized *best practices* from previous conflicts rather than the volatile, high-tech requirements of current and future near-peer engagements, creating a friction point between administrative oversight and frontline operational necessity. As seen in recent events during Operation Epic Fury, this results in the loss of necessary equipment and irreplaceable lives on the battlefield.

To address these challenges, the Aviation Center of Excellence and Security Assistance Group–Ukraine (SAG-U) Aviation Catalyst Team, collected lessons leading to a reliable solution—feeding real-time relevant warfighting data from the *front* to the cadre of courses in the *rear*, like the new Unmanned Advanced Lethality Course (UALC) and other POIs at Fort Rucker, Alabama. From lessons observed



UALC students conduct basic first person view flight operations. Photo provided by the authors.

to lessons applied, UALC has centered training on six key areas: Simulator First Training Pipeline; Operator Survivability, and a term I have developed for the course, the *Hunted Mindset*; Tactical Restraint and Matching the Tool to the Threat; Rapid Unmanned Aircraft System (UAS) Field Maintenance and Troubleshooting; UAS Integration with Fire Support; and Squad Counter (C)-UAS Tactics.

Simulator First Training Pipeline

Unmanned Advanced Lethality Course student feedback consistently identifies a critical training gap. The Army is fielding many units with small UAS (sUAS) who have not received the mandatory new equipment training/new equipment fielding. This deficiency results in a high frequency of preventable sUAS accidents. Consequently, Soldiers are often prohibited from training operations, with many noting their UAS equipment remained locked up in storage to protect limited funding and equipment. This creates a preventable cycle of degraded readiness and diminished mutual trust across teams.

Research underscores the value of simulation in bridging this gap. A study of A-10 pilot performance during RED FLAG exercises found that pilots who rehearsed high-threat surface attacks in a simulator achieved significantly higher survival rates than those who did not



UALC student team leader debriefs CULEX event. Photo provided by the authors.

(Hughes et al., 1982). Applying these findings to drone operations, simulation-based pre-training is a proven, cost-effective strategy directly improving pilot proficiency and flight safety (Somerville et al., 2024). In fact, many Ukrainian simulation centers recommend at least 30-40 hours of simulation training across several days before live-flight training to ensure effective primacy, protect scarce sUAS resources, and reinforce confidence in their future drone operators (Kryzhanivska, 2026).

To mitigate the training gaps, the UALC implemented a realistic physics-based simulation to accurately replicate first person view (FPV) flight dynamics. For individual sUAS flight proficiency, the UALC utilizes a highly cost-effective commercial off-the-shelf platform (Herlick, 2025).

The training curriculum mandates a minimum of 25 hours of simulation time, culminating in a Proficiency Flight Evaluation (PFE) (Herlick, 2025). Cadre assess students on Basic, Intermediate, and Advanced flight tasks, subsequently assigning them to specific ability groups (A, B, or C). This tiering ensures that personnel enter a training pipeline directly tailored to their demonstrated aptitude and minimizes risk within the course. To maximize proficiency, students sign out gaming laptops, controllers, and FPV goggles for off-duty practice outside of standard POI hours. Additionally, a secondary PFE occurs days after the initial assessment, providing personnel with the opportunity to test into a higher training tier. To mitigate operational risk during inert and kinetic sUAS missions, personnel who do not meet Group B graduation requirements are removed from the FPV pipeline. Student data from five UALC pilot classes indicated approximately 1 in 6 students cannot continue with FPV training due to safety. Instead, these students focus their efforts on stable intelligence, surveillance, and reconnaissance (ISR) platforms with higher degrees of automation (e.g., Skydio X-10D).

This tiered, simulation-centric strategy optimizes training efficiency across the board. It allows advanced operators to rapidly progress to increasingly complex live-flight scenarios, while ensuring struggling students receive targeted remedial instruction. Ultimately, this approach decreases student-induced live-flight system damage by 50 percent and significantly expedites the training timeline toward safe lethal and tactical sUAS applications.

Operator Survivability and the *Hunted Mindset*

Failure to institutionalize a *Hunted Mindset* across all echelons leaves U.S. personnel highly vulnerable to rapid aerial targeting. I first introduced this concept to students during the inaugural UALC pilot course, drawing on an analogy from hunting bears in Alaska: When hunting a bear, one must always operate under the assumption that they are also being hunted.

For decades, American air supremacy provided ground forces with a sanctuary from enemy aerial and missile threats (U.S. Air Force, 2023). This long-standing aerial shield deeply shapes the Army's operational culture, fostering an environment where overhead aircraft are viewed with wondrous excitement rather than potential danger—a luxury mirrored in civilian life, where pointing at passing helicopters or planes is a gesture of curiosity rather than survival. However, the modern battlefield—characterized by the deployment of up to 40,000 drones daily in Ukraine—marks a paradigm shift. We are transitioning from an era of uncontested skies to one where persistent, lethal aerial threats are a constant tactical reality.

Decades of uncontested skies leave U.S. Soldiers without the appropriate survival instinct to take cover from UAS activity—a stark contrast to the immediate reactions seen by Ukrainian civilians and military members. To counter this vulnerability, the UALC Culminating Exercise (CULEX) immerses students in the psychological stress of active Opposing Forces (OPFOR) utilizing UAS. Operating in four-person teams, students execute missions against a high-payoff target actively denying airspace to strategic assets. Success requires rigorous planning for UAS employment, power management, loadout distribution, and infiltration routing via satellite imagery, all while evading OPFOR drone observation and strike. Simulating this duress and psychological stress is a critical component of Operator Survivability and emphasizes that time taken to identify a drone is time granted to the adversary to finalize its strike. Personnel must treat every unidentified UAS as a confirmed threat, something hunting them, and deploy to cover.



UALC students conduct inert UAS strike. Photo provided by the authors.

Tactical Restraint and Matching the Tool to the Threat

Tactical restraint is the judicious, disciplined application of force. Far from passive inaction, it represents a calculated decision to limit the scale or type of force employed to achieve a mission objective, while preventing unnecessary escalation or collateral damage. Put simply, tactical restraint should not be viewed as hesita-

tion but as a deliberate and calculated operational choice. Today, against peer and near-peer adversaries, it is synonymous with signature management and survivability. Every action taken by a forward element—whether launching a UAS, engaging with direct fire, or even a single radio transmission from an Apache cockpit—creates an observable signature (electromagnetic, acoustic, or thermal). Tactical restraint dictates that a unit should only emit a signature when the tactical benefit outweighs the risk of immediate enemy triangulation, UAS targeting, and counter-battery fire.

While the principles of tactical restraint and signature management represent foundational tactical concepts, observational data from the UALC indicates a significant proficiency gap across the Army. Despite possessing theoretical knowledge, many students struggle to execute these survivability tasks effectively when placed under the stress of a contested, multidomain training environment. To bridge this capability gap, the UALC curriculum is expanding to incorporate iterative execution of the CULEX. By rotating squads through diverse operational locations and complex tactical scenarios, students are afforded the necessary repetitions to hone their operational discipline, refine their asset-allocation decisions, and support their survivability in future armed conflict. Institutional training must be aggressively reinforced in a similar way at the small-unit level. Commanders intending to incorporate sUAS into their scheme of maneuver must integrate these platforms comprehensively during field training exercises. To ensure these critical survivability lessons permeate the formation, UAS operations must be exercised and emphasized at every level of command.



Soldiers participating in the UALC at Fort Rucker take part in a CULEX. U.S. Army photo by Leslie Herlick.

Rapid UAS Field Maintenance and Troubleshooting

Small UAS have become the modern infantry squad's primary organic ISR asset and band-aid systems compensating our brigade's loss of Tactical UAS. When a platform is down due to minor mechanical or software faults such as a chipped propeller, a binding motor, a firmware handshake error, or a loose telemetry wire, the unit immediately loses its eyes in the sky. If operators cannot perform rapid, high-tempo troubleshooting, they must either abort the mission or proceed without aerial scouting, dramatically increasing their vulnerability to ambushes and indirect fire. Field-level maintenance ensures that the squad keeps its Detect, Identify, Decide, Engage, Assess (DIDEA) loop spinning faster than the adversary's.

In a modern electronic warfare environment, troubleshooting is not just a maintenance task, it is a high-risk tactical activity. Rapid, checklist-driven diagnostics minimize 'on-air' time, allowing the operator to quickly identify the issue, execute the fix, and power down before the enemy can direct fires onto their location. Operating on a logistically dispersed and highly lethal battlefield means that relying on depot-level maintenance or returning broken systems to the rear is functionally equivalent to losing the asset entirely.

Training operators in rapid field maintenance, such as modular component swapping (e.g., replacing propellers, entire arm assemblies, or camera gimbals in under 5 minutes) and basic electronic soldering, establishes a self-sustaining tactical unit. This independence reduces the burden on the military's broader distribution network and ensures the unit remains lethal, even when cut off from immediate resupply.

To reinforce these skills, UALC students receive instruction on basic maintenance and software management techniques. When a controller will not bind to a UAS, a propeller is installed backward, an FPV suffers structural damage from striking a tree in the woods, or a lithium polymer battery catches on fire. Unmanned Advanced Lethality Course students must know and implement tactical triage to identify the issue, fix it, or divert to a separate system to accomplish their mission; squads routinely encounter multiple overlapping equipment failures simultaneously.

Upon mission completion, operators must immediately transition to deliberate maintenance tasks from a position of relative safety. This post-mission regeneration ensures that damaged systems receive repairs, calibration, and are ready to fight tomorrow's battle.

Incorporating maintenance classes, empowering software experts in your formation, and standardizing immediate maintenance actions will make or break a unit in combat. This concept is not new to our Army. The difference between a lethal unit and a blind one often comes down to internal maintenance proficiency.

To ensure combat readiness, commanders can implement training at home-station. Integrate sUAS maintenance and software troubleshooting classes into the standard training calendar rather than treating them as an afterthought. Subject matter experts can identify and empower Soldiers with high technical or software aptitude to serve as unit-level sUAS master trainers. Develop and drill standardized immediate action checklists for sUAS failures, much like traditional weapon malfunction drills (e.g., Confirm, Slap, Pull, Observe, Release, Tap, Squeeze or Pull, Observe, Push, Squeeze [C-SPORTS/POPS]).



Four students, one instructor, and one Army Combat Capabilities Development Command engineer prepare UAS for kinetic strikes. Photo provided by the authors.

Squad C-UAS Tactics

Countering sUAS must be treated fundamentally as a survivability task rather than a specialized Air Defense Artillery function. Lacking the heavy, vehicle-mounted kinetic electronic warfare platforms organic to higher echelons, infantry squads must rely on passive defense, strict signature management, and rapid execution of the DIDEA process to mitigate drone threats.

Passive and active C-UAS strategies, such as integrating visual and multi-spectral camouflage, maximizing micro-terrain to mask movement and maneuver, maintaining disciplined dispersion, and deploying to cover at the first detection of UAS activity, are systematically integrated throughout the UALC to enhance operator survivability across the modern multidomain battlefield. Future iterations of the curriculum will expand upon this foundation by incorporating live-fire engagements against low-altitude sUAS targets, iterative squad-level battle drill lanes, and rigorous C-UAS evaluations against a free-thinking OPFOR drone threat during the CULEX.

Recent operational realities within the U.S. Central Command area of responsibility underscore that the extended battlefield spares no formation; maneuver and support echelons alike are highly vulnerable. Consequently, institutionalizing a standardized *React to UAS* battle drill is an Enterprise-wide imperative, agnostic of branch or military occupational specialty. Commanders must operate under the persistent baseline assumption that all echelons are subject to continuous enemy observation and kinetic targeting, effectively nullifying the traditional concept of a secure rear area.

Conclusion

The Russo-Ukrainian War serves as a real-time laboratory for the changing character of war. The invaluable insights generated from this conflict would inevitably be lost to time without the persistent presence and diligent observation of American elements, like the SAG-U Aviation Catalyst Team. However, observation alone is insufficient; the U.S. Army must urgently operationalize these lessons. Accelerating tactical and technical innovation within the sUAS domain is no longer a future objective—it is an immediate operational imperative. Institutional agility is critical to this effort, and without the robust organizational support required to rapidly update POIs and dynamically adapt garrison training in real-time, the force faces a severe risk of tactical stagnation. To maintain overmatch against near-peer adversaries, our institutional adaptation must relentlessly outpace the rapidly evolving character of modern combat.

Biography:

MAJ Rachel Martin is currently a Command and General Staff College student at Fort Leavenworth, Kansas, and the outgoing Director of the UALC and the Air Cavalry Leaders Course, Fort Rucker, Alabama. She has served in intelligence roles for the Attack Battalion and Air Cavalry Squadron, an Air Cavalry Troop Commander of AH-64D Apache Helicopters and RQ-7B Shadow UAS, and a Gray Eagle Company Commander of MQ-1C Gray Eagle UAS. The coauthors are current instructors for the Air Cavalry Leaders Course and UALC experts in aerial reconnaissance and security.

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Optimizing Geospatial Intelligence Support in Aviation Brigades: Lessons from the 101st Combat Aviation Brigade Deployment



From Hawai'i to the Alaskan tundra, United States Military Academy faculty and cadets explore the identification of Helicopter Landing Zones (HLZs) using drones and geospatial analysis during a field study. Photo courtesy of The United States Military Academy at West Point.

By MAJ Adam W. Burns, MAJ David A. Beaumont, CPT Jeffrey T. Godwin, and SFC Phillip T. Coppney

Introduction

Combat aviation brigades (CABs) operate in demanding environments requiring rapid Geospatial Intelligence (GEOINT) support for mission planning, route analysis, landing zone (LZ) assessment, and threat evaluation. Traditional centralized brigade (BDE)-level task organization of 35G and 12Y, while efficient for resource management, may not provide the responsiveness required for time-sensitive, decentralized aviation operations. During its most recent combat deployment, the 101st CAB implemented an experimental force structure, placing GEOINT capabilities to a direct-support role with subordinate aviation task forces (TFs). This article discusses the operational effectiveness of a BDE intelligence section, provides aviation TF intelligence sections with a GEOINT support package, and analyzes the operational outcomes of the 101st CAB's organizational approach.

Background

The 101st CAB S2 consisted of five imagery analysts (35G), four geospatial engineers (12Y), and a geospatial engineering technician (125D). We were able to simultaneously augment two subordinate aviation TFs, including 2D Squadron, 17th Air Cavalry Regiment, and the 6th General Support Aviation Battalion (BN), 101st Aviation Regiment, at two geographically dispersed locations. One aviation TF received an imagery analyst, a geospatial engineer, and a geospatial workstation (GWS), while the other aviation TFs received two imagery analysts and a GWS cross-trained in geospatial engineering tasks. This deliberate augmentation and employment of capabilities enabled two aviation TFs with collocated GEOINT Support Packages (GSPs), providing direct support and a holistic picture to aviation TF commanders.

Purpose

1. Document the organizational structure and resource distribution of GEOINT support within the 101st CAB.

2. Analyze the operational advantages and challenges of decentralized GEOINT support.

3. Provide recommendations for future force structure within CABs.

4. Examine tactical-level operations, not address strategic or theatre-level GEOINT support architecture.

Modified Table of Organization and Equipment vs. CAB GEOINT Structure

Based on Force Management System Web, the 101st CAB is authorized the following GEOINT Soldiers: one 12Y30, one 12Y20, two 12Y10s, one 35G40, one 35G20, and four 35G10s. The 101st CAB had eight personnel equivalent to the authorized level, although skill levels and experience did not always match, resulting in additional personnel beyond the authorized structure. The 125D departed the CAB post-deployment and was never an authorized billet.

Equipment: Resource Distribution of GEOINT

The CAB's geospatial analysis relies on an Enterprise commercial-off-the-shelf (COTS) software that serves as the primary Geographic Information System for aviation-centric mapping. Analysts use it to ingest diverse terrain, vegetation, and obstacle data to conduct intelligence preparation of the operational environment specific to aviation movement and maneuver. This includes performing vertical obstruction analysis, calculating line-of-sight (LOS) for nap-of-the-earth flight routes, identifying suitable HLZs, and identifying forward arming and refueling points based on slope and surface conditions. By synthesizing these data into a common operational picture, the GSP ensures aircrews can navigate complex environments while minimizing exposure to geographical and enemy threats.

For detailed imagery exploitation, the GWS uses powerful Electronic Light Table applications, notably BAE Systems' SOCET GXP®[1] and the National Geospatial-Intelligence Agency's (NGA) iSPY. SOCET GXP provides the advanced

[1] The Army signed a multi-year agreement to add and upgrade SOCET GPX licenses for the Distributed Common Ground System-Army (BAE Systems, 2011).

photogrammetric capabilities necessary for deep analysis of target areas and the precise mensuration required for aviation targeting. Complementing this, NGA's iSPY serves as a critical system for collecting and viewing diverse intelligence feeds, including full-motion video, electro-optical, and synthetic aperture radar imagery. By leveraging iSPY alongside SOCET GXP, imagery analysts can seamlessly generate coordinate data for AH-64 target handovers, assess enemy air defense artillery (ADA) positions, provide LZ assessments using national systems, and build a comprehensive operational picture. This detailed situational awareness capability enables air assault planning and ensures the survivability of aviation assets in contested environments.

Operational Advantages of Decentralized GEOINT

The 101st CAB S2 section's shift to a decentralized GEOINT support model yielded significant operational advantages by embedding analysts directly within supported aviation TFs. Brigade-standardized products developed and approved by the BDE command and aviation standardization teams ensured that all products were created consistently across the distributed locations. Personnel forward deployment altered the dynamics of intelligence support, reducing response times for planning and operational products.

Response Time

By eliminating delays in traditional support requests at BDE and higher echelons caused by communication or network issues, the embedded analysts operated at the same battle rhythm with their assigned and supported aviation TF. Deliberate parallel planning with aviation planners, coupled with in-person GEOINT support enabled rapid production and refinement of vital GEOINT products, including route analysis for ADA assets, HLZs for deliberate operations supporting special operations forces, and products supporting the Aerial Response Force with a 30-minute time requirement. This capability directly contributed to tactical agility and lethality.

Relationships and Understanding

Beyond reduced product development and distribution timelines, relationships flourished due to proximity, enabling analysts to develop a deeper understanding of the aviation TF requirements and operational needs they support. Through exposure to the organization's operations, standard operating procedures (SOPs), and commander's intent, analysts developed mission familiarity that can be lost when providing remote support. The integration facilitated strong professional relationships with pilots, aviation TF staff, and intelligence sections, enabling analysts to provide anticipatory support based on operational trends. The immediate feedback loop enabled rapid product refinement, reducing the "lost in translation" effect occurring when there is no request context.



Personnel at the Geo-integrations office look at computer-aided drawings and blueprints at Joint Base Charleston, South Carolina. Photo by Airman 1st Class Cory Davis.

Operational Flexibility

Distributing GEOINT personnel enhanced the BDE's overall operational flexibility. By establishing support packages, the BDE's intelligence section could better support aviation TF missions in parallel and create redundancy to ensure operations continuity, should equipment or communications issues arise. Additionally, this approach reduced the risk of the BDE becoming a single point of failure.

Operational Challenges of Decentralized GEOINT

While the GWS provides a robust suite of analytical tools, the forward-deployed GSP faced critical operational constraints regarding software licensing and network infrastructure. A primary issue is limited software license availability. Typically, a GSP may operate with as few as 2 licenses for SOCET GXP. During high-tempo aviation operations, such as planning a large-scale air assault or responding to dynamic targeting requirements, multiple 12Y and 35G analysts must work concurrently. Lack of available SOCET GXP licenses severely impedes these simultaneous workflows, forcing analysts to serialize tasks such as target mensuration, LOS generation, and route planning, which increases the intelligence production timeline and delays dissemination to aircrews.

Network Limitations

Forward-deployed GSPs relied heavily on tactical Secret Internet Protocol Router Network (SIPRNet) infrastructure. This introduces significant bandwidth and latency challenges compared to the robust throughput of strategic SIPRNet environments. Modern geospatial datasets, including high-resolution national systems imagery, dense elevation models, and full-motion video, are massive files. At the tactical level, limited bandwidth and high latency of tactical SIPRNet degrade download speeds required to consume these large datasets. This network degradation delays receipt of sensitive intelligence, thereby reducing the CAB's ability to maintain an updated, real-time common intelligence picture in a rapidly evolving environment.

Key Findings

The following key findings highlight how decentralizing and integrating

GEOINT support at the aviation task force and battalion level affects the efficiency and effectiveness of intelligence support to training and combat operations

1. Augmenting BN TFs with GEOINT capabilities reduced production time for imagery products and HLZ analysis during training and combat operations.

2. Direct support relationships enhanced product relevance, mission understanding, and immediate product refinement based on pilot requests and feedback.

3. Interoperability challenges between systems platforms, SOCET GXP and the COTS primary agency-wide standard for GIS software, created workflow inefficiencies.

4. Limited plotter availability restricted large-format product generation across all outstations.

5. Geospatial work station distribution enabled critical analytical capabilities and immediate product development at forward locations.

Analysis and Discussion

The 101st CAB pushed capabilities to the lowest appropriate level. Aviation TF commanders and flight crews gained direct access to geospatial expertise, enabling faster decision-making and a reduced dependency on the higher headquarters. However, mission command requires decentralized execution **AND** a unified effort. The software interoperability challenges and inconsistent equipment distribution suggest decentralization requires more than personnel allocation, it requires a supporting infrastructure enabling both full autonomy and integration. Without standardized systems and adequate capabilities at each echelon, decentralized personnel cannot achieve full potential, and the risk of creating isolated, incompatible workflows increases.



The NGA and XVIII Airborne Corps monitor the real-time data feed as the drone collects data at Fort Bragg, North Carolina. Photo by the NGA.

Recommendations for the Future Force Structure

Aviation organizations must develop SOPs and resourcing strategies balancing centralized geospatial expertise with forward-deployed and training analytical capability while standardizing software platforms and ensuring adequate equipment distribution across echelons. The 101st CAB continues to provide this support with specific GEOINT capabilities allocated to each BN supporting combat training center rotations and training events, furthering their established relationship.

Aviation-Specific Considerations

Combat aviation BDEs present unique GEOINT support requirements compared to mobile brigade combat teams (BCTs) or other functional BDEs. Flight operations are conducted under compressed timelines for mission planning, especially in deployed environments. Precision HLZ analysis requires precise mensuration and detailed terrain assessments to ensure flight crew and aircraft safety. Operations often remain dynamic due to frequent changes based on weather, enemy activity, or shifting priorities. These factors contend for responsive, BN-specific GEOINT cell support and responsive GSPs driven by demand for high-quality, technically accurate products spread across the BDE. This decreases the need for technical oversight and further empowers the BDE.

Conclusion

The 101st CAB's GSP provision to subordinate aviation TFs represents an innovative approach to intelligence support and demonstrates significant operational advantages while also revealing challenges. Responsiveness matters in aviation operations, and the speed of GEOINT support directly impacts mission effectiveness. The intelligence capabilities collocated with aviation TFs provided time-sensitive support, situational awareness, and in-person customer support that the BDE could not match.

Biographies:

MAJ Adam Burns is the BDE S2 for the 101st CAB, 101st Airborne Division (Air Assault). His previous experience includes G2 Plans and Exercises, 101st Airborne Division (Air Assault); Resident Naval Command and Staff College; Light Infantry TF S2 Observer, Coach/Trainer at the National Training Center, Fort Irwin, California; Military Intelligence (MI) Company Commander for 4th BCT (Airborne), 25th Infantry Division; BN S2 for 1st Squadron, 73D Cavalry Regiment, 4th BCT (Airborne), 25th Infantry Division.

MAJ David Beaumont is the MI Major Talent Manager at Human Resources Command. His previous experience includes BDE S2 for the 101st CAB, 101st Airborne Division (Air Assault); Resident Command and General Staff College; Commander, Company Alpha, 304th MI BN; MI Captains Career Course Small Group Leader and Instructor; BN S2 for 1st BN, 27th Infantry Regiment (WOLFHOUNDS); MI Company Commander for 2D Infantry BCT, 25th Infantry Division.

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SFC Phillip Coppney is the Senior Imagery SGT and BDE S2 Noncommissioned Officer in Charge (NCOIC) for the 101st CAB, 101st Airborne Division (Air Assault). His previous experience includes Detachment SGT for Headquarters and Headquarters Detachment, 302D Intelligence and Electronic Warfare BN; Senior Drill SGT, 3-39th Infantry, Fort Jackson, South Carolina; GEOINT NCOIC, MI Detachment, 2D BN, 7th Special Forces Group (Airborne), and Imagery Analyst, 21st Engineer BN, and 3D BCT, 101st Airborne Division (Air Assault).

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Dog-Faced Soldier Drone Dominance—How 3D Infantry Division Trains Expert Small Unmanned Aircraft System Operators

Marne innovation takes over the National Training Center. U.S. Army photo by SPC Rebeca Soria.

By CW5 Jonathan M. Morrison, CW2 Joseph C. Askwith, and MAJ Paul T. Merklinger

On June 6, 2025, President Donald Trump signed Executive Order 14307, Unleashing American Drone Dominance. The order highlighted the rise in the use of unmanned aircraft systems (UAS) across the modern battlefield and the United States' need to rapidly modernize the battlefield. This modernization includes a sharp increase in the number of small UAS (sUAS) on the battlefield and the requirement for teamwork across each Army post to rapidly expedite the facilities, training, and airspace required to train expert, lethal operators. This article describes how the Dog-Faced Soldiers of the 3D Infantry Division at Fort Stewart, Georgia, responded to this call for modernization. Other organizations can utilize these lessons learned to improve their own programs, create additional training opportunities, and continue to integrate sUAS in their unit's training programs.

The Deliberate Training Progression at the Marne Unmanned Center of Excellence

The Marne Unmanned Center of Excellence (MUCE), led by CW5 Jonathan Morrison and established in March 2026, developed a detailed training progression to certify its sUAS operators. The training scenarios incrementally increase in difficulty. The progression included a deliberate *crawl, walk, run* methodology with three stages, ensuring that operators receive the required baseline knowledge and skills to build toward expertise. Operators must master the flight line track before advancing to their final evaluation, which is conducted in the challenging, wooded terrain southeast of the main facility footprint. Each of the unit commanders are able to shape the Commander's Task List according to the unit's priorities and upcoming missions.

Stage 1—Initial Orientation: Stage 1 integrates the use of flight simulators to give operators exposure into the operability of the system, refine their control touch, and learn how environmental factors can impact their missions. Operators complete academics on the sUAS safety, range procedures, and an orientation to airspace followed by two separate simulators. Through the first flight simulator, trainers focus on teaching control inputs and control touch in flight. The second simulator, the Virtual Drone Collective Trainer as a part of the Virtual Battlespace Simulator 3, focuses on integration of sUAS, tactics, techniques, and procedures. Operators are able to learn how to properly integrate with the other Warfighting Functions to accomplish the mission, including working with artillery in call for fire missions. Simulator usage is the leading catalyst providing the formula to first person view (FPV) or quadcopter familiarization training and progression. The simulated virtual space creates a level of both apprehension and a feeling of success once the operator progresses to the evaluation portion of simulations before moving to the live flight phase of the programs of instruction (POI) in stage 2.

Stage 2—Individual Licensing Training (ILT) *Mission Prepped* (equivalent to Readiness Level [RL1] Pilot): The ILT courses provide POIs to the forefront that qualify operators to become familiar with airspace, drone operation, reporting, and standardization within their unit's flight operations. Soldiers will participate in 2 weeks of flight training on the system. The course ends when the master trainer (MT) certifies the operator after completing all maneuvers to standard. Master trainers instruct these courses and add a level of experience fostering expertise. Once operators graduate an ILT, the operator is considered mission preparation (MP) and must continue training with an MT to achieve mission certified status in the doctrinally established timeframe.

Stage 3—Advanced Tables: Once the ILT is completed, operators are able to

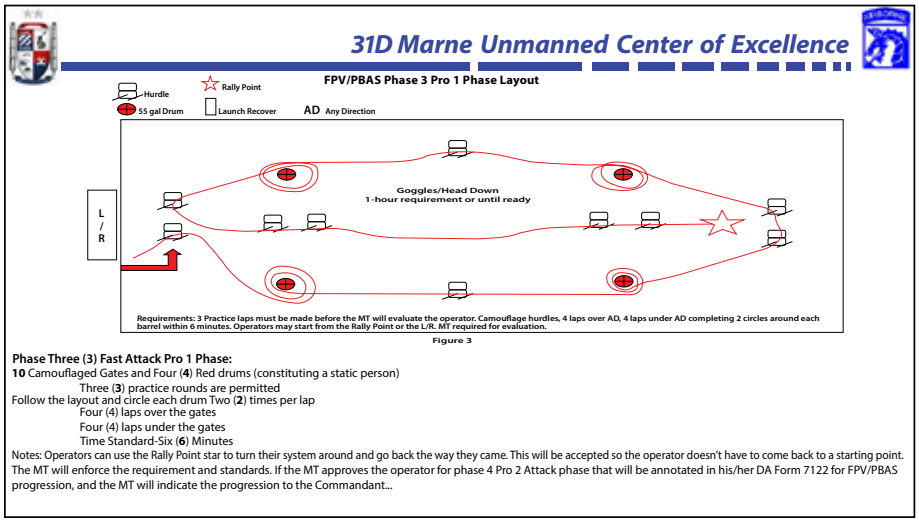

Figure 1. First person view/purpose-built attritable system Phase 3 Pro 1 resource and training aide layout. Figure provided by the authors.

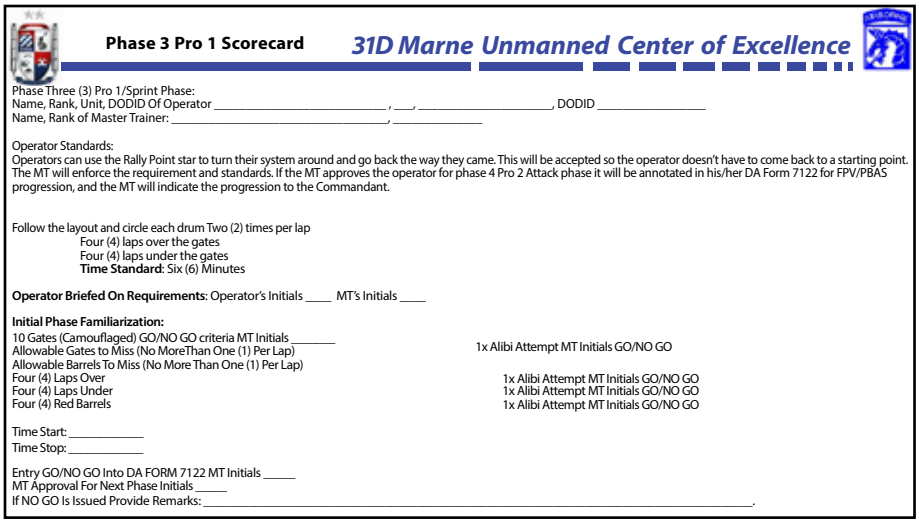

Figure 2. Phase 3 Pro 1–master trainer scorecard for sUAS operators. Figure provided by the authors.

further refine their skills and build expertise in the fast attack FPV advanced qualification phases. Stage 3 includes deliberate phases on a measured course:

- Phase 1—Beginner Phase (Observed course during walkthrough of MUCE)—Complete 5 total laps in less than 6 minutes.

- Phase 2—Intermediate Phase—Complete 7 laps in 5 minutes.

- Phase 3—Fast Attack Pro 1 Phase—Complete 8 laps in 6 minutes; add camouflaged gates and other man-made obstacles.

- Phase 4—Fast Attack Pro 2 Phase—Complete 8 laps in 6 minutes; add camouflaged gates and other man-made obstacles—training areas in woods surrounded by MUCE.

Within Stage 3, the most important phase allowing an operator to become mission certified and deemed a fast attack drone operator, is the Fast Attack Pro 2 Woodsman Qualification. This exercise is a culminating event testing every aspect of a Soldier/operator's collective training tasks, regardless of their military occupational/operational specialty. From camouflage to reading a map or creating a hide site from which to operate a drone, these are all rigorously evaluated in an intentionally stressful environment. The Marne Division will train like it fights. Successful completion of Stage 3 certifies as an FPV fast attack expert, equivalent to the Pilot-in-Command certification, with the opportunity to progress to the MT.

The development of this training progression required several iterations of flight route development matched with objective training evaluation standards. Figures 1 and 2 show an example of the Stage 3 Advanced Tables certification development.

Integration and Support From Installation Partners

Members of the 3D Infantry Division staff coordinated with several partners across the installation to facilitate the listed training progression. The two most critical partners were members of the Airfield Division, who assisted with airspace, and members of the Garrison, who allocated existing facility space.

Facility and Footprint Allocation

Members of the Garrison were excellent teammates coordinating several co-use agreements in the use of existing facilities at Evans Army Airfield, which once housed Shadow UAS formations. Former Shadow buildings have been fully converted into advanced classrooms and secure spaces for sUAS demonstrations. Taken together, the MUCE boasts over 40,000 square feet of training area and corresponding airspace. The MUCE was able to utilize unserviceable, excess containers and modify them as a key training aid during the advanced FPV tables.

Airspace and Integration

To effectively integrate emerging UAS technology, units required accessible training environments that did not add cumbersome coordination processes to their operations. The Division Airspace Managers set out to create individualized training areas, easily accessible to the most junior Soldier. The intent was to allow squad leaders the required airspace to maximize training repetitions to attain expertise. The airspace surrounding Fort Stewart and Hunter Army Airfield provided additional challenges, as the unit footprints fall squarely inside the Class D controlled airspace of both airfields' towers and are situated adjacent to the Class C and E airspace of Savannah/Hilton Head International Airports.



First person view house at Evans Army Airfield in Georgia. U.S. Army photo provided by the authors.

The 3D Infantry Division leadership envisioned the MUCE as a unique initial training solution. Although still within Class D airspace and subject to the same request and approval requirements, the MUCE is situated safely away from populated cantonment areas, while remaining outside the primary training areas. This provides units with easy access to a safe environment for initial through advanced qualifications, building operator confidence before transitioning decentralized training back to permissive areas within their own unit footprints. Subject to the requirements of the same Class D airspace, both areas enabled bottom-up refinement of airspace processes and trained operator proficiency for safely operating inside controlled airspace.

Over the past 24 months, this initiative evolved from a restrictive, platform-specific, area-specific approval process into a comprehensive division-level program encompassing all Group 1 and 2 UAS across numerous training areas. Accomplished through robust collaboration by the Division Airspace Managers with the Division UAS Officer, the installation Air Traffic and Airspace Officer, Range Control, and the Department of Army Representative to the Federal Aviation Administration, this effort successfully established 14 permissive airspace areas for sUAS operations. This strategic expansion significantly enhances unit readiness by decentralizing training—placing accessible operating areas directly within unit footprints and establishing dedicated airspace at the MUCE to support initial through advanced qualifications. Figures 3 and 4 show the overall airspace, including sUAS restricted operations zones throughout the Fort Stewart, Georgia, cantonment area. Figure 4 shows the additional airspace partitions within the MUCE to facilitate the training of operators from different brigade combat teams at the same time.

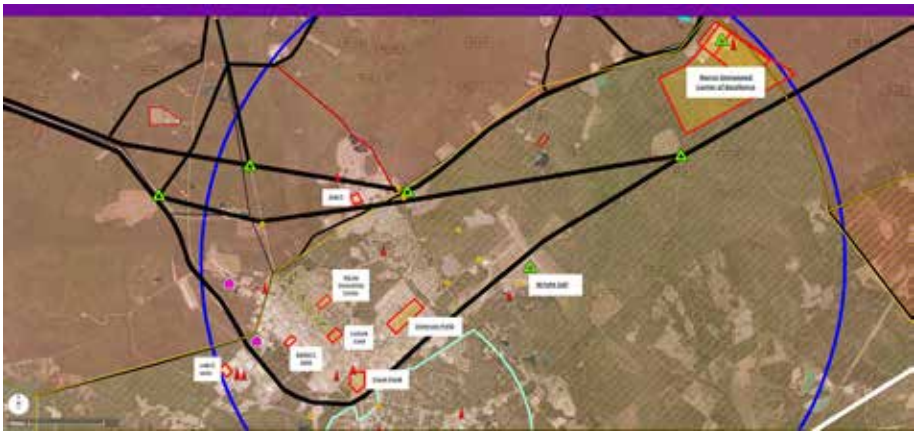

Figure 3. Fort Stewart, Georgia, and MUCE Airspace–Macro perspective. The airspace at Fort Stewart is within the Class D airspace of Wright Army Airfield. Figure provided by the authors.



Figure 4. The MUCE Airspace Micro perspective. Within the MUCE, the division staff coordinated for partitioned training areas to maximize the number of units that can train at the facility. Figure provided by the authors.

To ensure safe integration, a formal Letter of Agreement (LOA)[1] was deliberately designed so that any Soldier can pick it up and successfully execute training flights within Class D airspace. By providing comprehensive end-user checklists and clear external coordination requirements—including mandatory air traffic control briefings and Notices to Air Missions requests—the LOA empowers operators to safely deconflict airspace and ensures protection to all aircraft. The procedures codified in this LOA have subsequently established best practices for coordinating with Range Control and Marne Radio. Recognizing the value of these procedures, the lessons learned from operating inside Wright Army Airfield's Class D airspace are now being leveraged to rewrite the local Aviator Procedures Guide for Fort Stewart and Hunter Army Airfield. The guide will capture the extensive nuances required to safely integrate this new echelon of drone activity.

Crucially, these localized UAS training opportunities eliminate the extensive lead times traditionally associated with

[1]For more information regarding this LOA, please contact MAJ Paul T. Merklinger at paul.t.merklinger.mil@army.mil



U.S. Soldiers work on a medium-range reconnaissance drone before takeoff during Spartan Focus at Fort Stewart, Georgia. U.S. Army photo by SPC Rebeca Soria.

land reservations in the Range Facility Management Support System (RFMSS). This immediate access builds operator proficiency, not only in flying the system, but in executing safe airspace coordination practices. With the addition of a dedicated "air" reservation within RFMSS, operators can now seamlessly transition the individual tasks mastered at the MUCE and their unit footprints into larger situational training exercises and culminating training events. This progressive training model ensures units are gainfully integrating sUAS capabilities into collective operations, effectively preparing them for the future fight.

Conclusion

Since becoming operational and within the first 4 months, the MUCE has certified several sUAS operators through its ILT. The staff continuously validates and refines the objective time standard within the Stage 3 advanced tables. As sUAS become more prevalent across the force, the MUCE serves as an example of applying an objective training program, supported by the installation partners, that meet the rapid modernization on the battlefield. Within the next year, the MUCE will host its first ever expert sUAS operator competition, validating the final stages of its advanced training program. CW5 Jonathan Morrison credits his manned aviation experience as the basis for ensuring that he provides the framework needed to understand progressional Army requirements. His motto—"Safety First!" regardless of whether the aircraft is manned or unmanned—strengthens the relationship between manned and unmanned operations.

Biographies:

CW5 Jonathan Morrison currently serves as the Division 150U UAS Operations Officer for the 3D Infantry Division. He entered military service in 2000, becoming a WO in November 2008. He has established standardized sUAS and safety programs from the U.S. Army Intelligence and Security Command to Western Hemisphere Command and is a graduate of Embry-Riddle Aeronautical University with a Bachelor of Science in Aeronautical Science and a Master of Science in Engineering Management Aviation and Aerospace.

CW2 Joseph Askwith is a 150A (Air Traffic and Air Space Management Technician) and currently serves at the 3D Infantry Division Headquarters as the Division Airspace Manager. He has served in Airspace Management roles with the 3D Combat Aviation Brigade (CAB), 2D CAB, and 2D Infantry Division.

MAJ Paul Merklinger previously served as the 3D Infantry Division's G3 Aviation Director. He was commissioned from the United States Military Academy in 2011 and is a rated UH-60M/HH-60M Pilot-in-Command and Air Mission Commander. He is currently serving as the Brigade Executive Officer for the 25th CAB.

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AN AVIATION MAINTENANCE PERSPECTIVE ON CRAFTING A WARFIGHTING CULTURE

An AH-64E lands for rearm and refuel during forward arming and refueling point operations at Fort Bragg, North Carolina. U.S. Army photo by SSG Dillon Burnhauser.

By LTC Wayne E. Griffin Jr. and MAJ Lee H. Jones

MG Clair Gill, former Army Aviation Center of Excellence Commanding General (CG), published the *Aviation Digest* article, "Crafting an Aviation Warfighter Culture for the Future Fight," in March 2025. This article served as a call to action for the U.S. Army Aviation Branch to fundamentally shift its organizational culture. He argues that to prepare for a "complex future fight" (p. 8) against peer adversaries, the branch must transition its current mindset to a more integrated "Aviation Warfighting Culture" (p. 8).

> "THIS IS A CRITICAL MOMENT FOR AVIATION SOLDIERS EVERYWHERE TO CONSIDER WHAT WE DO WELL, AREAS FOR IMPROVEMENT, AND USE OUR TIME NOW TO EMBRACE A REVISED AVIATION WARFIGHTER CULTURE TO ENSURE THE PREPAREDNESS FOR A COMPLEX FUTURE FIGHT."
>
> -MG CLAIR GILL

For aviation professionals who have spent 2 decades focused on keeping aircraft in the fight, the CG's words are a necessary wake-up call. In the hangars and classrooms of the 1-210th Aviation Regiment, 128th Aviation Brigade, leaders have been discussing crafting a warfighting culture from an aviation maintenance perspective with urgency and pride. The consensus is clear: We need a cultural overhaul. The era of counterinsurgency (COIN) is all our generation has known, and we have some work to do to prepare for the next fight.

Our thoughts are a compilation of voices—they are the shared feedback of 170 aviation maintenance leaders and professionals with more than 20 years of operational and institutional COIN experience. Charged with the sacred responsibility of training the future aviation maintenance Warfighter, we are ready for the challenge but believe a successful transformation requires acknowledging ground-level realities. Crafting an aviation warfighting culture requires leaders to balance the foundational demand for operational readiness (OR) with the developing tactical survivability skill of our sustainers, investing in maintenance noncommissioned officers (NCOs) as our critical operational linchpin.

THE MAINTENANCE NCO: THE CRITICAL LINCHPIN OF CULTURAL CHANGE

To sustain readiness in large-scale combat operations (LSCO), Army Aviation culture recognizes one fundamental truth: Maintenance drives operations. For aircrews to deliver effects, resources, and people at the decisive point in the next conflict, the transformation of the warfighting culture must undeniably start in the maintenance trenches with Soldiers from every 15-series military occupational specialty (MOS). How do we get there?

The entire concept of survivable, dispersed, high-tempo operations rests squarely on the shoulders of our committed NCOs. They remain the critical linchpin between maintenance and operations, leading specialized teams of avionics, armament, airframe, and powerplant experts to generate the combat power required to fight and win. Field



LeJuan Feliciano, guides a trainee on troubleshooting procedures for the UH-60 Black Hawk intercommunications systems, Fort Eustis, Virginia. U.S. Army photo by SSG Dillon Burnhauser.



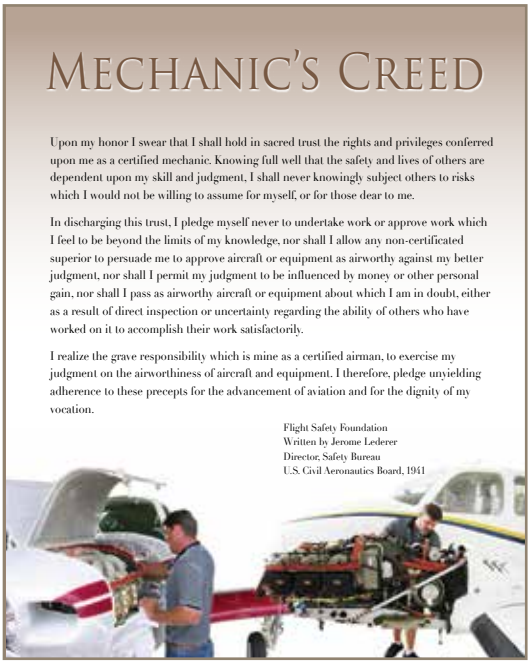
AH-64E Armament/Electrical Systems Repairer (15Y) Training Instructor SSG Ryan McCullough (Ret.), trains Soldiers on removal procedures of the 30mm gun turret, Fort Eustis, Virginia. U.S. Army photo by SSG Dillon Burnhauser.

Manual 3-04, *Army Aviation*, highlights the friction that will exist in LSCO from a maintenance perspective and the ability to sustain operations (Department of the Army, 2025). Dispersed locations and degraded communication will challenge our maintainers to plan and report effectively. Our NCOs possess the unique skills to solve these doctrinal challenges because they speak both languages—operations and maintenance. They understand the aircrew's mission requirements and the 15-series maintenance tasks to generate the necessary combat power.

Transforming our culture will require trust. An aviation maintenance Warfighter understands that their honor is not just a personal attribute; it is a combat multiplier. Trust between the pilot and the maintainer allows the aircrew to fly into the most dangerous situations, confident that the aircraft will perform as designed.

However, this trust does not materialize on its own; the maintenance NCO forges and underwrites this trust. As the ultimate enforcer of standards and technical discipline, the NCO ensures this trust serves as the bedrock of our cultural transformation—shifting our institutional mindset from simply *getting aircraft up* to sustaining combat power in contested environments.

Unlike the centralized, protected maintenance of the COIN era, LSCO will be decentralized, nonpermissive, and relentlessly contested. This unforgiving environment demands a warfighting mindset—shifting maintainers from technical specialists to tactical survivors. These consequences are already visible in our most challenging training environments.



At the National Training Center (NTC), the Army's premier leadership laboratory, the friction of contested logistics routinely takes its toll on rotational training units. Aviation Observer-Controller/Trainers (OC/Ts) from the Eagle Team consistently highlight severe dips in readiness during contested sustainment. As a former Eagle (E03), I have witnessed units consistently struggle to plan and execute aviation maintenance, ultimately failing to generate combat power while under relentless attack from a world-class opposing force. In addition, every maintenance NCO leading a small, forward team becomes a node of operational endurance, and their ability to conduct critical repairs under direct threat is what will generate combat power. In this role, they are the direct link between the tactical assembly area's reality and the aircrew's ability to continue the fight. They are, in effect, the front line of contested logistics. The cost of not adopting an aviation warfighting culture will, without a doubt, result in mission failure. Are we ready to balance building warfighting proficiency with generating readiness? How do we get after it?

REBALANCING 'AIRCRAFT UP' WITH WARFIGHTER DOWNRANGE

SFC Russell Gambrell is a 15R (AH-64 Helicopter Repairer) and a former Combat Engineer with more than 8 years of aviation maintenance leadership experience ranging from Quality Control (QC) NCO in charge (NCOIC), technical inspector, and Platoon SGT. He believes the most immediate and critical challenge is the deeply ingrained 'get the aircraft up' mentality. Historically, we have intrinsically linked our unit's reputation and perceived operational effectiveness to the OR rate. We must evaluate whether this focus is merely a symptom of our past culture, or if the unrelenting drive for high OR rates is actively dictating our current culture.

From a maintenance perspective, adopting a warfighting culture will challenge leadership to accept that sharpening basic soldiering skills, conducting home station small-team tactical training, and sending personnel to warfighting schools may temporarily affect aircraft availability. SFC Matthew Frederickson is a seasoned 15L (Aircraft Electrician) with more than 8 years of aviation maintenance leadership experience ranging from QC NCOIC, Advanced Leader Course Instructor, and Platoon SGT. He describes the cost of increasing warfighting readiness as a *time tax* leaders will need to pay to build proficiency. We need a fundamental shift where warfighting proficiency is rewarded like an OR rate. Until then, the basic skills of shoot, move, and communicate

could continue to be a secondary priority to the immediate task of maintenance.

OPERATIONALIZING THE MAINTENANCE WARFIGHTING CULTURE

To operationalize this culture, we recommend a series of targeted investments in our formations. We, as a branch, should seek opportunities and incentivize our top performing aviation maintenance leaders to courses such as Ranger and Sapper School to build the resident grit and survivability expertise required for contested logistics. Simultaneously, we recommend tapping into the existing tactical DNA of our prior combat arms MOS-transition leaders, actively utilizing them as force multipliers. Institutionally, we recommend overhauling schoolhouse programs of instruction with rigorous LSCO vignettes to shape the warfighting mindset from day one. Finally, we recommend accelerating the development of our instructor bench by sending seasoned leaders to the Air Cavalry Leader's Course to master the latest tactical procedures.

Developing an aviation maintenance warfighting culture requires consistent 'reps and sets' to shift our training focus from a static COIN mindset operating from the rear to the dynamic realities of LSCO. SSG Matthew Cunningham is a 15N (Avionic Mechanic) and former Infantryman with more than 6 years of aviation maintenance leadership experience. He has served in positions ranging from avionic line supervisor to battalion aviation maintenance training program manager and believes our Soldiers *lack urgency* to adopt a mental shift in the warfighting culture because no one has trained them for it. Leaders would have to be creative in developing and practicing tactics for dispersed operations under the threat of high-intensity fires, including defending against drone attacks in tactical assembly areas and areas for forward arming and refueling. Our exercises could simulate realistic logistical constraints at distance, forcing us to travel light, do more with less, and make



AH-64E Attack Helicopter Repairer (15R) Training Instructor SSG Donovan Richards, identifies Apache tail rotor components, Fort Eustis, Virginia. U.S. Army photo by SSG Dillon Burnhauser.

difficult choices, as opposed to operating from the hangar.

CONCLUSION: WE CAN ADAPT, BUT WE HAVE WORK TO DO

As MG Gill notes, "some might argue that we don't need change; we just need to focus on the fundamentals" (Gill, 2025, p. 10). We acknowledge the perspective of our teammates that time is a finite resource, a reality now compounded by balancing new force structure and budgetary constraints. To maximize these limited hours, a maintainer's primary duty must be turning wrenches, relying on unmatched technical proficiency rather than elite tactical skills. If sustainment forces operate from a secure rear echelon, investing in field craft appears unnecessary. Many operational leaders rightly express concern that losing personnel to non-technical training will inevitably cause maintenance readiness to suffer.

Cultivating an aviation maintenance warfighting culture requires reconciling these competing priorities. We can neither sacrifice aircraft readiness, nor can we ignore the contested realities of LSCO. The challenge before us is collaboratively finding that balance—ensuring our Soldiers possess technical mastery today alongside tactical survivability tomorrow.

MG Gill's article is a direct appeal for Army Aviation to reorient its professional identity toward the demands of modern, large-scale warfare. Our response offers an operational and institutional perspective on how to achieve this with a spotlight on the linchpin of our branch—the maintenance NCO. We believe in continued dialogue, collaboration, and even a willingness to 'break things' to drive deliberate, sustainable action. Can the aviation maintenance community embrace this new culture? We understand the stakes. But we cannot do it without a parallel shift in how the Enterprise measures success, invests in leader development, and trains for the brutal realities of LSCO.

The institutional force is ready to do its part in driving this cultural evolution alongside the operational force, demonstrating that a lethal aviation warfighter culture begins with how we train the future aviation maintenance Warfighter today.

Biographies:

LTC Wayne "Griff" Griffin, Jr., is the Commander of 1-210th Aviation Regiment, 128th Aviation Brigade, Fort Eustis, Virginia. Qualified in the AH-64D/E, his previous assignments included OC/T, Eagle 03, NTC, and Brigade S3 1Air Cavalry Brigade and Battalion S3/Executive Officer, 1-227th Aviation Battalion, Fort Hood, Texas.

MAJ Lee Jones is the Brigade Operations Officer for 128th Aviation Brigade. Qualified in the UH-60L/M, UH-72, and OH-58D, his previous assignments include G5 planner, North Atlantic Treaty Organization Land Command; S3/Executive Officer, 3-25 General Support Aviation Battalion; Battalion Aviation Officer, 1-10 Special Forces Group (A); and Troop Commander, B/2-6 Cavalry.

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Lessons Learned: Airspace Integration in Support of Multidomain Operations and Training

The MDC-E launches high-altitude balloons at Arcane Thunder 26. U.S. Army photo by CPT Victoria Connell.

By LTC T. Jordan Terry, CW3 Harry R. Wise, III., SSG Shiv K. Zachariah, and SSG Spencer E. Meadows

Introduction

From 07 April to 07 May 2026, Multi-Domain Command–Europe (MDC-E)[1] executed Exercise Arcane Thunder 26, linking four training locations across the world to synchronize and converge multidomain kill webs (kinetic and non-kinetic) with a focus on technology development and building readiness for the European theater. In combination with cyber and space training at locations in Europe, MDC-E executed live multidomain operations (MDO) training at the National Training Center (NTC) and the Nevada Test and Training Range. The exercise relied on integrating high-altitude balloons (HABs), various unmanned aircraft systems (UAS), one-way kinetic attack platforms, ground/air launched effects (LE), unmanned airborne supply delivery systems, artillery fires, and electronic warfare payloads in order to sense and strike against a realistic threat. Arcane Thunder's success depended heavily on detailed airspace planning, close coordination with technology vendors, and the technical expertise of Aviation Soldiers. The MDC-E G3 Air team experience with Arcane Thunder offers numerous insights for the Aviation Enterprise as the Army continues to focus resources, doctrine, and training on the MDO battlefield.

MDO Exercise Planning

The MDC-E G3 Air team consisted of a 15B Aviation Officer, a 150A Air Traffic and Air Space Management technician, and three 15Q Airspace Command and Control (AC2) Noncommissioned Officers (NCOs). The G3 Air team leveraged deep understanding of airspace structures, Federal Aviation Administration (FAA) and Army regulations, local procedure guides, risk management, and the Tactical Airspace Integration System (TAIS) throughout the planning process. Additionally, airspace planners rapidly acquired new knowledge about the capabilities and employment of emergent technologies. As planning kicked off 6 months prior to execution, MDC-E airspace planners focused on three critical efforts.

First, airspace planners assisted with securing suitable training areas that nested with the MDO concept of employment, exercise design, and budgetary constraints. The key concern for suitability was providing as much flexibility and maneuver space as possible for the primary training audience and the technology platforms to be employed. Overly restrictive airspace or procedures would severely hinder dynamic training with overly scripted execution. Effectively employing UAS and LE demanded vast segments of restricted airspace, considering many of the employed technology platforms currently lack transponders or Automatic Dependent Surveillance-Broadcast (ADS-B). No single restricted airspace is currently large enough to support the complete flight profile and scope of HAB operations; MDC-E planners coordinated with civil and military authorities to weave together elements of civil and special use airspace across

[1] Multi-Domain Command–Europe incorporates elements formerly organized as the 56th Artillery Command and the 2D Multi-Domain Task Force.

the broader Mojave region. Additionally, planners coordinated with numerous Air Route Traffic Control Centers to facilitate flights through the national airspace infrastructure. Even these vast areas did not fully facilitate sufficient float time for HABs, so planners successfully coordinated access to sufficient airspace with pre-coordinated procedures to operate safely and expeditiously across southern California, including balloon launches and recovery on municipal and federal land.

Second, airspace planners coordinated to support airspace requirements for a wide range of technology platforms with varying degrees of technological maturity. G3 Air planners structured airspace coordination measures to support low-level, high-speed small UAS, one-way attack ground LEs, high-altitude UAS, air-dropped kinetic effects, and numerous other air-employed technologies. It was crucial for there to be a deep technical understanding of vendor systems and platform capabilities for route development, procedural considerations, and coordination with the appropriate airspace controlling agencies. Early on, airspace planners engaged vendors to understand performance envelopes, emergency procedures, communication equipment, transponder capabilities, endurance considerations, and airworthiness release statuses or FAA Certificates of Authorization. Several platforms did not field ADS-B/transponders or lighting; operating without these systems resulted in geographic and operational time restrictions. Planners also encountered (but overcame) significant friction with late-addition technologies requiring a surge of coordination to amend agreements and procedures developed with airspace authorities. Multidomain operations require synchronization of diverse mission platforms in the air, and airspace planners must fully account for technology capabilities and limitations in the exercise design and airspace resourcing of training.

Finally, the MDC-E G3 Air team deliberately planned to synchronize parallel efforts in support of Exercise Control, or EXCON, (real-world airspace coordination) and the training audience (providing higher headquarters airspace management support). To accomplish this, airspace planners coordinated a split footprint at both the EXCON command post and the Blue Force command post, which included the UAS flight line. Airspace planners ultimately facilitated safe training in compliance with regulatory and procedural requirements while making access to airspace as seamless and transparent as possible for the primary training audience. In this sense, the airspace team executed typical higher command and Observer Coach/Trainer (OC/T) duties in parallel.

AC2 During MDO Training Execution

Successfully maintaining AC2 while executing MDO training required exhaustive and continuous coordination. Unmanned aircraft systems and LE operations leveraged established routes, restricted operating zones (ROZs), and lost-link protocols pre-coordinated with restricted area airspace control authorities. Every launch required NTC airspace approval to operate within synchronized ROZs. To deconflict fires, airspace planners collaborated with range control and NTC airspace management to establish ROZs, protecting internal assets while maintaining safety for external aviation and ground units. Airspace planners exercised additional consideration to avoid interrupting the simultaneous training of a rotational training unit at the NTC. To facilitate this deconfliction, airspace planners submitted a Unit Airspace Plan through TAIS as part of the NTC 52D Infantry Division rotational Airspace Coordination Order, which accurately simulated real-world airspace C2 processes in an operational environment.

A more salient challenge, however, was the integration of HAB operations with



Soldiers experiment with technology during Arcane Thunder. U.S. Army photo by SSG Rajheem Dixon.

concern for constantly changing wind patterns between the surface and 60,000+ feet mean sea level (MSL). To ensure safe and legal operations, airspace planners developed a rigorous procedural framework, typically employing a 48-hour planning cycle. Once HAB planners identified a launch location suitable for mission execution based on wind patterns, planners issued a Notice to Air Missions (previously called Notice to Airmen) and provided a 24-hour projected trajectory to all affected airspace control authorities to ensure shared situational awareness. After securing approval and transponder codes from the R-2508 scheduling office, planners distributed more comprehensive flight plan graphics to all users. Precise notifications to radar control facilities were delivered at the 60, 30, and 15-minute marks prior to launch in accordance with 14 Code of Federal Regulations (CFR) Part 101, *Moored Balloons, Kites, Amateur Rockets, and Unmanned Free Balloons* (2026). During the mission, G3 Air planners notified airspace authorities when a HAB reached an operating altitude above 60,000 feet MSL, with final reports provided upon intention to terminate the HAB and verify the landing location and ground status.

In the highly condensed airspace of modern MDO, deliberate and constant airspace management is an imperative, especially at the distances and altitudes involved with diverse technology platforms and with consideration to the wide array of airspace stakeholders supporting the exercise.

Insights

As a result of detailed airspace integration for Arcane Thunder 26, MDC-E successfully qualified the Multi-Domain Company Team, certified the Multi-Domain Effects Battalion, executed multidomain sense-to-kill webs, integrated with the Germany-based MDC-E All-Domain Operations Center, and employed more than 40 new technology platforms, providing key feedback to industry and the MDO Enterprise. Additionally, MDC-E sustained trust with civil and military airspace authorities with no reported airspace violations or procedural excursions over 3 weeks of dynamic training spanning an area of more than 122,500 square nautical miles. The exercise exposed three key insights for aviation professionals:

1) Army organizations at all echelons must deliberately integrate Aviation Soldiers into planning and execution of MDO and training. While many Army branches contribute their technical expertise to the cyber, space, information, electronic warfare, lethal fires, and intelligence aspects of MDO, the unique knowledge, skills, and attributes of Aviation Soldiers remain irreplaceable. During Arcane Thunder, Aviation Soldiers added mature understanding of airspace structures; regulatory and procedural requirements; aviation weather; Army Regulation 95-1, *Flight Regulations* (2018); 14 CFR Part 101 (2026); 14 CFR Part 107, *Small Unmanned Aircraft Systems* (2016); risk management; command post operations; and combined arms operations planning.

"In the highly condensed airspace of modern MDO, deliberate and constant airspace management is an imperative, especially at the distances and altitudes involved with diverse technology platforms and with consideration to the wide array of airspace stakeholders supporting the exercise."

2) Even as efforts hasten to automate airspace integration to rapidly facilitate fires, manned aviation, unmanned/autonomous platforms, and LEs, there is still a critical requirement for deliberate planning and human-centric airspace coordination to facilitate MDO training. Future airspace management tools should also consider integrating into the national airspace for training beyond the boundaries of the Department of War's restricted areas and proving grounds.

3) The Aviation Enterprise and industry partners must balance engineering technology solutions purely to facilitate garrison-based training (transponders, lighting, communications, etc.) while continuing to accelerate the acquisition of simple, low-cost, go-to-war platforms without a combat requirement for such features. The Aviation Enterprise should consider refining regulatory requirements with the FAA to progress tech development, fielding, and training. Additionally, up/down-select processes for future MDO experimentation events should specify the technology requirements for vendors with consideration to the planned training area constraints.

Conclusion

Arcane Thunder 2026 demonstrated that aviation leaders and expertise are critical prerequisites to execute MDO. The Aviation Enterprise should continue to invest talent, training, and resources into formations and technology focused on tackling the MDO frontier—in training and in combat.

Biographies:

LTC Jordan Terry is a Senior Aviator serving as the MDC-E G3 Air Officer in Charge. Rated in the OH-58D and UH-60M/V, he has previously served in air cavalry, air assault, and air traffic control formations.

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Recalibrating Rotary-Wing Survivability in a Drone-Saturated World

By CW3 James L. Andreasen

The Roads Into Ukraine

The roads leading into Ukraine look different from the roads on which American Soldiers train. Long sections of these routes are covered by overhead netting and supported by wooden posts and metal frames. The purpose of the netting is simple—to prevent strike drones from diving directly onto vehicles traveling along the road. Additionally, public reporting has described "white anti-drone netting now draped over roads" throughout many cities in Ukraine (Brizard, 2026). Figure 1 demonstrates this type of netted corridor.

Looking at the netted corridor makes one thing immediately clear. Unmanned aircraft systems (UAS) have already changed how modern battlefields function. Infrastructure, movement patterns, camouflage, and defensive planning are influenced by the constant presence of drones overhead.

This crude but effective solution forces a critical realization for Army Aviation. If ground convoys require such extensive protection just to move, forward arming and refueling points (FARPs) face an extreme survival challenge in the same environment.

The Security Assistance Group-Ukraine

"The U.S. Army's headquarters for Ukraine security assistance is the Security Assistance Group–Ukraine (SAG-U)" (U.S. Army Europe and Africa, 2026), and the SAG-U is a "coalition of over 50 nations that trains, equips, sustains, and advises Ukraine," (SAG-U Public Affairs, 2023). Last year, I worked with SAG-U regarding unmanned systems forces. My focus was on connecting American analytical capability with Ukrainian operational experience.

That focus revealed a gap between how the United States discusses drone warfare and how it is actually unfolding on the battlefield. Most American discussions focus on individual strike videos or isolated tactical events. Ukrainian units, however, employ drones continuously across reconnaissance, strike operations, electronic warfare, targeting networks, and logistics tasks. Equipment and tactics evolve constantly because operators analyze each mission's results and incorporate adjustments into the next round of operations. The cycle, from observation to adaptation, often occurs in weeks or days.



Figure 1. Anti-drone netting covers a roadway. Photo provided by CW3 James L. Andreasen.

A Battlefield Built Around Drones

This pace of iteration affects every layer of the battlefield. The airspace, from the surface to 3,000 feet above ground level (AGL), is saturated with small, fast, and lethal drones. First person view (FPV) and interceptor drones are now an air-to-air threat capable of engaging and destroying helicopters in flight, as demonstrated by multiple Russian Mi-8 and Ka-52 losses to Ukrainian FPV systems (Hodunova, 2025; Romanenko, 2026). Our current aircraft survivability equipment is not designed to defeat optically guided, wire-controlled, or operator-piloted high-speed drones.

This threat is compounded by a critical identification shortfall. In Ukraine, friendly and enemy UAS often operate in the same low-altitude airspace, and unit-level identification methods are not yet universal. The Ukraine DELTA's broader ecosystem includes the UA DroneID application as one response to this challenge, but the lesson for Army Aviation is larger: Without a universal, reliable Identification Friend or Foe (IFF) protocol for unmanned systems, fratricide becomes a persistent risk in any drone-saturated airspace (Bondar, 2024).

The DELTA Ecosystem: A Universal Combat Multiplier

Ukraine's DELTA system is a modular, battle-hardened digital core that demonstrates the profound power of a fully networked battlefield. This software fuses intelligence, surveillance, reconnaissance, communications, and targeting data into a single ecosystem. DELTA integrates information from drones, satellites, stationary cameras, sensors, and reconnaissance units to create a common operating picture that supports near-real-time situational awareness and battlefield decision-making (Bondar, 2024).

The capability this system provides is highly useful for modern combat operations. Because DELTA uses a cloud-based architecture and can be accessed through web browsers and mobile applications, it can provide shared operational awareness without tying every user to a single hardware solution (Bondar, 2024). DELTA turns the familiar vertical kill chain into a horizontal *kill web* (Andreasen, 2026). The United States Army requires a comparable system available to all Soldiers everywhere.

While the Tactical Assault Kit (TAK), including Android Team Awareness Kit and Windows Team Awareness Kit, provides critical situational awareness, it is currently insufficient to serve as this universal solution. Because the TAK is application-based and relies heavily on client-side processing, it often struggles to ingest and distribute the massive volume of real-time sensor data produced by a drone-saturated battlefield without overwhelming tactical networks. We must urgently evolve our battle command systems into a lightweight, web-based architecture accessible from any secure device.

For Army Aviation, integrating a DELTA-like digital architecture directly into our cockpits would provide rotary-wing crews with immediate, actionable targeting data and precise threat locations long before they expose their aircraft to the enemy.

Adapting for Survival: An Actionable Framework for Army Aviation

The United States retains enormous technological ability and the most capable military force in the world. Adapting to the drone environment will require deliberate effort across training, doctrine, and procurement. Recent drone strikes against helicopters at temporary field landing and refueling sites demonstrate why static aviation sustainment nodes cannot assume sanctuary, even deep behind the forward line of troops (Konyk, 2026).

- **FARP Survival**: The traditional four-point FARP is obsolete in a drone-saturated environment. We must evolve to a *Jump FARP* model emphasizing extreme dispersal, rapid displacement, and integrated Counter-UAS capabilities. Ground crews must be trained to operate as mobile, concealed, and self-defended elements.

Russian Ministry of Defense imagery shows Ukrainian Mi-8 helicopters at a field landing area before and during a cluster-munition strike, providing a visual example of how exposed rotary-wing operating sites can be targeted once detected by UAS-enabled reconnaissance and fires (Army Recognition, 2024; Figures 2 and 3).

- **Manned-Unmanned Teaming at the Micro Level**: The future of rotary-wing attack involves high-speed, ultra low-level attack profiles designated by a separate, disposable UAS. Our manned crews must be trained to receive fireable data from these systems, allowing them to remain masked and reduce their exposure. The requirement for a DELTA-type U.S. system is paramount.

- **Mastering Terrain Flight**: Operating at nap-of-the-earth (NOE) altitudes must become the standard in high-threat environments. This perishable skill requires constant, rigorous training. Com-



Figure 2. Russian Ministry of Defense-released imagery, published by Army Recognition, shows a Ukrainian Mi-8 helicopter at a field landing area before a reported strike. The image is included to illustrate the vulnerability of exposed rotary-wing operating sites once observed by UAS. Screenshot from Russian Ministry of Defense video via Army Recognition (2024).

manders must prioritize terrain flight below 200 feet AGL as the rule, rather than the exception, and further prioritize NOE flight profiles within that envelope to maximize masking and survivability.

- **Accelerating and Integrating Technology**: We must urgently field a universal IFF system for all friendly unmanned aircraft to prevent fratricide in congested airspaces, while simultaneously fielding web-based, cloud-native digital architectures to process the resulting data.

American Casualties and a call to Action

The consequences of failing to adapt are already visible.

On March 1, 2026, an Iranian one-way attack drone struck a tactical operations center at Port Shuaiba, Kuwait. The strike killed six United States Army Reserve Soldiers from the 103D Sustainment Command, and more than 30 service members remained hospitalized with serious injuries in the days after the attack (Jacobs et al., 2026; U.S. Army Reserve Command, 2026).

Public reporting and satellite imagery indicated that the targeted operations center had limited overhead protection against drone or missile attack (Kelly et al., 2026). Cheap drones possess the ability to threaten advanced military forces and expose our logistical hubs. The deaths of American Soldiers at Port Shuaiba should never have happened.



Figure 3. Russian Ministry of Defense-released unmanned aerial vehicle footage, published by Army Recognition, shows Ukrainian Mi-8 helicopters at a field landing area during a reported cluster-munition strike. The sequence illustrates why FARPs and temporary rotary-wing operating sites require dispersion, concealment, and rapid displacement. Screenshot from Russian Ministry of Defense video via Army Recognition (2024).

The war in Ukraine had already demonstrated how easily drones target exposed positions. The information existed, yet American Soldiers still died from a threat that had already been well documented elsewhere.

For Army Aviation, the margin for error is zero. A single drone penetrating a FARP destroys irreplaceable airframes and cripples combat power. The netted roads in Ukraine and the painful loss at Port Shuaiba are direct warnings. American forces still have time to learn from these developments. The Soldiers already lost to drone attacks demand that our nation adapts now.

The responsibility for the rest of us is to ensure that future losses do not occur because we continue to refuse to apply the lessons that we should have already learned. The time to ACT is now.

Biography:

CW3 James Andreasen is an AH-64E Apache Instructor Pilot and Aviation Mission Survivability Officer at Fort Rucker, Alabama, where he serves as an instructor in the Air Cavalry Leaders Course. Following his work with SAG-U, he now contributes to the development of the UAS Advanced Lethality Course and supports Army Aviation modernization efforts focused on unmanned systems integration.

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THE FORGE OF READINESS: HOW THE 128TH AVIATION BRIGADE IS BUILDING THE FUTURE OF AVIATION MAINTENANCE

CPT Joseph H. Gutoske and MAJ Lee H. Jones

INTRODUCTION

Miles from the battalion headquarters, a small, diverse team of aviation maintainers race against the clock. Their UH-60 Black Hawk is needed for a follow-on mission, and enemy drones fill the skies. The threat of an attack is constantly present. This isn't a scene from a future war movie—it's the future the 128th Aviation Brigade (AB) is training its apprentice aircraft mechanics to face head-on. The nature of warfare has shifted. The era of operating from well-defended, sprawling forward operating bases with predictable supply chains has been replaced by the stark reality of a contested environment. In this new era, the ability to maintain complex aviation assets under threat is not a luxury, it is a mission-critical necessity. The 128th AB is at this shift's forefront and is the institution charged with forging the next generation of Army Aviation's maintenance backbone. Through its initiatives of operationalizing contested maintenance, shifting its training focus to operating in the new environment that defines modern large-scale combat operations (LSCO), and pioneering innovative programs of instruction (POI), the 128th is fundamentally transforming its approach to equip future Army Aviation maintenance professionals with the critical knowledge needed for modern, complex battlefields.

CONTESTED MAINTENANCE TRAINING

Contested maintenance is a radical departure from the past. For the past 2 decades, a maintainer's primary challenge was technical. Today, it is both technical and tactical. The new reality of LSCO demands that Soldiers be able to perform their duties while dispersed, on the move, and under the constant threat of enemy observation and attack. To meet this challenge, the 128th AB moved training beyond the confines of the hangar. In a gritty, realistic field training exercise known as Phoenix Week, students are introduced to the fundamentals of LSCO and contested maintenance. They learn the high-stakes practice of battle damage assessment and repair (BDAR), where split-second decisions regarding airworthiness can mean the difference between life and death. The students conclude with a tactical movement to a downed aircraft, fighting their way through contact to evaluate and evacuate a casualty. All of this occurs while calling for fire and 9-line medical evacuations to showcase their skills forged during Phoenix Week. This culminating event emphasizes the importance of a ***Soldier first*** mindset. In the future of combat, maintainers may very likely find themselves conducting maintenance in a contested environment where they need to know how to *shoot, move, communicate, AND maintain helicopters*, in that order.

SHIFTING THE FUNDAMENTALS

This new operational reality requires more than just new skills—it demands a profound shift in the fundamentals with which we fight. The counterinsurgency-era mentality was defined by routine procedures, scheduled parts replacement, and relatively abundant resources. The LSCO mindset, however, is one of relentless improvisation and resourcefulness. Our maintainers must be re-



U.S. Army Soldiers from the 128th Aviation Brigade ruck down a train track during Phoenix Week at Joint Base Langley-Eustis, Virginia. U.S. Air Force photo by A1C Donnell Ramsey.

sourceful and figure out how to do more with less. Commanders at all echelons should determine the acceptability and approval levels of performing controlled exchanges, cannibalizing non-mission capable aircraft, and decide when it is appropriate to push down to the lowest levels. Army Aviation will require innovative problem solvers at the team level to remain an effective force in a peer or near-peer combat environment.

The 128th is focusing heavily on training the fundamentals in this shift to the modern LSCO battlefield through academic and situational training exercises (STX) during Phoenix Week. Trainees are first taught LSCO basics in a classroom environment, BDAR, downed aircraft recovery teams, and field maintenance. These academic sessions lead to STX lanes—implementing what was previously taught in the classroom—such as dispersion and mobility. This foundational knowledge builds rapidly through the remainder of their Advanced Individual Training and ultimately empowers the students to be Warfighters first and aircraft mechanics second.

Dispersion is a critical doctrinal element in a LSCO fight. United States Air Force (USAF) Doctrine Note 1-21, *Agile Combat Employment*, (ACE) describes a recently introduced doctrine of ACE, which is defined as "**a proactive and reactive operational scheme of maneuver executed within threat timelines to increase survivability while generating combat power**" (USAF, 2022). The USAF is now dispersing its aircraft at multiple, small locations across the theater to complicate enemy targeting while increasing survivability. While the 2025 U.S. Army publication, Field Manual 3-0, *Operations*, discusses dispersion in detail, it is tailored to ground maneuver. Army Aviation must plan in detail for widely dispersed operations across the area of operations. Scattering aviation assets with small teams will present tremendous challenges for the modern aviation Soldier, but it is necessary to preserve the aviation fleet and deny the enemy a clear and lucrative target.

INTEGRATING EMERGING TECHNOLOGY

Supporting this entire evolution is a revolutionary approach to POI development and training device maintenance. The modern classrooms at the 128th are agile and wired for the 21st century. A cornerstone of this innovation is integrating emerging technology. Under 128th AB, the Black Hawk maintainer course is piloting an innovative solution to aircraft maintenance using virtual reality trainers. The students can 'walk through' the intricate steps of removing a UH-60 main landing gear on a digital twin before ever touching the physical aircraft. The 128th is working diligently to source mixed-reality training, which will allow the students to conduct certain critical tasks in the virtual environment, while maintaining the tactile feel of tools. Furthermore, the 128th is beginning to utilize some technological enablers to streamline training device maintenance and procure costly or hard to source components. Through artificial intelligence (AI) platforms, such as the Army AI Integration Center's Griffin tool, the 128th is utilizing predictive algorithms to gain a better understanding of components' high failure rates, while simultaneously and more accurately tracking device usage. The 128th is also beginning the venture of additive manufacturing, or 3-D printing. Training devices in the 128th do not have airworthiness standards like the operational fleet, and 3-D printing costly components will drive down expenditures and speed up the supply process, thereby keeping students on devices. If LSCO is the future of warfare, then digitally enabled, modern instruction is the future of the 128th AB. Resourceful and agile instructors, writers, and commanders should accept nothing less.

CONCLUSION

The three pillars of the 128th AB's strategy—operationalizing contested maintenance, forging a modern LSCO mindset, and innovating instruction—are not separate efforts but a deeply interconnected, cohesive whole. The ***what*** (maintenance under fire) requires the ***how*** (a wartime mentality), and both are built upon the ***foundation*** of a modern, agile institutional training unit. The 128th AB is doing more than just training Soldiers; it is forging adaptable, resilient, and intellectually sharp maintenance professionals who will provide a decisive advantage on any future battlefield. The success of Army pilots and the missions they undertake will always depend on the skill, courage, and ingenuity of the maintainers working on the ground.

Biographies:

CPT Joseph Gutoske is the Company Commander of Company A, 1-210th Aviation Regiment. He has served his time in Army Aviation as a CH-47F pilot. His previous assignments include CH-47 Flight Company Commander at Soto Cano Air Base, Honduras, and Platoon Leader/Assistant S3 within the General Support Aviation Battalion (GSAB) at Fort Bliss, Texas.

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Downed Aircraft Recovery: Lessons From the Box

By SFC Samuel K. Karoki

Introduction

United States Army Aviation provides essential maneuver, combat, and service support to combined arms operations. This mission's success hinges on the ability to sustain, maintain, and recover aircraft downed by enemy action or mechanical failure. However, exercises conducted by downed aircraft recovery teams (DARTs) at the Joint Multinational Readiness Center (JMRC) repeatedly show critical shortfalls that increase risk.

This article, based on observations from the JMRC's Aviation Maintenance Observer Coach/Trainers (OC/Ts), identifies recurring weaknesses in training, equipment integration, and mission execution. It provides actionable best practices to help unit commanders enhance training, integrate equipment, and synchronize enabler support.

Beyond Muscle Memory: The Need for Doctrine-based Planning and Execution

Units winning at DART planning during JMRC rotational exercises leverage essential tools, such as the Problem, Plan, People, Parts, Tools, Training, and Time (P4T3) framework, a critical technique for aviation maintenance planning (Department of the Army [DA], 2020, p. 1-15).

Downed aircraft recovery team planning is seldom augmented using tools and fighting products such as maintenance standard operating procedures (SOPs) and tactical standard operating procedures (TACSOPs) that reflect doctrine, real-time conditions, and lessons learned. This oversight increases the risk of missing critical elements. Developing and issuing reference materials such as SOP annexes, SMART cards, laminated battle damage assessment and repair (BDAR) checklists, pre-execution checklists, or battle drill products prevent the DART from relying solely on muscle memory. The Figure depicts a DART planning example.



A DART combat scenario observed and evaluated by a Falcon Team OC/T at the JMRC. U.S. Army photo provided by the author.

Vignette: The Flawed Launch

A "Fallen Cherub" call
crackles over the radio—broken and unreadable.
A junior Soldier serving as the radio transmission operator,
who is unfamiliar with aviation maintenance, takes copious notes.
His inexperience prevents him from recognizing critical
details and asking clarifying questions.

Confusion shrouds the initial report. The aircrew miscommunicates the fault, mechanics misdiagnose it, or the transmission is cut short. This results in a fundamental misunderstanding of the problem on the ground.

Based on this flawed premise and muscle memory rather than a deliberate, doctrinal process, the unit launches a DART. This wastes critical time and resources. On a modern, sensory-saturated battlefield, uncontested areas can become hostile in minutes. The immediate response to a downed aircraft is the ultimate test of a unit's tactical prowess.

One Team, one Fight: Integrating the DART Effort

Many units perceive the aviation maintenance company (AMC) as solely responsible for aircraft recovery and fail to consider support from other companies. The observed outcomes include an AMC that is task-saturated, poorly resourced, and consistently delayed in executing tasks. The DART should be a concerted effort at echelon; the AMC should not be the unilateral decision and action point. "Building a DART begins by force tailoring … and recovery teams are task organized from any available personnel in the battalion or brigade" (DA, 2021, p. 3-1).

Doctrine, specifically Army Techniques Publication 3-04.13, *Helicopter and Small Aircraft Battle Damage Assessment, Repair, and Recovery*, further requires all aviation support companies and aviation maintenance companies to conduct aircraft recovery and BDAR (DA, 2021). Forward support companies and distribution companies should support transportation and recovery efforts.

DART Launch Criteria: Staff Responsibilities

The S1, S2, S3, S4, S6, Medical team, DART officer-in-charge (OIC), and Noncommissioned OIC provide critical input to inform the commander's decision to launch a DART. Each section has distinct responsibilities:

- S1 (Personnel): Tracks all personnel, equipment, and sensitive items leaving the tactical assembly area.

- S2 (Intelligence): Provides a continuous threat assessment based on the latest intelligence. The S2 continually evaluates area threats to inform the commander's launch decision, advises against inserting a DART into a contested operational environment, and confirms the completion of isolated personnel reports and personnel recovery plan updates.

- S3 (Operations): Functions as the command and control node. The S3 develops operational plans and coordinates all necessary resources by tasking internal assets and requesting external support.

- S4 (Logistics): Delivers a sustainment brief assessing the DART's logistical needs and days of supply. The S4 forecasts the DART package's requirements and determines how to augment it for mission success.

- S6 (Communications): Validates the DART's primary, alternate, contingency, and emergency, or PACE, communication plan. The S6 can also assign personnel to the DART to ensure seamless communication with higher headquarters. The DARTs typically depart without over-the-horizon communication equipment and instead, rely on line-of-sight communications. This is a systemic issue seen across multiple rotations.

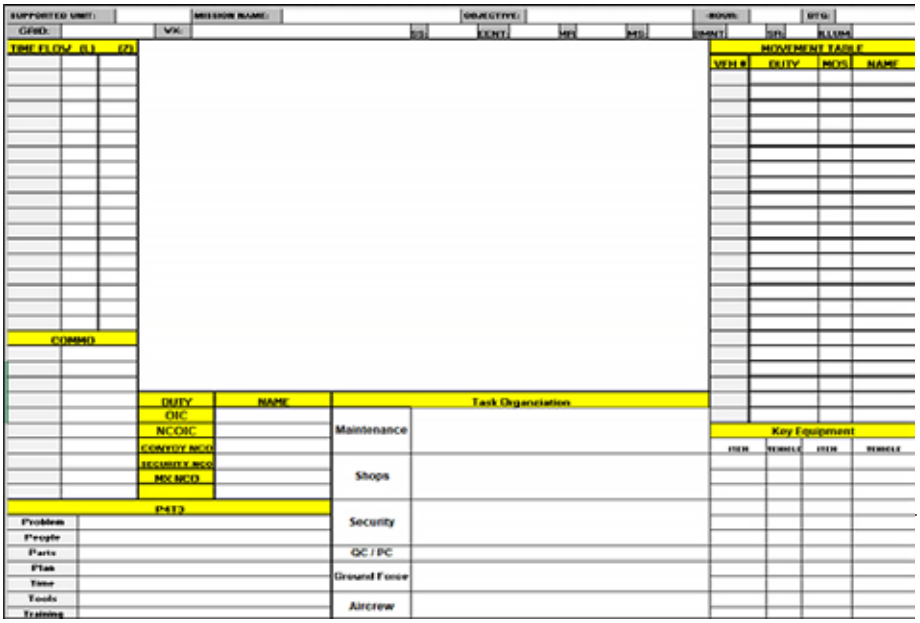

Figure. Example of a DART board delineating tasks and responsibilities. Example board provided by the author.

- Medical Team: Provides the personnel and equipment for tactical combat casualty care. The medical team can also augment the DART to treat casualties or assist with personnel recovery.

Units should not assume the AMC must provide its own security for aircraft recovery. For example, during exercise Saber Junction 25 at the JMRC, the AMC's main command post coordinated with a nearby North Atlantic Treaty Organization (NATO) unit to secure a downed aircraft site. To ensure this type of synchronized effort is the standard, units must outline these shared responsibilities in their TACSOP and conduct joint training to foster command team buy-in and a clear understanding of each element's role.



The medical team serves a dual role on the DART, providing tactical field care and executing personnel recovery missions during aircraft recovery. U.S. Army photo provided by the author.

Winning on the Ground: Mastering Tactical Convoys

Distribution companies in combat aviation brigades are the only organic companies with trucks and trailers large enough to perform aircraft recovery over ground. To enhance mobility over the ground, it is critical for AMCs and aviation support companies to train with distribution companies (DA, 2021). With more than 10 rotations as an OC/T spanning 3 years with the Falcon team at the JMRC, I believe my observations inform the perspective that aviation elements are often ill-prepared to conduct tactical ground-convoy operations. This is irrespective of whether it is as part of DART missions or the rapid displacement of their tactical assembly area. A lack of preparation is common where teams skip rehearsals; neglect vehicle maintenance; and poorly coordinate their intelligence, security, and supply efforts.

Units will fail to receive or prioritize the operations and intelligence brief in the lead-up to the tactical convoy execution. This is critical, as understanding the common operating picture could help identify friendly assets, the threat landscape, and enemy posture to inform route planning. Units almost always have the products to support an execution—such as convoy brief checklists in their TACSOP—but are sometimes unaware of their existence. A combination of poor training, a myopic focus on aviation over ground mobility, apathy, and a weak reading culture causes these shortcomings.



A ground DART from a rotational training unit at the JMRC is engaged by special purpose forces as they exfil the DART location during exercise Saber Junction 25. U.S. Army photo provided by the author.

Aviation maintenance companies often overlook night vision devices because they fail to emphasize night ground-convoy operations. This same neglect appears in their driver training programs, which frequently disregard night driving altogether. Compounding this issue, the ground vehicle fleet is often antiquated or in disrepair. The tools are not only conceptual that units often fail to bring, but also operational capabilities.

Improvement requires a disciplined approach, including integrating convoy operations into mission-essential task lists, standardizing maintenance tracking, and scheduling regular rehearsals. Use convoy and casualty evacuation preparation templates to ensure readiness.

Tip of the Spear: Competence Within our Domain

The most sophisticated BDAR plan was rendered moot by a single dead battery in a power drill. The aviation maintenance OC/Ts at the JMRC often observe this as units execute BDAR complex battlefield injects (CBIs). Battle damage assessment and repair is an important aspect of recovery and field maintenance, as it is an expedient repair putting the aircraft back into service. While units may inspect BDAR kits, they rarely validate their operational readiness. Units inspect BDAR kits for accountability as part of command supply discipline adherence, but operational readiness is rarely consistently and cyclically validated. Most Soldiers have little exposure to BDAR repairs, technical manuals, or field use. This is evidenced by JMRC OC/Ts, whose evaluations of executed performance are informed by their assessments during aviation-related CBIs during combat training center rotations.

Downed aircraft recovery team and BDAR-related CBIs at the JMRC also reveal the significant knowledge gap existing in Army Aviation between experienced Soldiers and junior, inexperienced personnel, mainly due to limited operational, field, and combat exposure. Addressing this gap requires targeted training led by the DART's most experienced personnel. The training plan must be aligned with Army Aviation doctrine tailored to the operational environment and informed by lessons learned.



A unit at the JMRC prepares a downed aircraft for a UMARK lift. U.S. Army photo provided by the author.

Aircraft recovery for the purposes of repair or return to friendly control is sometimes augmented by the Unit Maintenance Aerial Recovery Kit (UMARK). The UMARK is a universal kit utilized to sling all Army rotary-wing aircraft during aerial recovery efforts. The UMARK's capabilities remain underutilized due to a lack of certified personnel and minimal emphasis on in-unit training. Rotational training units have a noticeable knowledge gap with UMARK operations and sling load procedures. Units should track certified sling load inspector certification course, Pathfinder, and Air Assault personnel on the unit manning report with expiration dates noted. Additionally, units should assign qualified personnel to conduct periodic rigging validation during recovery simulations. Units should also expand the use of certification events during field training exercises and partner with local aviation safety officers or certified instructors where necessary.

Conclusion

The shortfalls identified in this article are widespread. To fix them, units must ground their DART operations in doctrine, fully integrate with all support and staff sections, and aggressively close training gaps. The best units already do this—they train for contingencies, plan for the unexpected, and manage risk deliberately.

Mastering aircraft recovery is critical. As Army Aviation advocates for its central role in combined arms operations, it must also be able to answer for its own emergencies. Our ability to self-recover is fundamental to our credibility. Without it, we cease to be a force multiplier and risk becoming a burden on the battlefield.

Biography:

SFC Samuel Karoki is an Army Aviation Noncommissioned Officer with more than 16 years of experience shaping aviation excellence across U.S. Army Forces Command, U.S. Central Command, the Army Transformation and Training Command (formerly Training and Doctrine Command), and NATO-aligned forces. He now serves as an OC/T with Falcon Team at the JMRC, where he evaluates aviation units on mission-critical tasks, including downed aircraft recovery, BDAR, and survivability.

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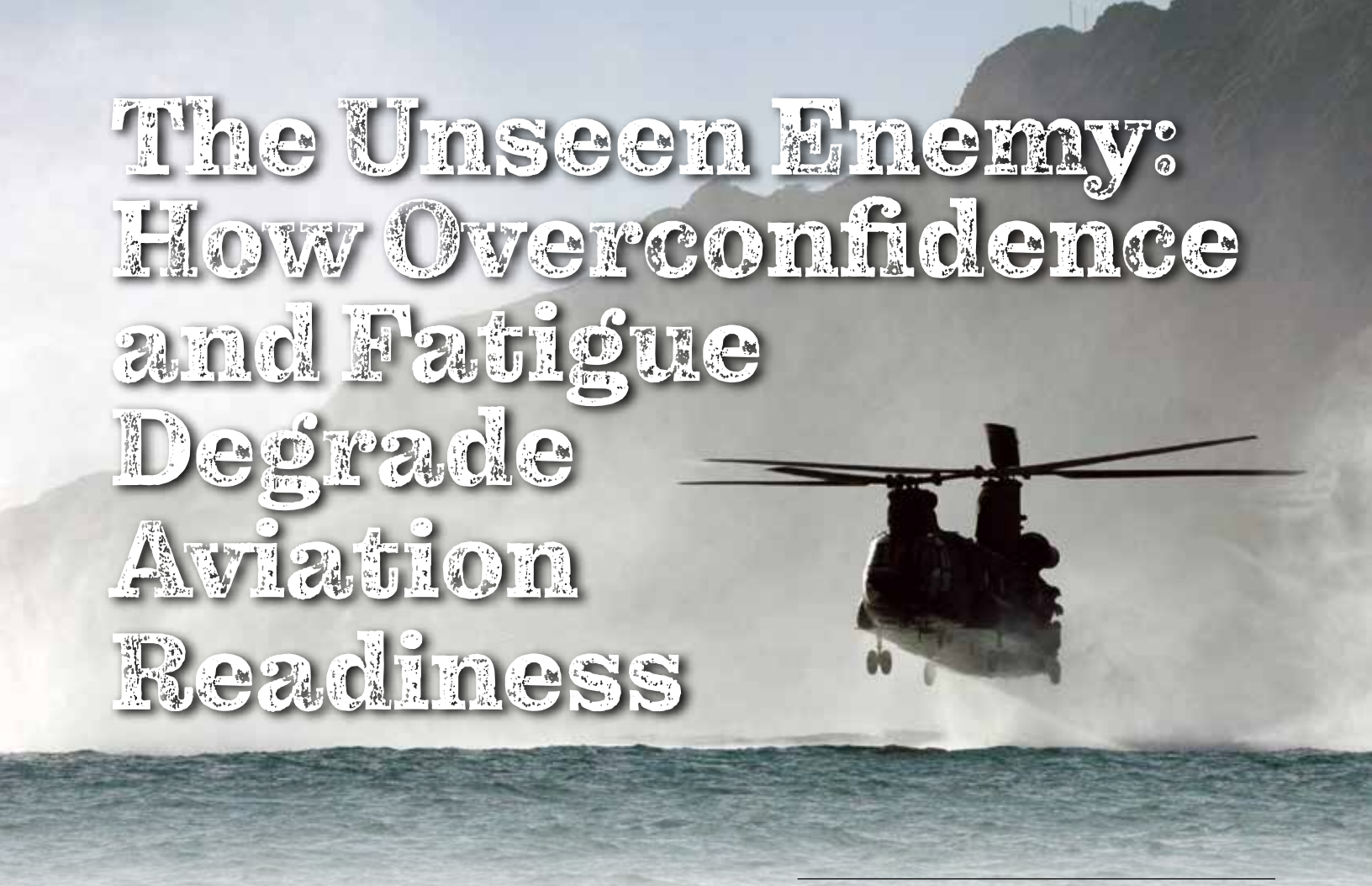
The Unseen Enemy: How Overconfidence and Fatigue Degrade Aviation Readiness



25th CAB's 'Mungadai' training tests leaders' limits as they conduct operations during periods of exhaustion and fatigue. U.S. Army photo by SPC Michael Alberts.

By CW3 George L. Howard and MAJ Ashley H. Howard

Introduction

In Army Aviation, mission success and lethality depend on peak aviator performance. This article examines two insidious human factors degrading that performance: the Dunning-Kruger effect (cognitive overconfidence) and physiological fatigue. These factors, particularly when combined, create a dangerous synergy that impairs judgment and erodes the core competencies outlined in Field Manual (FM) 3-04, *Army Aviation* (Department of the Army [DA], 2025).

Drawing from cognitive science and established Army Aviation doctrine, this article demonstrates how overconfidence can lead aviators to dismiss the clear operational risks of fatigue. Mastering these human factors is not merely a safety concern, it is critical to preserving the force and ensuring air crews are combat effective.

Winning the Fight Within

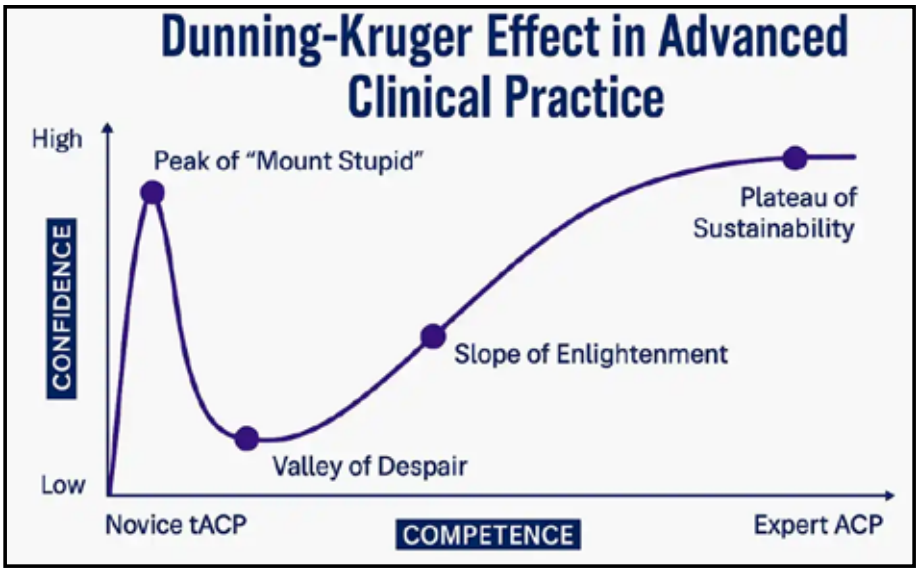
We spend billions of dollars and countless hours training to achieve overmatch, yet we are overlooking a critical fight—the one against our own human limitations. What if our greatest vulnerability is not an enemy's capability, but a pilot's overconfidence? What if the most dangerous threat to a mission is a crew that is simply too tired to make the right call?

Individual biases and pilot fatigue are not abstract concepts for a safety brief; they are persistent threats to our readiness, lethality, and survivability. Yet, we often fail to confront them with the sober rationale they deserve. This is not an article about a new piece of technology or a change in doctrine. It is a hard look at our culture and a call to action. It is about embedding the principles of honest self-assessment and disciplined fatigue management into everything we do, from the flight line to the command post, because the lives of our Soldiers and the success of our missions depend on us winning the fight within ourselves first.

The Dunning-Kruger Effect: A Blind Spot in the Cockpit

The Dunning-Kruger effect is a well-documented cognitive bias in which individuals with low ability not only perform poorly, but more dangerously, are unaware of their poor performance, and tend to overestimate their competence (Kruger & Dunning, 1999). This phenomenon is not a product of simple arrogance but a critical failure of the metacognitive skills required to accurately self-assess. This bias poses a significant risk, and studies confirm its presence among aviation students, suggesting the threat manifests—and must be mitigated—at the earliest stages of a pilot's career (Pavel et al., 2012).

In Army Aviation, this bias can present as a junior aviator overstating



Adapted from the conceptual model of the Dunning-Kruger Effect (Kruger & Dunning, 1999).

proficiency or a crew underestimating mission complexity. The resulting overconfidence creates a dangerous gap between perceived and actual capability, producing flawed, high-risk decisions. As Siems (2016) argues, such biases are not minor personality quirks but direct contributors to operational risk. At its worst, this overconfidence can be a causal factor in catastrophic failure, compromising the mission and presenting an unacceptable threat to the force (Erickson, 2025). Precision and discipline are foundational to aviation culture; this internal blind spot must be addressed head-on through rigorous training and honest self-assessment.

Fatigue: The Corrosive Agent of Readiness

Fatigue is a far more menacing threat than simple tiredness. Training Circular 3-04.93, *Aeromedical Training for Flight Personnel*, defines it as "the state of feeling tired, weary, or sleepy that results from prolonged mental or physical work … or loss of sleep" (DA, 2018, p. 3-10). Army doctrine identifies it as a significant operational concern that degrades performance by reducing "mental alertness" and causing crewmembers "to respond more slowly to situations that require immediate reaction" (p. 8-20). Resulting from sustained operations and the inherent stress of combat, fatigue attacks sound judgment and corrodes the foundation of an aviator's readiness.

In a fatigued state, an aviator's situational awareness narrows, increasing susceptibility to missing critical cues. Research by Wingelaar-Jagt et al. (2021) confirms that fatigue diminishes the cognitive faculties essential for effective piloting, from memory to problem-solving. Effective fatigue management is therefore not a luxury or merely a personal responsibility; it is a critical component of risk management and a doctrinal prerequisite for maintaining combat power.

A Threat Multiplier: When Overconfidence Meets Fatigue

When combined, the Dunning-Kruger effect and fatigue create a dangerous synergy—a threat multiplier that can lead to mission failure. An overconfident aviator is precisely the one most likely to dismiss the warning signs of fatigue, believing they can *push through* the mental and physical strain. That individual may be performing at a higher level than is actually the case, even as cognitive functions actively degrade.

Conversely, a fatigued state further impairs the self-awareness needed to recognize one's own incompetence. This vicious cycle places less experienced aviators at extreme risk, as they often lack the depth of experience to temper their self-assessment and the physiological awareness to recognize the onset of critical fatigue.

The Way Forward: A Call to Action

We talk a good game about human factors. As a community, we nod along during safety briefs and acknowledge the dangers. But are we treating these threats with the same seriousness as a failing engine or an enemy missile system? The honest answer is no. For too long we have treated the most critical component in our aircraft as a secondary concern. It is time to move from passive acknowledgment to active, cultural change—not through a new program—but by recommitting to the standards we already have.

First, training must get real about the human element. Passive classroom instruction on cognitive bias does not build resilience. Aviators need to feel the effects of fatigue and overconfidence through scenarios intentionally designed to induce stress and demonstrate how judgment erodes. As standardization pilots, we have the tools to do this. We must move beyond maneuver-based training and begin pressure-testing the aviator's mind.

Second, commanders must ask whether the after-action review (AAR) is a candid truth session or merely a mission recap. A principle is useless without a culture to support it. We have a professional responsibility to create a climate where an aviator can admit being overwhelmed or tired without fear of reprisal. If crews are afraid to be honest, the AAR is failing, and leaders are blind to the most significant risks in the formation. Candor is a hallmark of strength, not weakness.

Third, we must stop guessing and start measuring. Subjective self-assessments alone are flawed; the Dunning-Kruger effect teaches us that the aviators most at risk are often the least likely to recognize it. Flight Data Monitoring, advanced simulator analytics, and biometric devices offer objective, data-driven feedback. Leaders can use these data to help aviators calibrate self-perception against actual performance.

Finally, we must enforce the Fighter Management Program as the



A United States Army Soldier, along with a medical helicopter pilot, prepare to take off in a civilian medical helicopter to participate in a medical lane course during a Combined Best Warrior Competition. Competitors are evaluated on their individual ability to adapt and overcome challenging scenarios and battle-focused events, testing their technical and tactical abilities under stress and extreme fatigue. U.S. Army Reserve photo by SPC Olivia Cowart.

non-negotiable standard it was always meant to be. Too often, it is treated as a guideline to be bent when convenient. The 12-hour duty day, flying hour limits, and mandatory crew rest are not suggestions; they are our doctrinal defense against fatigue. Commanders must enforce it, and safety officers must monitor it. It is a readiness line-item as critical as fuel in the tanks or hours on the engine. The moment we treat our own endurance as optional is the moment we accept unnecessary risk—a compromise the Army, the mission, and our Soldiers cannot afford.

Note: The authors used artificial intelligence to aid with article editing and clarity. Article content was fully reviewed, edited, and fact-checked by the Army Aviation Digest.

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Re-evaluating the Role of Air Assault Companies in Heavy Divisions: A Call for Transformation

U.S. Army Ordnance School conducts sling load operations for its ammunition specialist trainees. U.S. Army photo by Chad Menegay.

By CW2 Benjamin T. Paddock

A New Paradigm: From Air Assault to Rapid Lift

Air assault companies within heavy division formations must rapidly change course to remain relevant. The current model for air assault companies within these formations has already become obsolete. The Army's focus on Force Design Update, the lessons from the war in Ukraine, and the service's philosophy of the division as the primary maneuver element all send a clear message: These air assault companies should rebrand to *Rapid Lift* and embrace a new operational culture.

This proposed shift does not suggest a complete abandonment of fundamental air assault skills. There will always be a need for these skills, whether for supporting special operations forces within the division's area or conducting scout infiltrations when the terrain and enemy situation permit.

However, in a heavy division, the air movement mission-essential task (MET) should be prioritized over the air assault MET. Currently, the opposite appears to be true. There is an underlying and negligent assumption that proficiency in air assault automatically translates to proficiency in air movement. Compounding this issue is the fact that there are more pilots than available flight hours. This necessitates a serious re-evaluation of training priorities and an acceptance of risk in less critical areas. Units cannot be masters of all tasks, especially when UH-60 units are projected to remain at more than 100% of their authorized personnel strength for the foreseeable future (Seck, 2025).

The Equipment vs. Personnel Challenge

There must be an emphasis in training between moving personnel and moving equipment. Calculating whether a pallet of mixed ammunition will exceed floor-loading limits and determining how to move it expeditiously on and off a landing zone (LZ) are more complex challenges than moving people.

Many ask if heavy machinery can be operated safely under the rotor disk. The answer is often no. An A-frame tent movement at the Joint Multinational Readiness Center (JMRC), for example, requires more than the crew to offload and must also be moved clear before the aircraft can take off, lest it be caught by the rotor wash. Because leaders do not understand that aircrews alone cannot manage these resupply missions, extended times on LZs result. The simplest way to improve survivability is to limit time on an LZ; people are fast, but equipment is slow.

In my experience, a significant portion of crews are either not qualified on external load operations or have not performed such an operation in more than 6 months. In one assault company on a rotation, a little more than half of pilots on the Aircrew Training Program (ATP) were sling-qualified—not all of

whom are qualified for night-vision goggle sling operations—and a majority have not performed the task in more than 6 months, even with it being on their commander's task list. Looking at combat crews, not all UH-60s could be launched for a sling mission based on crew proficiency. This is a travesty in a heavy division where the demand for logistical support is paramount.

Russia learned the hard way that the logistical needs of armored formations are much larger and more fast-paced than many people understand. In 2022, photos of Ukrainian farmers with tractors towing abandoned armored vehicles dealt a great blow to the Russian image and armored campaign (The Armourer's Bench, 2022). In constrained training areas, it is easy to resupply when supply lines are 25 kilometers, but when distances are much farther from resupply points to forward units, the mission becomes much harder (King & Dempsey, 2015, p. 2). There is such a focus on seeking out air assault opportunities that training with support personnel is neglected.

To further break down the logistical needs of heavy divisions, their real limiting factor is fuel, which is a CH-47 problem set. However, the UH-60 could be the method for rapidly delivering critical parts and for maintenance teams to get a vehicle mission capable. UH-60 companies taking ownership of classes of supply transit within their ability would be a small part of the larger resupply effort; however, it would let logistic convoys focus on other needs. The challenge is not revealing battle positions and hide sites, so these resupplies may have to be delivered to the logistical area. If the ground force can afford to wait several days for a resupply, they will simply use the next logistical package. Aviation assets' value is in speed, the ability to traverse terrain inaccessible to ground vehicles, and convenience. Two of these advantages are lost if extensive planning timelines are required before each launch.

The Reality of Air Infiltration in a Modern Threat Environment

Arguably, in a division-level fight, a deliberate air infiltration near or beyond the forward line of own troops would demand to be the number one priority. It would have to be a surgical strike, not sustained, since modern and mobile integrated air defense systems are present (Bronk et al., 2022, p. 26). Ensuring success would require a substantial number of joint enablers. In such a scenario, it is more likely that the 160th Special Operations Aviation Regiment or a light division aviation asset would be tasked with the mission. Aviation units in heavy divisions often lack the requisite level of joint interoperability, expertise, funding, or training time to reduce risk to the level a commander would find acceptable.



A UH-60 helicopter at sunset. Photo provided by the author.

A Disconnect Between Training and Reality

A JMRC rotation involving training with a scout troop from the 1st Infantry Division serves as a case in point. The moment their commander mentioned waiting for the squadron commander and brigade commander to give the go-ahead for the infiltration, it became clear that it would not happen. Sure enough, later that day, the brigade commander only wanted to discuss resupply. During that rotation, the UH-60s provided zero air movement requests in support of the ground maneuver brigade. When the brigade support battalion asked about moving 120-mm rounds and a tank transmission, the aviation element took too long to respond because the concept of heavy division resupply by UH-60s was foreign to both units. These questions should be answered through individual and collective training, not resolved at a combat training center.

At the National Training Center, the primary points of contact for supporting a heavy brigade were the executive officers, who were interested in using



U.S. Soldiers assigned to various units touchdown from a helicopter during Air Assault School in the Grafenwoehr Training Area, Germany. U.S. Army photo by SGT Addison Shinn.

aviation assets for supply lines. Training priorities should shift from sending infantry and scouts for hot/cold load training to focusing on support personnel.

A Proposed Path Forward: Embracing a *Rapid Lift* Mentality

In addition to refocusing on the primary customer, brigade and division support units, a proposed solution is that air assault companies adopt a model similar to the medical evacuation community. By posturing to be more comfortable with ***hours, not days*** from receipt of mission to wheels up, the companies could become relevant to an armor brigade's logistics plan. Develop an operational posture at the start of each mission day, allowing execution of a resupply mission within hours of receiving the tasking; otherwise, it is a mission failure.

The current MET list may not require changes. Air assault can and should remain a task for heavy division UH-60 companies. The tasks are similar, with near-identical prerequisite collective and individual supporting tasks already. A scenario for a UH-60 company to deliberately supply an armored battalion on the attack with personnel and parts could meet all requisites for both air assault and air movement tasks. The same *air assault* planning sequence can be applied to that scenario, from an initial planning conference through the final crew briefs.

The new platform to be fielded for the assault companies, the Bell MV-75 (Cheyenne II), is unlikely to change this operational equation. While its speed and range are improved, this does not alter a heavy division's need from rotary aircraft. The cabin is of a similar dimension to the UH-60, and the increased rotor dimensions will make it harder to get into small LZs (Army Recognition, 2026). This only means staging areas can be farther from the enemy and thus safer, which is the true purpose of the new aircraft.

It is no secret that air assault pilots in heavy divisions are not as proficient as their counterparts in light divisions. It is time to acknowledge these differences and focus on what the actual customer wants, rather than assuming to know better. All we talk about is air assault, yet all we are asked to do is everything but.

Biography:

CW2 Benjamin Paddock is a UH-60 company Aviation Mission Survivability Officer in 3D Combat Aviation Brigade, 3D Infantry Division, with experience on two rotations to European Command. He previously served as an armor officer in a tank and scout platoon in 1st Armored Division, with experience in a general's aide position under Joint Modernization Command out of Fort Bliss, Texas.

The author used Gemini Enterprise artificial intelligence to assist in outlining and drafting their article. The content was fully reviewed, edited, and fact-checked by the Army Aviation Digest, which retains full editorial control.

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SWARMING SMALL UNMANNED AIRCRAFT SYSTEMS FROM MANNED AIRCRAFT



Unmanned aircraft systems conduct a swarm demonstration in preparation for the Joint Pacific Readiness Center Exportable Exercise in Laoag City, Philippines. U.S. Army photo by PFC Hunter Carpenter.

By CW3 David D. Tyo

INTRODUCTION

Two UH-60s swoop low and fast over a dense tree line, bookended with two AH-64s. All eyes are glued to a ridgeline to the east as the flight hurtles toward its release point to the north. The mission: Destroy forward enemy positions to allow freedom of movement for nearby friendly forces.

In the back of the UH-60s, drone crews are strapped into the seats with first-person view (FPV) goggles on their faces. Word from the pilots filters back to the operators that the flight is over the release point, and with a shout from the crew chief, drones begin dropping out from the sling hook hatch. The UH-60s begin a slow climb to allow clearance for their deadly cargo to drop free, and behind the flight of four, the air fills with a swarm of glistening black drones laden with ordnance.

The UH-60s turn to the west into a lazy and low orbit as the newly released swarm hurtles east over the ridgeline toward the enemy positions. The AH-64s break off and follow the drones east en route to their supporting battle position. In the back of the UH-60s, the drone operators push the craft to their maximum speed and climb over the ridgeline before dropping down into the enemies' prepared positions.

Below, the enemy soldiers are barely finished with breakfast before a few seconds' notice of screaming fiberglass rotors overtake them. The lone anti-aircraft gun vehicle explodes, followed by the command vehicle. Confusion and panic reign as soldiers blindly fire into the sky with small arms.

Nearing the ridgeline's crest, the AH-64 crews swipe through each drone's eye view through their on-board tablets and turn their aircraft toward the ensuing melee.

Ground maneuver commanders want drones and their effects at all echelons of the battlefield. But how can they employ them to maximize their effects on the enemy? How can they achieve mass, synchronicity, and lethality while minimizing the danger to their own units?

This is where Army Aviation can help. Masters of aviation planning and tactical execution, existing organic aviation assets, can be used to enable small unmanned aircraft systems (sUAS) to deploy rapidly and in large numbers, achieving surprise and violence of action on unsuspecting enemy formations. This gives maneuver commanders additional battlefield options during the offense or defense, allowing the small drone to extend beyond the normal range of ground-based sUAS operations.

SEE, STRIKE, MOVE, EXTEND

Using existing Army Aviation platforms as drone motherships offers many benefits for the drone operator. Better radio signal propagation—the ability to release drones closer to targets and therefore conserve battery life—aids in operator survivability by becoming a moving target, allows for synchronization of effects with other friendly aviation forces by being included in the aviation planning process and flight itself, reduces overall electronic signature, and minimizes allowable enemy time to react by quickly entering a launch window and exiting the area. This allows speed, surprise, and mass at an unexpected time and place on the battlefield. Please note that this list is not all-inclusive as additional tactics, techniques, and procedures (TTPs) are developed for this maturing capability.

Nesting UAS within our legacy aircraft mission sets benefit Army Aviation as well. Operators within the flight can broadcast live battlefield updates to aircrew and commanders, allowing instantaneous battlefield feedback and development. Retransmitting drones and aircraft extend command and control range for ground-based command elements. Armed platforms can quickly exploit gaps in enemy defenses and inflict maximum damage after being enabled by UAS operators. Assault forces



Figure 1. Air release of sUAS with AH-64s on security. Figure created by CW3 David Tyo.

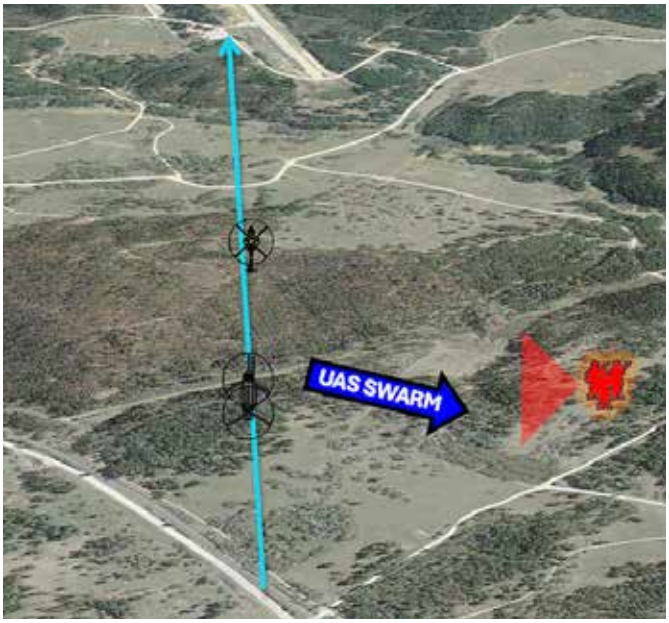

Figure 2. Air release of sUAS during a react to contact while conducting a screening operation. Figure created by CW3 David Tyo.

can be massed deep into enemy territory after a gap is created by sUAS and widened and deepened by aviation attack assets and ground-based fires platforms. Unmanned aircraft system integration is well-nested in current aviation core competencies and fits into every category of See, Strike, Move, Extend, and can be done **today** with little to no added cost.

TECHNIQUES FOR UAS EMPLOYMENT

Aircraft-based UAS seeding can be performed either on the ground or in the air. Deployment can be deliberate based on detailed mission planning or conducted as a hasty task to develop the tactical situation or react to contact. Selection and employment of these techniques depend on aircrew proficiency and tactical or mission requirements and should be identified early in the mission planning process.

Employment of these techniques, particularly in mixed mission design series formations, will demand rigorous air mission commander (AMC) programs and selection criteria. An empowered AMC could have a significant and outsized effect on the battlefield. This AMC can bring attack aviation, UAS, lift, and indirect fire platforms to bear on an enemy in an incredibly violent storm of synchronized effects.

Figure 1 shows an example of a deep attack objective being prepared by ground lager-based UAS seeding. This allows a flight of two UH-60s to release up to 15–20 drones rapidly on the ground and at a sufficient distance, allowing an objective to be prepared prior to a deliberate attack by AH-64s. After launching the UAS, the UH-60s conduct an air or ground lager, staying within UAS control signal range of the objective area. Accompanying AH-64s conduct near and far side security of the ground lager site until the UAS swarm departs the launch area. After allowing for UAS saturation of the objective area, the accompanying AH-64s can then occupy predetermined battle positions against a degraded enemy, having information on their composition and location before exposing themselves to the enemy.

> "SEEDING IS THE ACT OF QUICKLY PLACING PRE-PLANNED MASSED ASSETS IN A GIVEN AREA TO ACHIEVE A DESIRED EFFECT IN AN AREA OF OPERATIONS"
>
> —CW3 DAVID TYO

Figure 2 shows the air release of UAS conducted by a paired AH-64 and CH-47 during a screening route. Upon enemy contact—predesignated point or detection of enemy forces by the flight—the CH-47 releases up to 30 drones via the sling hatch beneath it. The air release is conducted by a mixture of CH-47 crew who are handed UAS by assistant UAS operators. The UAS operators are prepared with FPV goggles and controllers. As the UAS swarm clears the flight, the operators arrange their UAS formation at a predetermined post-launch azimuth, depending on the enemies' direction.

CONCLUSION

Training and Development

Aerial seeding sUAS equipped with munitions, reconnaissance, or other mission packages gives a ground force commander or aviation mission commander maximum flexibility to accomplish the mission and augments attack aviation airframes with additional eyes and firepower, as well as minimizes some of the weaknesses of sUAS platforms. Training programs and TTP development can occur with equipment fielded in units today. This article suggests the creation of aviation and ground maneuver unit task forces to develop and refine TTPs to validate this process. Unmanned aircraft system integration and TTP development within the existing aviation force structure allows the Aviation Branch to continue demonstrating new ways to provide support to our ground forces while increasing lethality.

Biography:

CW3 David Tyo is a Black Hawk SP/IE/AMSO currently assigned to 1AD Combat Aviation Brigade. He is a graduate of the Massachusetts Institute of Technology Lincoln Laboratory Electronic Warfare course. He can be reached at david.d.tyo.mil@army.mil

The 151A Aviation Maintenance Technician Evolution: Enabling Readiness for the Future Fight

Tool icon courtesy of Pixabay.com

By CW5 Donald L. Chambers

The Strategic Imperative

Army Aviation has entered the most significant transformation since the Cold War. The Army Aviation Transformation Initiative (ATI) is reshaping how aviation forces generate readiness, sustain combat power, and support multi-domain operations (MDO) in an increasingly contested operational environment.

Future conflicts against peer and near-peer adversaries will no longer afford the luxury of uncontested logistics, unlimited repair parts, or contractor-heavy maintenance support. Instead, aviation formations must be capable of sustaining combat operations while dispersed across extended battlefields where communications, transportation networks, and supply chains may be degraded or denied.

Within this transformation, the **151A Aviation Maintenance Technician** has become one of Army Aviation's most critical technical leaders.

Far beyond serving as a maintenance manager, today's 151A integrates maintenance operations, logistics, readiness analytics, digital sustainment systems, predictive maintenance technologies, modernization initiatives, and commander decision support across every



Evolution of the 151A Aviation Maintenance Technician. Image provided by the author.



A maintenance crew rebuilds a rotor head after a static mass repair on an AH-64 Apache Helicopter at Pōhakuloa Training Area, Hawaii. U.S. Army photo by SGT Olivia Cowart.

echelon—from the Aviation Brigades to Theater Army, Service Component Commands, and Major Army Command.

The technical warrant officer of tomorrow must understand not only how to repair aircraft, but how to integrate sustainment into operational maneuver.

From "Re-Greening" to Readiness Transformation

MG Lynn Collyar, former Commanding General of the U.S. Army Aviation and Missile Command, initiated the Army's aviation maintenance re-greening effort (Association of the United States Army [AUSA], 2014).

The objective was straightforward. Transition aviation maintenance capability back to Soldiers after years of reliance on contractor logistics support during sustained operations in Iraq and Afghanistan. That initiative fundamentally changed maintenance culture by restoring technical troubleshooting, component repair, maintenance discipline, and leader development.

Today's ATI builds upon that foundation. Instead of simply replacing contractors with Soldiers, the ATI seeks to create an Aviation Sustainment Enterprise capable of operating in denied environments while leveraging digital technologies, predictive analytics, and data-driven decision-making. The focus has shifted from maintaining aircraft after failures occur to predicting failures before they happen.

The Modern Role of the 151A

The 151A serves as the commander's principal advisor for aviation sustainment, maintenance readiness, and logistics integration. Operating across tactical, operational, and strategic levels, the 151A synchronizes:

- Aviation maintenance operations
- Production control
- Technical supply management
- Component repair operations
- Aviation logistics
- Readiness reporting
- Quality assurance
- Aviation maintenance training
- Contract oversight
- Sustainment planning
- Digital maintenance management
- Enterprise logistics integration

Today's 151A must bridge technical expertise with operational planning, ensuring commanders understand not only current readiness, but projected readiness based upon maintenance trends, flying hour programs, parts availability, and operational tempo. The position has evolved into one of Army Aviation's premier systems-integration roles.

Data-Driven Aviation Sustainment

Army Aviation is rapidly adopting data-centric maintenance management. Modern sustainment requires leaders capable of integrating information from:

- Global Combat Support System-Army
- Logistics Information Warehouse
- Integrated Logistics Analysis Program
- Aviation Mission Planning Systems
- Condition-Based Maintenance Plus
- Predictive maintenance technologies
- Readiness analytics
- Supply chain visibility platforms

The future aviation maintenance technician must transform maintenance data into operational decisions. Rather than simply reporting aircraft status, the 151A analyzes trends affecting fleet readiness, identifies emerging systemic failures, recommends resource prioritization, and informs command decisions before readiness declines. Data literacy has become as important as technical proficiency.

Sustainment Aviation in Large-Scale Combat Operations

Future conflicts will demand expeditionary sustainment. Army Aviation units must operate across dispersed locations with reduced logistical support while maintaining operational tempo against technologically advanced adversaries.

The 151A plays a central role in enabling:

- Expeditionary maintenance operations
- Distributed aviation logistics
- Cross-domain sustainment integration
- Rapid damage assessment and repair
- Component recovery operations
- Forward repair capability
- Maintenance prioritization during contested logistics

Commanders require maintenance leaders capable of balancing operational risk with available resources while maintaining combat power under austere conditions.

Modernizing Warrant Officer Education

The continued evolution of Army Aviation demands corresponding changes in professional military education. The redesigned Warrant Officer Basic Course and Warrant Officer Advanced Course and the addition of the Intermediate and Senior Courses

will continue emphasizing technical competence while expanding instruction in:

- Multidomain operations
- Artificial intelligence applications
- Predictive maintenance
- Digital sustainment systems
- Aviation data analytics
- Enterprise logistics
- Readiness forecasting
- Supply chain resilience
- Contract management
- Joint sustainment operations
- Leader development
- Strategic communication

Future aviation maintenance technicians must become equally proficient technicians, logisticians, analysts, educators, and advisors.

The Aviation Maintenance Enterprise

The 151A no longer operates solely within an aviation brigade. Today's warrant officers routinely serve throughout the Army Aviation Enterprise, including:

- Combat Aviation Brigades
- Theater Aviation Commands
- Army Service Component Commands
- Aviation Centers of Excellence
- Army Materiel Command
- U.S. Army Aviation and Missile Command
- Program Executive Offices
- Army Futures Command
- Joint and Combined Headquarters

These assignments require an understanding of modernization programs, acquisition processes, lifecycle sustainment, resource management, and strategic readiness.

The aviation maintenance technician has become a critical link connecting tactical maintenance execution with Enterprise sustainment.

Building Readiness Through Leadership

Technology alone cannot generate readiness. Maintenance excellence remains grounded in disciplined leadership, technical mentorship, and professional development.

The 151A is responsible for developing maintenance leaders capable of:

- Diagnosing complex aircraft discrepancies
- Applying disciplined troubleshooting
- Enforcing maintenance standards
- Developing technical proficiency
- Managing risk
- Building maintenance culture
- Mentoring Soldiers and junior warrant officers



Operation Skyfall: Apache crews refine air to air precision against unmanned aircraft system threats. U.S. Army photo by SGT Scyrrus Corregidor.

Readiness is ultimately built through people. Every aircraft returned to mission-capable status reflects the expertise, leadership, and professionalism of the maintainers behind it.

Looking Beyond 2030

Army Aviation's future will include increasingly sophisticated aircraft, autonomous systems, advanced mission systems, artificial intelligence, and digitally connected sustainment networks.

While technology will continue evolving, the requirement for technically competent aviation maintenance leaders will only grow. The 151A Aviation Maintenance Technician will remain indispensable because technology does not replace leadership—it enhances it.

Future success will depend upon warrant officers capable of integrating technical expertise, operational understanding, strategic logistics, and digital innovation into one cohesive sustainment capability.

Conclusion

The Army ATI 2030 represents more than modernization—it represents a transformation in how aviation readiness is generated, measured, and sustained.

The modern 151A is no longer simply a maintenance expert. They are an operational integrator, logistics strategist, technical advisor, data analyst, mentor, and trusted member of the command team.

As Army Aviation prepares for the challenges of future warfare, the continued development of technically proficient, adaptive, and strategically minded 151A warrant officers will remain essential to ensure aviation formations are ready to fight and win whenever called upon.

The future of Army Aviation readiness will not be defined solely by new aircraft or advanced technology. It will be defined by the leaders entrusted to sustain them.

Biography:

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Reference:

Association of the United States Army. (2014, March 17). *Re-Greening of aviation maintenance.* https://www.ausa.org/articles/re-greening-aviation-maintenance

Fighting in the Deep: How Aviation Coordinator Intelligence Makes Corps Aviation Survivable

By CPT Allen M. Grant, WO1 Nicholas C. Jude, COL Adam R. Bock, and MAJ Preston J. Dihle

Introduction

In a near-peer fight, deep aviation attacks will not fail because manned Army Aviation lacks courage, technology, or capability. They will fail when formations enter the deep with an incomplete air threat picture, poorly synchronized enablers, and a battle rhythm that treats aviation as another consumer of fires instead of a formation that must survive inside the enemy's integrated air defense system. In near-peer conflict, deep aviation attacks are only viable when the combat aviation brigade (CAB) owns the air threat picture and integrates intelligence, targeting, and cross-domain enablers within a synchronized Corps battle rhythm.



A UH-60M firing launched effects. U.S. Army photo provided by SPC Grant Hockley, Brigade Public Affairs Officer.

Warfighter Exercise (WFX) 26-03 forced the 12th CAB staff to confront this reality early. The exercise showed that shaping for ground maneuver while operating in the Corps deep required more than good crews and detailed mission planning. It required disaggregating enemy air defense; prioritizing aviation requirements inside the targeting process; and synchronizing intelligence, fires, cyber, space, and electronic warfare before manned aircraft crossed the line of departure. The Air Mission Approval Brief (AMAB) became the final checkpoint where that convergence was either real or exposed as incomplete, consistent with Army Aviation's emphasis on mission approval as a commander risk decision informed by planning, briefing, and continuous assessment.

Owning the Air Threat Picture

12th CAB's beginning challenge during WFX 26-03 emerged during intelligence preparation of the operational environment. The brigade identified critical intelligence gaps in the enemy air defense picture and made assumptions about when the Corps would gain enough freedom of maneuver in the air domain to support deep attacks and air assaults operations. Those were not minor planning errors; they drove false confidence in mission feasibility. When planners assumed strategic air defense would be destroyed before execution, they built operations on conditions that did not yet exist.

The deeper issue was a mismatch between the Corps' understanding of operational intelligence and the CAB's understanding of the tactical threat to aircraft. That disconnect affected route design, timing, target access, and the survivability calculus at every planning stage. To close this gap, 12th CAB assumed responsibility for consolidating the *Red Air Picture* in the Corps area of operations. That adjustment improved operational environment awareness because it fused operational reporting with the tactical realities of enemy integrated air defense as experienced by aviation planners and survivability experts. For the Corps planning effort, that was the first major aviation lesson of the Warfighter. The CAB must fuse collection, analysis, and air mission survivability planning with tactical aviation systems and aviator planners to build an air threat picture useful for actual mission execution.

Synchronizing Enablers in the Targeting Cycle

That lesson carried directly into the targeting process. The CAB operated inside a 12-hour targeting cycle that had to nest within a 72-hour planning horizon for deep shaping. The process began with the Target Working Group (TWG), where targets were nominated roughly 72 hours before execution, and continued through the Target Coordination Board, where targets were refined and validated before detailed mission planning and final AMAB approval. Army targeting doctrine and Warfighter best practice already reinforce the value of TWGs and decision boards as the places where targeting is integrated across warfighting functions, but WFX 26-03 showed that aviation requirements must be present in those forums from the start—not added later as a coordination detail during final mission planning.

Early execution made that point unmistakable. Within the first 5 air tasking order days, aviation missions routinely failed because enablers were not synchronized, threat assessments were wrong, or expected effects had never actually been confirmed. Poor or assumed battle damage assessment (BDA) fed the next targeting cycle with bad information. That created a chain reaction: Inaccurate BDA led to flawed intelligence assessments, flawed assessments drove poor target nominations, poor nominations led to ineffective enabling plans, and ineffective enabling plans placed aviation at unacceptable risk. The issue was not simply that one mission underperformed—it was that each weak assessment poisoned the next decision cycle.

The turning point came when the CAB integrated the Aviation S2 directly into the TWG, and the intelligence-targeting effort was reinforced with the CAB's tactical air threat assessment. That change mattered because it inserted aviation threat logic into target nomination early enough to shape the plan. Instead of validating targets in the abstract, the working group began to evaluate them through the lens of aircraft survivability, timing, route feasibility, air defense exposure, and the conditions required for launched effects (LE) and manned platforms to survive on the objective. Standardizing multi-source intelligence fusion across the CAB S2 and Corps G2 eliminated conflicting threat pictures at AMAB, reduced replanning time, and enabled more consistent mission approval inside the 72-hour cycle. As enemy integrated air defenses were degraded and the planning process became more disciplined, the CAB's mission success increased.

The intelligence fight after target selection proved just as important as target nomination itself. Once targets were selected, the CAB intelligence section shifted to target tracking and threat development for mission planners. Using available tools to build and refine enemy threat templates, the S2 section assessed likely target location during the intended mission window so planners could determine routes, timing, and actions on the objective. When that assessment was wrong, the cost was immediate. In one case, an unmanned aircraft was shot down by unanticipated air defense, forcing mission cancellation. In another, the target formation was not where it had been assessed, and the wrong formation was struck instead. Those failures were not random friction—they were direct consequences of incomplete fusion between intelligence planners at all echelons.

"Cyber and space matter but so do electronic warfare, suppression and destruction of enemy air defense, ISR, and aviation-delivered fires. Deep aviation cannot *pick up* those effects at execution—it must be built around them during planning."

That friction often surfaced during the AMAB. When the G2 and CAB S2 arrived with different threat pictures, planners lost time, routes changed late, enablers drifted out of alignment, and confidence in the mission eroded. The solution was not simply better briefing discipline. It was broader fusion. Intelligence had to combine reporting with counterfire data, enemy air tracks, and enemy intelligence, surveillance, and reconnaissance (ISR) activity to produce a threat picture relevant to air mission planning. Once that happened, assessments improved, AMABs became more coherent, and mission approvals reflected a shared understanding rather than last-minute reconciliation.

For the CAB, the second major lesson is just as clear as the first: Synchronizing enablers for deep aviation begins at the TWG and must be aligned by the Aviation Coordinator, Fire Support Coordinator, G2, and Cyber Electromagnetic Activities Enterprise throughout planning. Cyber and space matter but so do electronic warfare, suppression and destruction of enemy air defense, ISR, and aviation-delivered fires. Deep aviation cannot *pick up* those effects at execution—it must be built around them during planning.

Echelons-above-brigade enablers ultimately proved decisive in reducing aircraft risk and increasing mission success. Aviation LE were employed in two ways: as an organic means to find and engage enemy assets, and as a layered effect operating alongside manned aviation to increase the density of fires at the objective. In the first four missions, however, aviation LE were largely ineffective because the enabling architecture was not synchronized. Enemy surface-to-air systems quickly detected and destroyed it. When non-lethal effects were timed properly and paired with other enabling actions, LE penetrated farther and contributed meaningfully to the CAB's operational reach. That experience argues for a clear execution standard: LE employment should be tied to synchronized non-lethal effect windows as a condition of mission execution, not treated as an independent capability that can compensate for poor integration.

Intelligence, surveillance, and reconnaissance also proved indispensable, both along the route and at the target. Communication between the Corps collection manager and the CAB S2 was strong; however, friction at the ISR Tactical Controller level often under-

mined otherwise solid planning. When tactical controllers did not understand the aviation mission profile or did not employ ISR assets in a way that supported route surveillance and overwatch, collection was late, incomplete, or tactically irrelevant. When ISR control improved, collection assets reached the target area, provided tactical identification, and reduced uncertainty for manned aircraft. That is a practical lesson with immediate institutional value: ISR Tactical Controllers should be certified against CAB mission profiles, not just against generic collection procedures. The third lesson learned is that deep aviation requires ISR employment tailored to aircraft survivability and timing.

The CAB's Air Mission Survivability Officer (AMSO) role remained central throughout the exercise. Pre-mission planning and refined intelligence allowed the AMSO to build routes using survivability techniques grounded in actual enemy capabilities, not assumptions. By integrating threat overlays with available enablers, the AMSO fused intelligence and operations into a route and risk recommendation the commander could act on. That role matters because survivability is not a product created at the end of planning; it is the result of how well the formation fused intelligence, targeting, and enabling effects from the beginning.

This experience also reinforces the value of the Strategy, Tactics, and Analysis Team, or STAT, as an operational construct for high-intensity conflict. WFX 26-03 showed that a standing team responsible for linking intelligence analysis, targeting refinement, survivability planning, and operational assessment can prevent the exact disconnects crippling early missions. In practice, the formation needed a persistent mechanism to connect what the Corps knew operationally, what the CAB needed tactically, and what the commander had to decide in terms of risk. That is where STAT proved useful—not as an abstract doctrinal label—but as a disciplined way to maintain continuity between targeting, analysis, mission planning, and assessment.

Recommendations

Five recommendations emerged from the exercise and should be treated as enduring requirements for future deep aviation operations. **First**, the CAB S2 should be integrated into the TWG as a permanent requirement; **second**, responsibility for the consolidated air threat picture must be assigned clearly between the CAB and G2, with authorities defined before execution; **third**, ISR Tactical Controllers should be certified against CAB mission profiles to ensure collection supports survivability and route security; **fourth**, LE employment should be tied to synchronized cyber and space windows as a condition for execution; and **fifth**, BDA standards must be enforced before effects are fed back into the next targeting cycle. Army targeting forums exist to integrate these functions across the staff, but WFX 26-03 showed that without discipline in those forums, the process can move fast while still producing the wrong answer.

"The CAB's Air Mission Survivability Officer (AMSO) role remained central throughout the exercise. Pre-mission planning and refined intelligence allowed the AMSO to build routes using survivability techniques grounded in actual enemy capabilities, not assumptions."

Risk Ownership at the Corps Level

There is also a command-level takeaway that cannot be ignored. The Deputy Commanding General-Maneuver and Corps staff, must own the risk for deep aviation operations and should not delegate those decisions to lower echelons. Mission success and aircraft survivability depend on whether the force is properly resourced, whether enablers are synchronized, and whether the threat picture is credible enough to support informed approval. Those are not brigade-level risk decisions when aviation is operating in the Corps deep against an integrated air defense system. Army Aviation's mission approval process is designed to inform commanders before they accept or reject risk, and WFX 26-03 experiences reinforced that the risk decision belongs at the echelon controlling the enabling architecture and operational priorities.

Conclusion

Deep aviation attacks in a near-peer fight will remain viable only when the formation enters the deep with a shared threat picture, synchronized enablers, and command decisions that match the risk. WFX 26-03 showed when the CAB fused multi-source intelligence with tactical survivability planning; when the Corps synchronized cyber, space, electronic warfare, fires, and ISR through the targeting process; and when senior commanders owned mission risk at their level, aviation became more survivable and more lethal. This is the enduring takeaway from the exercise. Deep attacks are not made possible by bold execution alone. They are made possible by a Corps battle rhythm, giving aviation the conditions to survive long enough to matter.

Biographies:

CPT Allen Grant serves as the Brigade S2 for the 12th CAB. He has 6 years of Army experience, including 4 years specializing in aviation.

WO1 Nicholas Jude serves as the All-Source Technician for 12th CAB. He has 14 years of Army experience, including 4 years specializing in aviation.

COL Adam Bock was commissioned as an Aviation Officer holding degrees from Marion Military Institute, Colorado State University, Naval postgraduate school, and the Harvard Kennedy School of Government. COL Bock's assignments include standard leadership and staff positions at the tactical level, as well as command positions in the Army's forward-deployed rotary-wing units in Central America and the Korean theater of operations. In addition, he has developed expertise through key strategic, operational, and institutional assignments, and has completed multiple joint and multinational tours.

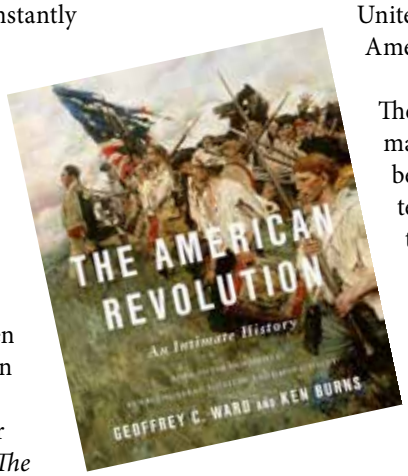
MAJ Preston Dihle is a U.S. Army Intelligence Officer currently serving as Deputy Commander for the 12th CAB. He holds a master's degree in biology from NYU and has multiple overseas assignments including Europe, Afghanistan, and South Korea. His primary interests lie at the intersection of analytic tradecraft, data science, and biosecurity.

The American Revolution: An Intimate History

Authors: Geoffrey C. Ward and Ken Burns: Knopf; 2025; 608 pages

A book review by Dr. Leonard S. Momeny

In 2026, the United States of America turned 250 years old. As a country, America remains young, and this birthday certainly marks a significant time in our shared national history. And while many of our readers potentially recall a great deal about the American Revolution from their time as a student in school, this is a terrific year to once again dive into our national history. Our origin as a nation should remain a powerful light for our hearts and minds, constantly giving us pause to recall that freedom and independence are never to be taken lightly.



The American Revolution: An Intimate History is a companion book to the PBS documentary series by Ken Burns and is primarily written by Geoffrey C. Ward. Yes, Ken Burns is the same filmmaker who produced wildly popular series such as *The Civil War*, *The War*, and *The Vietnam War*. Ken Burns has been widely recognized as America's Storyteller, as he is known for taking large swaths of historical information and transforming them into powerfully vivid histories. This book, *The American Revolution*, brings the filmmaker's eye for detail and storytelling, typically reserved for the screen, and transforms it into a beautiful text.

Ward and Burns open the book with a frank introduction, laying out the challenges that accompany typical historical investigation, citing the complexities of the American origin and how it differs from moments told specifically through popular memory. America was born out of fire, as early colonials had to tame wild lands and carve new opportunities and enterprise from literally nothing, all the while traversing the challenges of a world that was at times overwhelmed with violence. However, the story of the American origin is more than just hard scrabble existence, as Jane Komensky is quoted in the text stating "to believe in America, rooted in the American Revolution, is to believe in possibility" (Ward & Burns, 2025, p. xiii). It would seem the entirety of this book is one that builds to the foundation of American possibility, a feeling that still thrives even today in the minds of all who speak of the United States of America.

The primary motive behind the text seems to be the removal of what the authors think is an overly simplistic understanding regarding the American Revolution. The authors contend the Revolution was a complex engagement between multiple actors. The entire work is supplemented by a variety of perspectives, including accounts from Soldiers, women, Native Americans, and British Loyalists. Additionally, Ward and Burns have further enhanced their work through scholarly insights by the likes of Vincent Brown, Maya Jasanoff, and Alan Taylor. As it is a work meant to serve as a companion to the documentary series, the text is full of paintings, maps, and images of period artifacts. All of these things bring life to the opening moments of our nation's history.

Context aside, the book picks up the story of the Revolution in 1754, at the onset of the French and Indian War, or what the rest of the world called the Seven Years' War. The obvious points of the historical timeline are accounted for, specifically the critical moments of Fort Duquesne and Fort Necessity. These engagements are critical to the development of a young George Washington and the coming nation. By the end of the Seven Years' War, the stage had been set for tensions between America and Britain to simply boil over. After this block of time is reviewed, Burns simply takes things in small chunks of time, e.g., *An Asylum For Mankind* (March 1775–August 1776), or *The Times That Try Men's Souls* (July 1776–January 1777). And while a large portion of the book covers the war in detail, the final chapters actively discuss the "soul of America" and how our collective identity grows based upon the closing moments of the conflict.

Admittedly, my review is wildly simplistic when compared to the actual text and greater history surrounding the American Revolution. However, it is my hope that this book review encourages every reader to either watch the documentary or pick up the book for yourself.[1] After all, the value of the book is that it seeks to inform every reader about the details and complexities comprising the founding moments of the American story. The history surrounding the birth of our nation is one that not only should be protected but also shared.

And so, in light of our nation's 250th birthday, may I encourage all of you to read Ward and Burns (2025), *The American Revolution*. Should you take up this challenge, read the work with an open heart and mind, cast yourself into the historical period, and consider how incredibly brave it was to build a nation from nothing. If you are able to read our collective story in this manner, you are sure to better see why this nation and her gifts of freedom and independence are worth our continued protection and sacrifice.

[1]For more information regarding the documentary, please visit: https://www.pbs.org/show/the-american-revolution/

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U.S. Army Soldiers assigned to the 10th Combat Aviation Brigade, 10th Mountain Division (LI), fly AH-64 Apache helicopters over the Verrazzano-Narrows bridge in New York City, New York. U.S. Army photo by SSG Alexander Kelsall.

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