



Aviation

DIGEST

UNITED STATES ARMY

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HOW WE FIGHT

IN THIS ISSUE:

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THE PROFESSIONAL BULLETIN OF THE ARMY AVIATION BRANCH



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The Doctrine and Tactics Division, Directorate of Training and Doctrine (DOTD), U.S. Army Aviation Center of Excellence, Fort Rucker, AL 36362 produces the *Aviation Digest* quarterly for the professional exchange of information related to all issues pertaining to Army Aviation. The articles presented here contain the opinion and experiences of the authors and should not be construed as approved Army policy or doctrine.

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Archive issues of *Aviation Digest* (1955-2021) are available on the DOTD SharePoint site at <https://armyetaas.sharepoint-mil.us/sites/TR-ACOE-DOTD/SitePages/Directorate-of-Training-and-Docctrine.aspx>.

Issues from 2013-present may be found on the *Aviation Digest* web page.

Submit articles or direct comments pertaining to the *Aviation Digest* to: usarmy.novosel.avncoe.mbx.aviation-digest@army.mil



By Order of the Secretary of the Army:

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U.S. Army 3D Assault Helicopter Battalion, 4th Aviation Regiment, 4th Combat Aviation Brigade, 4th Infantry Division, provide live fire operations with 1st Battalion, 75th Ranger Regiment, during Operation Tandem Hydra at Cannon Air Force Base, New Mexico. U.S. Army photo by SGT Robert Spaulding.

The Command Corner



Learning the Right Lessons

The Concern

As the Army prepares for Large-Scale Combat Operations (LSCO), there is a growing narrative that Army Aviation may not be survivable on the future battlefield. Some prognosticators point to the increasing capabilities of peer and near-peer adversaries who can detect and engage Army aircraft farther and faster than ever before. While this is a concern, we must be vigilant in Army Aviation to examine our tactics, techniques, and procedures (TTPs) as we train to fight in LSCO; the enemy is not invulnerable, and Army Aviation is indeed a decisive, survivable force. We must incorporate the “right” lessons learned as we observe the actions of others in combat and peace to ensure we capture those that apply to us.

Army Aviation enjoyed certain freedoms of operations during counter-insurgency operations that are incongruent with what we will confront operating in a LSCO environment. The luxuries of building up supplies in theater before combat operations, flying at higher altitudes during missions, having a protected footprint for staging areas, static tactical operations centers, forward arming and refueling points, and enjoying air superiority may no longer be realities in this new environment. The adversary will be more lethal and sophisticated. The battlefield will become much more transparent for them...and us. We have vicariously been able to glean these realities from observations of the Ukraine-Russian

War and other recent conflicts. Unfortunately, many who observed aviation employment on both sides, especially early in these conflicts, concluded that aviation would not be survivable in LSCO. The Army Aviation of the USA is not what you see on YouTube reels.

The Correction

The history of warfare is replete with examples of armies learning the wrong lessons from previous conflicts. The U.S. Army's Center of Lessons Learned (CALL) provides a systematic approach to identifying and validating lessons learned. The CALL provides a system in which discovered lessons and best practices are validated, and corrective actions are implemented into doctrine, training, education, leader development, and operations. Using a network of commands, units, and organizations, CALL continuously collaborates on observations to facilitate the integration and sharing of lessons and best practices. It employs a defined and verifiable process translating usable observations into lessons learned applicable to our Army. Some so-called lessons learned from other sources do not undergo the rigors of the CALL process. As such, one may take an observation and elevate it to a lesson learned regardless of the dissimilarities in conditions or comparisons to how the formations fight.

For example, the conclusion that Army Aviation is not survivable in a LSCO

environment is not supported by a thorough analysis of the evidence. While it is true that recent conflicts, such as the Ukraine-Russian War, have highlighted the challenges of operating in contested airspace, Army Aviation neither fights like the Russians...nor the Ukrainians. We understand the threat's integrated air defense systems and posit that our mission planning, flight profiles, terrain masking, and employing aircraft survivability equipment and joint enablers make it a completely different equation! Furthermore, if we are equipped with the Future Long-Range Assault Aircraft and other ecosystems, we increase our collective lethality.

To be sure, we will face several credible threats in LSCO. First, airspace management. The complexities and congestion of future airspace management are disconcerting. We must contend with deconflicting many friendly unmanned and manned systems and defeating comparable enemy systems in the same airspace. After meeting with senior Army leadership, the Future Vertical Lift Cross-Functional Team took on an "airspace sprint" to rapidly experiment and field tools to enhance our situational awareness (of all things airborne, to include munitions) and synchronize assets in the upper-tier of the land domain. Subsequently, in March 2025, the U.S. Army Aviation Center of Excellence (AVCOE) hosted its first Airspace Summit to tackle the totality of these challenges. It was a productive summit and laid out some of the problems we must resolve going forward. Therefore, we must plan now, in peacetime, to mitigate the threats facing us in airspace management. Second, the battlefield is becoming more transparent. We are vulnerable to our adversary's unmanned, cyber, and space systems. The enemy can kill us if he can see us and vice versa. This danger applies not only to Army Aviation but to all our forces. Even the use of cell phones, as observed during the Ukraine-Russian War, can be detected and targeted, and ultimately, units destroyed. On the future LSCO battlefield, transmitters are targets. We will face threats in multiple domains of LSCO and we must learn, adapt, and train to defeat them. That is why we must conduct tough, realistic collective training. This premise supports my last point. Third, AVCOE developed and started the Aviation Tactics Instructor Course (ATIC) in Fiscal Year 2025. The ATIC's purpose is to reorient our formations toward the need for tactical competence, and not just in aviation doctrine but ground scheme and maneuver, as well. Working alongside their unit commanders, the ATIC graduate helps build the tactical proficiency in our formations necessary to fight and win on the battlefield.

There are other threats to Army Aviation, so where do we go from here?

The Conclusion

The survivability of Army Aviation in LSCO is a complex and challenging issue, but it is not insurmountable. I am absolutely convinced Army Aviation will continue to fight and win tonight and on the battlefield of tomorrow. As a combined arms team member, we are committed to the Soldiers on the ground. Several enablers will ensure that we can survive in LSCO: We understand the threat; we develop the TTPs to mitigate and defeat them; we obtain the technology to enhance our weapons and support systems; and we train realistically and rigorously.

For all this to work, we must learn the right lessons and sometimes cultivate success based on the school of hard knocks. In 1412, the English, fighting outnumbered and armed with the longbow, decimated the French forces at Agincourt ("We few, we happy few, we band of brothers"-Shakespeare, Henry V). History often focuses on the English employment of a new technology, the longbow, as the lesson learned for such a decisive defeat of the French forces and the end of the dominance of the French's mounted knights on the battlefield. Ian M. Sullivan, Deputy Chief of Staff, G2 for the U.S. Army Training and Doctrine Command, points out in his 2019 article, *The Myth of Agincourt and Lessons on Army Modernization*,¹ that this was not the French's first rodeo with the longbow; they were familiar with it from the Battles of Crecy in 1346 and Poitiers in 1356, with its lethal and similar results as Agincourt. Perhaps the use of this game-changing technology (the longbow) is only a piece of a lesson learned and not the entire lesson, because despite the English's success at Agincourt and elsewhere, the French still won the war (i.e., The Hundred Years' War).

Today, we must ensure we learn proper lessons about how to fight and apply them correctly. How we fight in Army Aviation is based on sound TTPs that enable us to be lethal and survivable. We are Aviation Warfighters ready to apply the right lessons to win the fight!

Above the Best!

Fly Army!

Clair A. Gill
Major General, USA
Commanding



¹Mr. Sullivan's article is available at <https://madsciblog.tradoc.army.mil/164-the-myth-of-agincourt-and-lessons-on-army-modernization/>



U.S. Army Aviators fly a formation of helicopters supporting Marne Week events. Marne Week brings together currently serving Soldiers, Veterans, Family members, and the community to celebrate the division's legacy and display its fighting spirit, tenacity, and warrior ethos. U.S. Army photo by SGT Savannah Roy.

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Author Guidelines

Articles prepared for *Aviation Digest* should relate directly to Army aviation or reflect a subject that directly relates to the aviation professional. Submit the article to the *Aviation Digest* mailbox at usarmy.novosel.avncoe.mbx.aviation-digest@army.mil.

Please note that *Aviation Digest* does not accept previously published work or simultaneous submissions. This prevents an overlap of material in like publications with a similar or same audience.

Aviation Digest is an open-source publication. As such, we do not accept articles containing For Official Use Only or Classified materials. Please do not submit articles containing Operations Security (OPSEC) violations. If possible, have articles reviewed by an OPSEC officer prior to submission.

Please submit articles via MS Word document format. Articles should not exceed 3500 words. Include a brief biography (50 word maximum) with your article. We invite military authors to include years of military service, significant previous assignments, and aircraft qualifications in their biographies.

Aviation Digest editorial style guidelines follow the American Psychological Association Publication Manual, 7th edition; however, Digest staff will incorporate all necessary grammar, syntax, and style corrections to the text to meet publication standards and redesign visual materials for clarity, as necessary. Please limit references to a maximum of 20 per article. These changes may be coordinated with the authors to ensure the content remains accurate and reflects the author's original thoughts and intent.

Visual materials such as photographs, drawings, charts, or graphs supporting the article should be included as separate enclosures. Please include credits with all photographs. All visual materials should be high-resolution images (preferably set at a resolution of 300 ppi) saved in TIFF or JPEG format. For Official Use Only or Classified images will be rejected.

Non-military authors should submit authorization for *Aviation Digest* to print their material. This can be an email stating that *Aviation Digest* has permission to print the submitted article. Additionally, the author should provide a separate comment indicating that there is no copyright restriction on the use of the submitted material.

The *Aviation Digest* upcoming article deadline and publication schedule is as follows:

July–September 2025 (published on or around 15 August 2025). Submissions closed.

October–December 2025 (published on or around 15 November 2025). Accepting articles now through 15 September 2025.

Authors are asked to observe posted deadlines to ensure the *Aviation Digest* staff has adequate time to receive, edit, and layout materials for publication.



Notices to Air Missions (NOTAMs)

Directorate of Training and Doctrine Director (COL Sean C. Keefe):



The Directorate of Training and Doctrine (DOTD) is actively shaping the future of U.S. Army Aviation through several key initiatives focused on readiness, modernization, and adaptation to the evolving threat landscape.

On March 11, 2025, DOTD published the *Army Aviation Training Strategy*, a vital document outlining how commanders can effectively resource and coordinate training to build capable combined arms organization prepared for large-scale combat operations. This strategy provides the foundational building blocks for progressive training models across the Aviation Enterprise. We encourage all aviation leaders, Soldiers, and Department of the Army (DA) Civilians to review the strategy and provide valuable feedback via the Aviation Digital Department of the Army Form 2028, "Product Change Requests," accessible on the DOTD SharePoint site: <https://armyetaas.sharepoint-mil.us/sites/TR-ACOE-DOTD/SitePages/Directorate-of-Training-and-Doctrine.aspx>

Recognizing the critical importance of unmanned aircraft systems (UAS) in modern warfare, DOTD is spearheading multiple initiatives to maintain our advantage over peer and near-peer adversaries. Notably, the small UAS (SUAS) Lethality Course is currently in development and scheduled to conduct a pilot course at Fort Rucker in August 2025. This multi-week course, a collaborative effort between the Aviation, Maneuver, and Fires Centers of Excellence, will train the Army's best SUAS operators—regardless of military occupational specialty—in advanced offensive tactics utilizing a variety of platforms.

Further standardizing SUAS training, DOTD is assisting the Maneuver Center of Excellence in the development and publication of Training Circular (TC) 3-04.62-1, "SUAS Training," and TC 3-04.62-2, "SUAS Gunnery." These TCs, slated for approval by the Aviation Center of Excellence, will provide critical, standardize guidance for SUAS operators Army-wide, with TC 3-04.62-2 specifically addressing the employment of lethal effects.

Finally, DOTD is conducting a rapid revision of Field Manual (FM) 3-04, "Army Aviation," to align with the recently announced Headquarters, DA Executive Order 222-25, Army Transformation Initiative (ATI). While FM 3-04 was recently released on March 27, 2025, this revision will ensure the capstone aviation doctrine reflects the latest strategic guidance.

For continuous updates and access to a wealth of resources, including planning products and standard operating procedures, request membership to the **Army Unmanned Systems (UxS) Repository** on Microsoft Teams. This valuable resource is maintained by DOTD subject matter experts.

The DOTD remains committed to equipping the U.S. Army with the training and doctrine necessary to remain the world's most lethal and ready fighting force.

Aviation Digest Editor-in-Chief (CPT Phillip Fluke):



Greetings! This message contains information on *Aviation Digest* trends and tips for anyone looking to submit an article in the future.

First, thanks to all the authors who contribute to the journal and share their ideas with the aviation community. To the readers, thanks for staying engaged in the discourse and developments in the aviation branch.

- **Article length.** Most articles submissions are too long relative to their argument or topic. Professional writing is clear, concise, and to the point—not wordy, verbose, and unnecessarily long. Use simple language and only the number of words required to communicate your point, no more and no less. We will consider articles between 800-3,500 words for publication.
- **Directed articles.** I have noticed a flood of submissions that were directed by supervisors or senior leaders. This is good, because engaging in professional discourse and developing writing skills is extremely valuable. I highly encourage leaders to continue commissioning articles with this caveat: If you direct an article, be a part of the writing process. Spend 15 minutes here and there talking with your authors about the article. Help them brainstorm, outline, draft, edit, and revise, especially early on.
- **Collaborate/Proofread.** Authors, shop your article for feedback during every step of the writing process. When you are brainstorming a topic, freewriting, or drafting—seek *critical* feedback. Feedback improves the coherence of your manuscript and the strength of your argument. If the *Aviation Digest* editors are your first stop for feedback, expect long lead times due to the number of articles that we must evaluate and edit.
- **Themes.** The *Aviation Digest* will no longer have quarterly themes such as sustainment, training, maintenance, unmanned aircraft systems, etc. All articles will be considered for publication in an upcoming issue based on relevance and merit.

Doctrine Branch (Branch Chief: MAJ Ross Skilling):

The Aviation Doctrine Branch remains agile during an epoch of continuous transformation in the Army. The rate of innovation in Army organization, personnel, materiel, and tactics drives a need for updated Army doctrine in a timely manner. Recently, Field Manual (FM) 3-04, "Army Aviation," and the *Aviation Training Strategy* were both published in March 2025, culminating 2 years' worth of collaboration across the branch. Recent guidance regarding the Force Design Update and the Army Transition Initiative put a hold on an immediate Change 1 to FM 3-04, as we await the finalized force design. Looking forward to quarter (Q) 4 of fiscal year (FY) 2025 and Q1FY26, Training Circular (TC) 3-04.4, "Fundamentals of Flight;" TC 3-04.93, "Aeromedical Training for Flight Personnel;" and Army Techniques Publication 3-04.25, "Fundamentals of Aviation Combat Survivability," are projected to be published. Thank you to all who participated in providing feedback on those drafts. It is imperative that we receive relevant feedback during publication revision cycles to ensure Army Aviation doctrine is sound.



Enlisted Training Branch (Section Chief: Ms. Jaime Jack):

The Aviation Maintenance Advance Leaders Course has undergone a significant redesign, effective in the 3rd quarter of fiscal year (FY) 2026, based on recommendations from the 2022 Critical Task and Site Selection Board. This update incorporates more technical training to address a gap created by the consolidation of individual maintenance leader courses. While the foundational instruction of the Aviation Maintenance Training Program and Aircraft Weight and Balance remain, new lessons have been added. These lessons cover essential areas like forms and records, aviation ground support equipment, and a full week dedicated to supervising maintenance repairs—all within the course's current timeframe.



Also beginning in the 3rd quarter of FY26, the multi-phased Aviation Life Support Equipment Technician Course will feature a significantly upgraded learning experience. Developed by the Army Aviation Center of Excellence's Educational Technologies Branch, the new distributed learning component will be integrated with simulated hands-on training, emphasizing practical exercises and increased learner interaction, while also allowing for more agile material updates as references evolve. Additionally, Phase 2 will expand survival field training alongside dedicated instruction on rescue hoist equipment.

Gunnery Branch (Branch Chief: CW4 Joshua Diel):

Gunnery Branch is currently working on the rewrite of the Aviation Gunnery Manual, and we expect to publish it in late summer of 2026. We would like to congratulate the following crews for earning Top Gun during their gunnery events:

SPC Trujillo, L., and SPC Trammel, J., from 3-82 GSAB

SPC Roberts, T., and CPL Boe, L., from Co. B, 15th Mi Bn 116th MI BDE

And SPC Gaspar, E., from 6-101 CAB



Survivability Branch (Branch Chief: CW5 Lee Kokoszka):

The Survivability Branch has completed the final draft of Army Techniques Publication 3-04.25, "Fundamentals of Aviation Combat Survivability," with a projected release of the 4th quarter of Fiscal Year (FY) 2025. The revision of Training Circular 3-04.9, "Commanders Aviation Mission Survivability Program," has been initiated and will be reaching out to Aviation Mission Survivability Officers across the force for input. The Embedded Aircraft Survivability Equipment B-Kit Emulator (E-ABE) will be fielded to the Aviation Tactics Instructor Course in the 1st quarter of FY2026, with projected availability to units in the 3rd quarter of FY2026.



Attached is the link to the Aviation Life Support Equipment (ALSE) Analysis Survey for the upcoming Critical Task and Site Selection Board scheduled for 6-10 October 2025.

Your feedback is critical to informing their deliberations and shaping the future of the ALSE Technician/Officer.

The survey will close out for analysis at the end of July 2025, and your input is appreciated. Please disseminate to ALSE-qualified personnel as appropriate.

<https://survey.tradoc.army.mil/EFM/se/0AFDD71A7F9205D3>

Address Book:

Fort Rucker has gone through several SharePoint migrations in the past year.

As of 4 March 2024, the active DOTD public-facing SharePoint is: <https://armyeitaas.sharepoint-mil.us/sites/TR-ACOE-DOTD>

Training: <https://armyeitaas.sharepoint-mil.us/sites/TR-ACoE-DOTD/SitePages/Training-Division.aspx>

DTAC: <https://armyeitaas.sharepoint-mil.us/sites/TR-ACoE-DOTD/SitePages/DTAC.aspx>

Aviation Leader Kit Bag: new address! <https://armyeitaas.sharepoint-mil.us/sites/TR-ACoE-ALKB>

Aviation Training Strategy: <https://armyeitaas.sharepoint-mil.us/sites/TR-ACOE-DOTD/DOTD%20Documents/Forms/AllItems.aspx?id=%2Fsites%2FTR%2DACOE%2DDOTD%2FDOTD%20Documents%2FArmy%20Aviation%20Training%20Strategy%2Epdf&parent=%2Fsites%2FTR%2DACOE%2DDOTD%2FDOTD%20Documents>

Aviation Branch Operations SOP, Annex A (Aviation Handbook), Annex B (Aviation Liaison Officer/Brigade Aviation Element Handbook), Annex C (Risk Common Operating Procedure), and Branch Maintenance SOP:

<https://armyeitaas.sharepoint-mil.us:/f:/r/sites/TR-ACOE-DOTD/Aviation%20Branch%20SOPs/Aviation%20Branch%20Operations%20SOP?csf=1&web=1&e=M3gYgb>

DOTD Educational Technologies Branch (*questions regarding the design, development, implementation, and administration of Interactive Multimedia Instruction and other design & development products*)

- Branch Chief: Mr. Chuck Sampson at 334-255-0198 or charles.l.sampson10.civ@army.mil
- TRADOC SharePoint: <https://armyeitaas.sharepoint-mil.us/sites/TR-ACOE-DOTD/SitePages/Educational-Technologies.aspx>

DOTD Enlisted Training Branch (*questions regarding NCO professional military education [PME] and AVN Operations/Unmanned Aircraft Systems initial military training [IMT], ATC/UAS Warrant Officer Basic Course, and Aviation Life Support Equipment*)

- Branch Chief: Mr. Morris Anderson at 334-255-1909 or morris.anderson2.civ@army.mil
- TRADOC SharePoint: <https://armyeitaas.sharepoint-mil.us/sites/TR-ACOE-DOTD/SitePages/Enlisted-Training-Branch.aspx>

DOTD Flight Training Branch (*questions regarding ATMs, Training Support Packages, SOPs*)

- Branch Chief: CW5 Lucas Abeln at (334) 255-0363 or lucas.k.abeln.mil@army.mil
- TRADOC SharePoint: <https://armyeitaas.sharepoint-mil.us/sites/TR-ACOE-DOTD/SitePages/Flight-Training-Branch.aspx>

DOTD Flight Training Integration Branch (*questions regarding aviation flight programs of instruction [POIs]*)

- Branch Chief: Mr. Brian Stewmon at 334-255-3119 or william.b.stewmon.civ@army.mil
- TRADOC SharePoint: <https://armyeitaas.sharepoint-mil.us/sites/TR-ACOE-DOTD/SitePages/Flight-Training-Integration-Branch.aspx>

DOTD New Systems Integration Branch (*questions regarding new system training deliverables, e.g., system training plans*)

- Branch Chief: Ms. Kelly Raftery at 334-255-9668 or kelly.a.raftery.civ@army.mil
- TRADOC SharePoint: <https://armyeitaas.sharepoint-mil.us/sites/TR-ACOE-DOTD/SitePages/New-Systems-Integration-Branch.aspx>

DOTD Officer Training Branch (*Questions about officer and WO IMT, PME, and non-flight functional courses*)

- Branch Chief: CPT Tyler Straits, (334) 255-1402 or tyler.r.straits.mil@army.mil
- TRADOC SharePoint: <https://armyeitaas.sharepoint-mil.us/sites/TR-ACoE-DOTD/SitePages/Officer-Training-Branch.aspx>

DOTD Maintenance Training Branch (*questions about Joint Base Langley-Eustis/128th Aviation Brigade IMT, PME, and functional courses*)

- Branch Chief: Mr. Philip Bryson at 757-878-6176 or philip.e.bryson.civ@army.mil
- TRADOC SharePoint: <https://armyeitaas.sharepoint-mil.us/sites/TR-ACoE-DOTD/SitePages/Maintenance-Training-Branch.aspx>

DOTD Faculty & Staff Development Branch (*questions regarding AVCOE faculty and staff courses and/or questions about Instructor and Developer training and certification*)

- Branch Chief: Mr. Chuck Sampson at 334-255-0198 or charles.l.sampson10.civ@army.mil

DOTD Doctrine & Sustainment Branch (*questions regarding Field Manual [FM], ATPs, TCs*)

- Branch Chief: MAJ Ross Skilling at 334-255-1796 or ross.m.skilling.mil@army.mil
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- SharePoint: <https://armyeitaas.sharepoint-mil.us/sites/TR-ACoE-DOTD/SitePages/Doctrine-Branch.aspx?csf=1&web=1&e=fFpkxS>
- FMs, ATPs, and TCs are published by APD at <https://armypubs.army.mil/>
- Living Doctrine FM 3-04 (2015) Archive: [https://armyeitaas.sharepoint-mil.us:/f:/r/sites/TR-ACOE-DOTD/](https://armyeitaas.sharepoint-mil.us:/f:/r/sites/TR-ACOE-DOTD/Doctrine%20Branch%20Documents/ARCHIVE/Living%20Doctrine?csf=1&web=1&e=SYzlcG)

[Doctrine%20Branch%20Documents/ARCHIVE/Living%20Doctrine?csf=1&web=1&e=SYzlcG](https://armyeitaas.sharepoint-mil.us:/f:/r/sites/TR-ACOE-DOTD/Doctrine%20Branch%20Documents/ARCHIVE/Living%20Doctrine?csf=1&web=1&e=SYzlcG)

DOTD Tactics and Collective Training Branch (*questions regarding Lessons Learned, Unit Mission-Essential Task Lists/Mission-essential tasks/Training & Evaluation Outlines/Task Lists/CATS, or Aviation Digest*)

- Branch Chief: MAJ Dustin Ramatowski at 334-255-1252 or dustin.d.ramatowski.mil@army.mil
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- SharePoint: <https://armyeitaas.sharepoint-mil.us/sites/TR-ACOE-DOTD/SitePages/Tactics-&Lessons-Learned.aspx>
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- Aviation Digest public site: <https://home.army.mil/rucker/aviationdigest>

DOTD Survivability Branch (*questions about all things AMS, Quick Reaction Tests, Computer-Based ASE Training, 2800/2900 Training Support-Packages, Aircraft Survivability Equipment home-station training*)

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- Intelinks NIPR/SIPR: <https://intelshare.intelink.gov/sites/army-ams/> and <https://intelshare.intelink.sgov.gov/sites/army-ams/>

DOTD Gunnery Branch (*questions about all things gunnery, Master Gunner Course, Ranges, Standards in Training Commission*)

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The Eagle Eye

National Training Center Warrior Chronicles-Aviation Newsletter



Area for Forward Arming and Refueling Operations: A Path Forward

By MSG Stuart L. McQuinn, CW3 Michael J. Sturgill, CW4 Edward A. Smith, and CW3 Joseph M. Schwermer

The area for forward arming and refueling (AFAR) is a forward arming and refueling point (FARP) variation that is quickly gaining traction throughout Army Aviation. As Army Aviation shifts its focus to Large-Scale Combat Operations (LSCO), survivability and sustainment become paramount. Traditional FARPs are increasingly vulnerable to enemy detection and precision fires, necessitating a more agile alternative. Area for forward arming and refueling operations provide a solution by enabling rapid, concealed refueling close to the forward line of own troops (FLOT). The Eagle Team has observed a best practice, which is units establishing multiple AFAR locations with concealed fuel trucks. These trucks rapidly approach inbound aircraft, execute refueling, and immediately displace. This new agile tactic, technique, and procedure (TTP) enhances survivability and extends operational reach. With appropriate measures in place, AFAR operations can be performed safely with minimal risk. This article examines the problem set, safety considerations, training strategies, and planning methodologies necessary to integrate AFAR into aviation operations.

In the contemporary operational environment (OE), “Peer threats use a wide variety of actions, activities, and capabilities to **preclude** [emphasis added] a friendly force’s ability to shape an operational environment and mass and sustain combat power” (Department

of the Army, 2022, p. 2-9). A very simple way to preclude Army Aviation’s ability to sustain combat power is to quickly and decisively eliminate our FARPs. Given the depth at which aviation will be established on the battlefield (division rear or beyond), attack and lift aircraft will have to travel greater than 150–200 km to reach the FLOT. Without the ability to rapidly refuel, aviation units risk culmination, leading to an inability to mass combat power.



Forward arming and refueling point Soldiers ensuring fire extinguishers are servicable and present at pump assembly. Photo provided by the authors.

During the conflict in Ukraine, persistent drone surveillance has enabled precision strikes on logistical nodes within minutes of detection. Traditional FARPs, with fixed fuel lines and visible equipment, present lucrative targets for adversaries with long-range

fires and intelligence, surveillance, and reconnaissance (ISR) capabilities. The AFAR mitigates this risk by leveraging terrain for concealment and enabling rapid displacement.

The AFAR provides commanders and leaders the ability to place all vehicles and equipment in defilade, where they remain (hidden) until air mission commanders notify the officer-in-charge (OIC)/noncommissioned OIC (NCOIC) that aircraft are inbound for refueling and rearming. This hinders the enemy’s ability to detect and target friendly aircraft and equipment. The AFAR can enhance survivability for sustainment personnel, while prolonging the culmination of aviation operations. However, the successful application of any emerging TTP in combat all starts with mitigating risk through focused training.

SAFETY MINDSET

As with any new concept, safety concerns must be addressed throughout training and operational implementation. Given the high personnel turnover rates within Army units, it is essential that AFAR procedures are regularly practiced to maintain proficiency. Currently, Army doctrine, specifically Army Techniques Publication (ATP) 3-04.17, “Techniques for Forward Arming and Refueling Points,” (2018) and ATP 3-04.1, “Aviation Tactical Employment,” (2020)¹ lack specific techniques or procedures for conducting AFAR operations.

¹ ATP 3-04.1 may be accessed through the Army Publishing Directorate website with a common access card (CAC).

Since AFAR is a new concept, units must experiment in training to refine best practices. As units gain experience, they should incorporate these lessons into their tactical standard operating procedures (SOPs) and unit SOPs. This creates a foundational base upon which the Army can build and refine its execution of AFAR operations. Over time, this will lead to the development of standard TTPs that will inform future doctrine.

• Certification Process for AFAR Operations

A critical aspect of implementing AFAR operations is the certification process. While ATP 3-04.17 includes a sample checklist for FARP certification (Department of the Army, 2018, Appendix C), many aspects of that checklist will not apply to the AFAR. A structured certification framework should mirror the rigor of FARP validation, while accounting for AFAR's unique considerations. It is necessary to create a new checklist that combines elements from the FARP certification checklist, the Aviation Resource Management Survey checklist for cold fuel procedures,² and other requirements specific to the AFAR and the unit's requirements and operations.

This new checklist should be tailored to the needs of the unit, as the certification process will vary based on mission sets and equipment. For example, in an AH-64 Apache battalion, special consideration must be given to handling munitions such as *Hellfire* missiles, rockets, and 30 mm. A standardized method for positioning the formation safely, with the aircraft pointed in a safe direction, must be established before executing AFAR operations. The certification process can be streamlined and simplified compared to regular FARP procedures. For example, a one-page checklist created by the aviation safety officer, could be completed by a trained officer or NCO to ensure the operation is conducted safely and efficiently.

• Passenger Safety and Marshalling Areas

In traditional FARP operations, passengers are required to exit the aircraft and move to a marshalling area for safety. This procedure is in place due to the inherent fire risks associated with refueling. However, AFAR operations involve significantly faster refueling and rearming times, sometimes within 10 minutes of the aircraft's arrival, given a highly trained crew.

For instance, when fully equipped Soldiers are reboarding a UH-60 after refueling, it typically takes a well-trained team 3–5 minutes. This process can take more than twice as long in a CH-47 Chinook. The time spent offloading and reloading could lead to 10–15 extra minutes of unnecessary exposure. This delay further exposes the operation to enemy detection. Commanders must weigh the risk of refueling aircraft with passengers aboard vs. prolonging the occupation of the AFAR. Striking the right balance is key to minimizing exposure and addressing risk to force vs. risk to mission.

• Night Operations and Ground Safety Considerations

Night and blackout driving is a critical skill for ground guides maneuvering fuel trucks near aircraft. Many Soldiers in combat aviation brigades (CABs) lack proficiency to drive in blackout conditions. Attempting to guide fuel trucks under such circumstances—especially when rotors are turning—poses a significant risk. To mitigate this risk, commanders must focus on building foundational driving skills, starting with daytime missions that transition into night operations. This allows Soldiers to gradually build proficiency and confidence before

² The Aviation Resource Management Survey checklist may be found at the Joint Technical Data Integration website and requires a CAC.



Aviation rotational training unit landing AH-64 at FARP. Photo provided by the authors.



Aviation rotational training unit Soldiers fueling AH-64. Photo provided by the authors.

tackling AFAR operations under full night-vision goggle conditions.

Another potential solution is to re-evaluate how fuel trucks approach aircraft from a safety perspective to further minimize the risk to aircraft and personnel. Area for forward arming and refueling operations are likely to take place in low light/nighttime conditions, making nighttime proficiency essential. It is crucial that the Army continue to prioritize this type of training to ensure the effectiveness of AFAR operations during both day and night.

• Communication and Coordination Across Units

Effective communication is critical to the success of any complex operation, especially one as intricate as the AFAR. Many units experience challenges with communication, which can lead to increased risk during operations. Miscommunication or a lack of coordination between company, battalion, and brigade levels could derail the operation and compromise safety. Given that the AFAR is still a new concept with limited established doctrine, units must engage in thorough planning and constant feedback loops. Lessons learned during training and initial operational attempts should be documented and shared across the aviation community. The development of standardized TTPs and SOPs will be essential in making the AFAR concept a repeatable and reliable process.

EMPLOYMENT

Eagle Team Observer, Coaches/Trainers recently observed a general support aviation battalion (GSAB) conducting AFAR training to refine and practice procedures to prepare for future operations. The key points are:

1. Pre-Mission Planning and Coordination

The battalion S-3 (operations officer) determined mission requirements, site selection, and timing. The S-4 (logistics officer) assessed sustainment requirements, including fuel and munitions needs. The forward support company (FSC) commander developed the execution plan and coordinated logistical assets. Communication and rehearsals were conducted between aviators and sustainers to ensure synchronization.

2. AFAR Deployment and Site Preparation

Once an AFAR team has been activated, the first task is ensuring a suitable landing zone (LZ) for inbound aircraft. Terrain elevations play a much greater factor in safe execution, with aircraft to M978 distances being much shorter than a traditional FARP's layouts utilizing the Heavy Expanded Mobility Tactical Truck Tanker Aviation Refueling System or the Advanced Aviation Forward Area Refueling System. After thorough site reconnaissance is completed, the AFAR

team begins marking locations for aircraft to land safely with standard visual markers commonly used for night operations. The team can then maneuver the M978s into the terrain for concealment until aircraft arrive. This phase of the operation will generally be 10–30 minutes prior to aircraft arrival.

3. Execution at H-Hour

Displacing M978s into separate sections of the LZ allows the AFAR team to adjust rapidly if aircraft alter the landing plan. Upon arrival, the command and control (C2) node coordinates which vehicles will be utilized during the operation using a ground guide, ensuring safe and minimal maneuvering toward the aircraft on the ground. Upon completion of refueling, those vehicles coordinate with C2 to return to its concealed position. This phase generally lasts between 10–20 minutes and concludes with the AFAR team cycling to the next location.

TRAINING PROGRESSION

The recent GSAB training event demonstrated the effectiveness of AFAR operations; however, it also revealed critical areas where refinement is needed. While the execution was successful in a controlled environment, challenges such as nighttime vehicle movement, rapid refueling under pressure, and coordination between aviation and sustainment elements underscore the need for a deliberate and standardized training progression. Without structured instruction, key operational risks such as fuel handling errors, munitions mishaps, and vehicle movement in blackout conditions could compromise the operation. To ensure AFAR operations become a repeatable and reliable capability, units should adopt a phased training approach that builds proficiency at all levels before execution.

Phase 1: Individual Training—Before AFAR can be successfully integrated into full-spectrum operations, personnel must master AFAR-specific tasks. Ground crews train on refueling procedures, blackout driving, and munitions handling, ensuring each team member understands the fun-

damentals and can operate safely in austere environments.

Phase 2: Crew Certification–To build cohesion and efficiency, AFAR teams conduct full setups in controlled environments, refining coordination, safety procedures, and execution under simulated combat conditions. This phase ensures that each team can perform AFAR operations safely and efficiently before integration into larger-scale training.

Phase 3: Collective Training–Finally, AFAR operations must be incorporated into battalion- and brigade-level exercises to validate interoperability with aviation and sustainment elements. This phase ensures that the AFAR can be executed effectively in LSCO, giving commanders confidence in their unit’s ability to sustain aviation operations forward on the battlefield.

By implementing this phased training model, units can ensure that AFAR operations are not just an emerging concept but a sustainable and standardized capability. A deliberate approach to training will improve operational readiness, reduce risk, and enhance the



Forward arming and refueling point Soldiers monitoring operations. Photo provided by the authors.

ability of aviation units to support the ground force commander in dynamic, contested environments.

PLANNING AT ECHELON

The AFAR should be a deliberate effort directed at the squadron or battalion level through the operations process to prevent culmination due to sustainment. A key element to any operation is

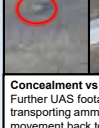
depth, which Army Doctrine Publication 3-90, “Offense and Defense,” defines as “the simultaneous application of combat power throughout an area of operations” (Department of the Army, 2019, p. 4-2). Field Manual 3-04, “Army Aviation,” further states that “depth is best achieved when aviation attacks, air assaults, and FARP/AFAR placements are deliberate, iterative division-level considerations” (Department of the Army, 2025, p. 15).³

At the National Training Center (NTC), we have seen considerable success when CAB commanders delegate C2 of AFAR and FARP operations to the aviation support battalion (ASB)—specifically the support operations officer. This enables centralized control of all sustainment planning in the military decisionmaking process (MDMP) and provides product uniformity across all brigade squadrons and battalions.

Army Techniques Publication 3-04.17 establishes FARP (AFAR) site selection as a function of METT-TC⁴ and is controlled by the battalion S-3. The primary planning considerations are that the FARP (AFAR) meets unit mission requirements, provides support throughout the battlefield under all conditions, and avoids threat observation and engagement. Area for forward arming



EAGLE TEAM
THE NATIONAL TRAINING CENTER

	13MAR24 Russian forces locate what appears to be a Ukrainian rolling FARP approximately 45km behind the FLOT in Dnipropetrovsk Oblast <i>Note: aircraft rotors are still spinning at this time.</i>	Key Takeaways: • 3 x lift helicopters met the threshold to commit long range artillery • UAS capable of providing precise targeting data and OTH HD video were able to penetrate and loiter in the support zone • Rapid execution of the D3A process between the UAS platform and at least two different LRF assets
	Initial strike with an airburst cluster munition immobilizes two aircraft. <i>Note: fuel truck has not repositioned between the time rotors were spinning and splash</i>	Planning Considerations: • How well have we integrated protection into our sustainment plan? What passive defensive measures can a FARP execute? • How can we minimize time spent in the FARP? How effectively can we disperse FARP operations? • Where can we most easily break the enemy's kill chain?
	Follow-on precision strikes destroy the two aircraft that could not displace. Unknown KIA. <i>Note: weapon used to destroy helicopters appears to be a loitering munition. It appears to have protrusions that could be wings and it's visible in several frames indicating lower speed</i>	 Concealment vs Persistent ISR: Further UAS footage released on the same date appears to show a truck transporting ammunition VIC FARP site. Operators were able to observe its movement back to a warehouse which they assessed to be a storage site. <i>Note: good concealment of vehicles and material proved insufficient when long-duration UAS operations were not contested.</i>

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Contested FARP operations in the support zone. Chart provided by the authors.

³ Field Manual (FM) 3-04, “Army Aviation,” has been recently published and is available at https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN43343-FM_3-04-000-WEB-1.pdf

⁴ Mission, enemy, terrain and weather, troops and support, time available, and civilian considerations.



UH-60 refueling in support of Deep Attack during NTC rotation 25-03. Photo provided by the authors.

and refueling site selection should be planned in-depth across all phases of the operation, not just one mission at a time. Provided adequate equipment and personnel, multiple AFAR teams should be employed as close to the FLOT as feasible, with each team occupying its own respective zone. A well-developed decision-support matrix (DSM) should define specific conditions or triggers for AFAR displacement, as determined through MDMP.

In addition to in-depth AFAR site planning, sustainment and resupply of the AFAR should receive equal consideration. In the contemporary OE, it may be realistic to assume that once the AFAR team(s) are employed, it could be weeks to months before they are able to return to the aviation tactical assembly area for refit. So the primary question(s) then is by what means, from what location, and at what points in time is Class I (food, rations, and water)/III(petroleum, oil,

and lubricants)/V (ammunition) being resupplied to the AFAR, and are these resupplies time-based or trigger-based? These are also decision points that should be included on the DSM.

As Army Aviation refines AFAR operations, success will depend on deliberate training, standardized certification, and institutional backing. Leaders at all echelons must champion AFAR's integration into training cycles and advocate for its inclusion in future doctrine. By prioritizing agility, survivability, and sustainment, aviation units will enhance their ability to project power and sustain combat operations in LSCO.

Biographies:

MSG Lee McQuinn, Eagle 17A—an FSC trainer, has served for 14 years in a variety of aviation sustainment positions. His most recent assignment was as the Airborne FARP NCOIC at the 82D CAB, the 122 ASB Fuel and Water Sustainment Platoon Sergeant, and previously, the LOG NCOIC for Iraq North. He has served on Eagle Team for 12 months and observed eight NTC rotations.

CW3 Mike Sturgill Eagle 3S—an Aviation Safety Officer trainer, has served for 18 years in the U.S. Army and the past 11 years as an aviator. He served 5 years as rated Aviation Safety Officer. His previous assignments include 2-3 GSAB, Multinational Force and Observers (Sinai Egypt), Military District of Washington. He has served on Eagle Team for 6 months and observed two NTC rotations.

CW4 Ed Smith Eagle 08—a Senior WO trainer, has served 25 years in the U.S. Army and 15 years in Army Aviation. He has 6 years of rated time as an Aviation Safety Officer and 7 years as an Instructor Pilot/Standardization Pilot. His previous assignments include 4-2 Attack Reconnaissance Battalion, 3-6 ACS, and 1-14th. He has served on Eagle Team for 33 months and observed 24 NTC rotations.

CW3 Joseph Schwermer Eagle 3A—an Assistant Operations trainer and *Eagle Eye* editor, has served for 18 years in the U. S. Army and 13 years in Army Aviation. He has experience with Gray Eagle, Shadow, and small unmanned aircraft systems. Previous assignments include 224th Military Intelligence Battalion, 4-6 Air Cavalry Squadron, and 2D Brigade, 101st. He has served on Eagle Team for 27 months and observed 16 NTC rotations.

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The Calm After the Storm: Regenerating Combat Power at Scale

By COL Nicholas J. Ploetz and MAJ Garrett C. Chandler

On August 1, 2024, at approximately 8 pm, a violent microburst struck Butts Army Heliport on Fort Carson, Colorado. Over an intense 11 minutes, the microburst battered the Ivy Eagle fleet. This unpredictable and severe storm damaged 44 aircraft, resulting in total repair costs exceeding \$50 million. The airfield's anemometer measured wind speeds at 78 miles per hour before failing; however, the intense gusts were forceful enough to flip several helicopters that had blade tie-downs applied and were moored to anchor points with chains. This destructive event occurred on the eve of three culminating collective training events for the 4th Combat Aviation Brigade (CAB), just days prior to a division-level combined arms training exercise and 3 months prior to a CAB rotation to the Joint Readiness Training Center.

Although a microburst is a relatively rare phenomenon, the amount of damage sustained by the 4th CAB was comparable to a ballistic missile strike or sustained artillery barrage against an aviation brigade's tactical assembly area in Large-Scale Combat Operations (LSCO). The similarity in scope of loss provides a unique opportunity to share several important lessons on combat power regeneration at scale by describing key steps taken by the 4th CAB and the assistance provided by the greater Aviation and Sustainment Enterprises during the repair of two battalions' worth of aircraft. We will also provide a few suggestions on how to improve the process for the future.

Within 24 hours of the storm, commanders and staff from across the brigade assembled to design a deliberate "get-well plan," which consisted of four discrete—yet related—parts: first, defining the problem; second, a systems approach; third, a shared understanding; and finally, assessment and reframing.

Defining the Problem

The initial design began by ensuring common understanding of the problem. The immediate concern was regenerating combat power while minimizing the loss of readiness across the brigade. The quickest way to categorize impacts to readiness was using the familiar readiness categories: "Personnel, Supply, Readiness, and Training (P, S, R, T)" (Department of the Army, 2019, p. 1).

Because of the extensive damage, initial assessments projected repairs to take months, not including the time required to fund, order, and receive parts. Using this assumption, personnel, operations, and standardization officers across the brigade conducted an initial assessment on the training impacts to our crews based on remaining available aircraft.

This analysis required a comparison of projected total crewmembers over time against the expected execution of the flying hour program (FHP). To complete this task, the S-1 provided total numbers of aircrew members that would remain in or arrive to 4th CAB over the next year. Standardization and operations

officers then determined the overall experience levels of these individuals and estimated the number of hours each crewmember would need to complete readiness level progression, annual proficiency and readiness training, annual flight minimums, and the hours required to conduct a train-up for a possible overseas deployment. These estimates provided the basis for how many hours 4th CAB needed to fly—by aircraft type—over the next few months to be in position to minimize readiness impacts. This analysis was key in determining the needs of the brigade to meet U.S. Army Forces Command (FORSCOM) required mission readiness gates and served as the foundation for describing the impacts of the loss in terms of risk to force.

The staff determined two risk reduction options during this analysis that we implemented within the first 2 weeks. First was the need for a waiver from the division commander to reduce flight hour requirements and provide future extensions. The early adoption of this waiver established clear expectations for all subordinate commanders and standardization officers to focus on specific training requirements to most efficiently meet FORSCOM readiness requirements during this period of reduced FHP execution. It also set expectations for all crewmembers across the brigade.

Secondly, the 4th CAB requested that Human Resources Command reduce the flow of newly graduated flight school students to Fort Carson. This would

temporarily reduce flight training requirements as aviators departed 4th CAB during the 25-01 movement cycle, allowing the CAB to focus efforts toward on-hand crew readiness.

Another area of immediate concern was funding and resourcing parts at the scale required to repair the large quantity of damaged aircraft. To address this issue, the 4th CAB leveraged the Brigade Aviation Maintenance Officer (BAMO), Aviation Materiel Officer, S-8 (resource management staff), and the rest of the Support Operations–Air team to manage a brigade-wide approach using Army Aviation’s proven problem, plan, people, parts, time, tools, and training maintenance methodology, commonly known as P4T3.¹

Managing P4T3 at the brigade level allowed the battalions to focus on detailed and accurate damage assessments to best understand the scope of the problem. Furthermore, it used available staff capacity at the brigade level to help prioritize and resource maintenance activities. The sheer scale of the damage outpaced

every battalion’s internal capability, so the CAB headquarters directed support from the 404th Aviation Support Battalion—and later—leveraged resources from the U.S. Army Aviation and Missile Command (AMCOM).

To accelerate the rate of assessment completion, the 4th CAB deliberately stopped all phase maintenance and tasked the phase maintenance teams to perform assessments. This was immensely valuable, as it allowed the 4th CAB to provide detailed descriptions of the support needed in terms of funds, parts, and time, providing higher level commanders maximum decision space. This proved critical with the incident occurring near the end of the fiscal year.

A Systems Approach

To leverage the full Aviation Enterprise, the 4th CAB predominantly used only established systems of record to document damage, order parts, and track expenditures identified during the assessments. Deliberately choosing to use available reporting tools and systems

versus manually generated products both prevented additional workload on units and allowed all echelons across the Army to see the information the same, reducing miscommunication. This allowed us to focus on communicating requirements and resourcing support outside the organization, which led to significant innovation in the use of the available systems and tools.

Tracking Maintenance

The **first** innovation was early adoption of the software application, Griffin. To consolidate reports of assessed damage and later track status of repairs, the BAMO leveraged Griffin’s artificial intelligence (AI) daily status report (DSR) tool, created by the Army Artificial Intelligence Integration Center (AI2C).² This was done by isolating the aircraft damaged in the microburst into a separate “Weather Task Force” query within the system. Since Griffin pulls data from standard reporting systems, it removed the need for additional reporting requirements from units, enabling the team to focus on maintenance tasks.



A flight crew member ties down the rotor blades of a UH-60 Black Hawk prior to inclement weather. Mississippi National Guard photo by SGT Shawn Keeton.

¹ “P4T3 is a planning concept allowing commanders, leaders, and maintenance personnel to coordinate and plan the personnel and resources to perform maintenance” (Department of the Army, 2020, p. 1-15).

² For more on Griffin and AI2C, please review the article *Commoditizing AI/ML Models* (Fairfield et al., 2024).

This OPT resulted in efforts divided by echelon. Through validating funding requirements, FORSCOM reallocated available end of year funds to purchase repair parts as complete “packages” to fully fund an aircraft’s repair requirements. The III Armored Corps, through 13th Expeditionary Sustainment Command, scrubbed the parts list to cross-load parts across the corps and assisted the 4th CAB in coordinating with outside organizations to redistribute inventory from across the Army to support the 4th CAB. Using the Griffin DSR, all echelons worked with the BAMO to coordinate outside augmentation to repair a few aircraft beyond the internal capacity for the brigade.

Assessment and Reframing

Categorizing the regeneration effort retroactively as an overall medium-structured problem, the primary challenge was determining what resources were needed at which time to maximize regeneration (Department of the Army, 2015, p. 4-2). The importance of ensuring the commands at echelon and across the Enterprise all acted toward common,

yet shifting, needs over time cannot be overstated. Although the overall goal remained rapid regeneration, establishing incremental supporting objectives allowed the Enterprise to methodically resource support in phases. For example, although assessments were critical within the first few weeks, the need shifted for maintenance repair support within the first few weeks. Managing these transitions required consistent feedback to the previously listed commands with supporting analysis and focused requests to position resources for the next phase. Eventually, the frequency of both the FORSCOM OPT and daily email updates reduced over time as the 4th CAB received resources, and repairs transitioned into execution at the unit level.

Lessons Learned

Broadly, the Enterprise operated precisely as it was designed to operate. Through using the systems of record, the 4th CAB could communicate precise requirements and status updates widely across the Enterprise. These systems allowed higher headquarters

in making data-informed decisions to reprioritize resources across their formations. **Additionally**, using that detailed data allowed maintenance managers across the force to identify and locate required specific things and then ship them across the world, when necessary, to support the 4th CAB. All these tools and systems exist in the current structure.

In the event of a high-intensity conflict, the main limitations with replicating this process are twofold. First, successful combat power regeneration is entirely dependent on having the available inventory of parts to then redistribute to the point of need. If we need to regenerate battalions worth of aircraft in LSCO, we need to build extensive inventory depth across both high usage and low usage items. Otherwise, we will be dependent on long manufacturing times. However, this inventory incurs additional cost, risk of obsolescence, and care of storage in supply requirements. Regardless, there needs to be a discussion and deliberate decision on this supply system vulnerability.



4th CAB Soldier performing a tap test after the microburst. Photo provided by the 4th CAB.

Second, particularly regarding aviation maintenance, the quantity and distribution of aviation maintenance organizations mean that decisions to reallocate inventory across formations happens at the corps level (at a minimum), or in

this experience, at FORSCOM. In high-intensity conflict, this system would be overwhelmed based on the number of competing challenges across multiple corps. It may be beneficial to consider the creation of a unit or committee to be

stood up in wartime that operates under FORSCOM and is charged to manage aviation maintenance with the authorities to reallocate funds, parts, and limited manpower. Composed of key leaders from both FORSCOM and AMCOM, this unit would be focused on aviation combat power regeneration alone and not be an ad hoc group of leaders balancing multiple competing requirements.

Finally, a significant portion of the communication process from the brigade outward oriented around an ad hoc delineation based on expertise. This served both to limit confusion and to play to individual strengths. For any interactions with the Aviation Enterprise and strategic-level communication, all information out of the brigade came through the brigade commander. Anything pertaining to parts, funding, and overall readiness with the Sustainment Enterprise passed through the brigade executive officer. Coordination for outside maintenance support or augmentation all flowed through the BAMO. These three channels, managed at the brigade level, reduced miscommunication and allowed battalions to focus on actual repairs versus coordinating their resources individually.

Hopefully, this article used the storm at Fort Carson to build a greater understanding in combat power regeneration at scale. We believe our use of problem definition, a systems approach, a shared understanding, and assessments and reframing provides a common stepping off point for any unit facing a similar situation in the future.

Biographies:

COL Nicholas Ploetz is the commander of the 4th CAB at Fort Carson, Colorado.

MAJ Garrett Chandler is currently the executive officer of the 4th CAB at Fort Carson, Colorado. He has previously served as the Support Operations Officer of the 4th CAB and as the S-3 of 325th Brigade Support Battalion. He is a graduate of the School of Advanced Military Studies.



CH-47 crane recovery from the August 1, 2024, microburst. Photo provided by the 4th CAB.

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Creating a Common Operating Picture in Crisis

Paratroopers conduct maintenance on a CH-47 Chinook. U.S. Army photo by SSG Catessa Palone.

By SFC Thomas J. Mason and MAJ Garrett C. Chandler

On August 1, 2024, the 4th Combat Aviation Brigade (4th CAB) suffered significant damage to multiple aircraft across all four flight battalions during a severe weather event. This damage resulted in thousands of lines of parts required for repairs using means of repairs, including evacuating some aircraft for depot-level repairs. The incident highlighted the importance of efficient communication and information management in response to unexpected events. In this article, we explain how 4th CAB used the software application, Griffin, and its Artificial intelligence (AI) Daily Status Report (DSR) capability, specifically the Task Force (TF) creation tool, to automate reports and streamline information requirements without burdening units with excessive reporting requirements.

"4 CAB was able to seamlessly track its damaged aircraft using Griffin's ability to flexibly configure aviation maintenance reporting capabilities. Griffin provided near real time visibility of recovery efforts at every echelon from the flight company to FORSCOM HQ [Army Forces Command Headquarters] with no additional products required. The flexibility Griffin demonstrated realizes benefits of data

driven organizations and the value of the enterprise [sic] aggregated backend and warfighter optimized frontend interface it offers" M. Andre (personal communication, November 20, 2022).

WHAT IS GRIFFIN?

"Griffin is an aviation maintenance management application that uses AI/ML [machine learning] algorithms to predict maintenance needs and logistical requirements for Army Aviation assets" (Fairfield et al., 2024). Griffin is a powerful software application designed to support unit operations and is typically used for daily reporting of each individual aircraft status, phase calendars, phase flows, and bank time. Additional features include a phase calendar, flight hour report, component analysis, and TF creation tool. It was this TF tool that 4th CAB leveraged to create a tailored solution that met specific needs in response to the severe weather event.

MAXIMIZING THE USE OF AVAILABLE SYSTEMS

Creating a TF using the DSR capability of Griffin streamlines information

requirements without burdening units with extra reporting requirements. It allows units to continue regular operations while fulfilling reporting requirements, provides commanders with relevant information, and enables real-time review of readiness information across the Enterprise. Deliberately choosing to incorporate the Griffin DSR used the already existing process for maintenance reporting to seamlessly provide updates, targeting a specific fleet of aircraft across mission design series (MDS) in near real time.

Firstly, for years, the Army utilized a DSR to understand the status of individual aircraft. Historically, it was tracked manually via paper reports, eventually giving way to Excel sheets and portable document format, or PDF files. Recently, the new system developed by the Army AI Integration Center, or AI2C, team developed a way to pull the information directly from Aircraft Notebook (ACN) updates through the Global Combat Support System-Army (GCSS-Army).¹ Griffin DSR capability integrates seamlessly into existing workflows. Units update information through their standard ACN daily updates, eliminating extra reporting as these data are already a daily requirement for aviation units. Higher HQ can analyze and review information without requiring subordinates to generate additional products, reducing the administrative burden on units.

Secondly, through creating a TF in Griffin, commanders can use the same daily report they are familiar with to see specific aircraft without having to conduct aircraft transfers. This feature enables commanders to focus on the specific aircraft or units that require attention, while still maintaining a comprehensive view of the entire operation. Normally, this type of organization is created to support deployments as a mixed MDS TF. Through the feature in Griffin, units can now generate the same concept for aircraft going to combat training centers or even pending transfer to another unit.

Thirdly, Griffin is visible to anyone with an account, enabling simultaneous analysis across echelons. This means that

¹ "Aircraft Notebook is the system of record for recording rotary wing aviation statuses. Global Combat Support System-Army is the system of record for providing information about movement or repair parts" (Campbell, 2023).

commanders at various levels can access and review information in real time, without impacting the data for subordinate units. Griffin provides a method for reporting readiness that requires no additional product generation from a subordinate unit, allowing them to focus on daily activities. This feature enables a more agile and responsive organization where information is readily available to support decision-making, while allowing maintainers to focus on keeping aircraft in the air. Tied to TF creation, easy access to view readiness across organizations means that unit's receiving aircraft, or even non-aviation HQs, can easily view the readiness of aircraft supporting their missions.

COMPARING PREVIOUS EVENTS

It's worth noting that this is not a unique incident; severe weather occasionally impacts aircraft across the Army. The use of Griffin and other tools has made a significant difference in regeneration efforts. Through coincidence, the current 4 CAB Brigade Aviation Maintenance Officer (BAMO), CW5 Todd Misurelli, served as the BAMO of 1 CAB when severe weather damaged aircraft in June 2022 and arrived on ground weeks before severe weather damaged significantly more 4 CAB aircraft. During a personal interview in December 2024, CW5 Misurelli highlighted that the three major differences in regeneration efforts were the use of an Operational Planning Team (OPT), Griffin reporting, and recent migration for aviation parts ordering through GCSS-Army. The OPT, held at the FORSCOM level, included all echelons and supporting HQs and ensured shared understanding and expectation management among entities. To create a common operating picture, units used the Griffin DSR for real-time status updates and TF capabilities, streamlining the regeneration process. The ACN system, integrated with GCSS-A, enabled efficient tracking of parts required and available, allowing for detailed products and easy sharing of

information across the Army Aviation Enterprise. Notably, 1 CAB did not have access to these tools during their recovery process, highlighting the importance of these systems in regeneration efforts, requiring significant workload to create, share, and track progress.

WAY FORWARD

Griffin is being actively developed by the AI2C, where the team is helping the Army to transform in contact by working closely with units across the Army to deliver AI solutions at speed. Based on the success of 4 CAB's use of Griffin,



we recommend that other units explore the potential of this capability to support their operations. Specifically, we suggest:

1. Using the DSR capability to streamline information updates and reduce administrative burdens on units. This specifically focuses energy on understanding the information communicated in the report vs. spending limited staff energy creating complex reporting tools to communicate the same information already available in new ways.
2. Creating TFs to focus on specific aircraft or units without impacting property transactions or maintenance alignment. Strictly an administrative tool, this allows a unit to focus on

specific aircraft based on priority or resource availability vs. property book alignment. The equipment is not even required to report through the same ACN but can aggregate at whichever level desired. Aircraft can be added, removed, or incorporated into multiple TFs at the same time.

3. Leveraging the real-time review and analysis capabilities of Griffin to support decision-making and improve overall readiness. As long as the information is connected and reporting, all echelons will have access to the most up-to-date information available from the unit and will not require frequent data inquiries to lower echelons for updates if units update their data routinely.

Through adopting these best practices, units can improve their ability to respond to unexpected events and maintain a high level of readiness, ultimately supporting the success of their missions.

In response to the severe weather event, the innovative way 4th CAB used the Griffin DSR capability, specifically the TF creation tool, demonstrated the power of streamlining information requirements. By leveraging this capability, 4th CAB created a tailored solution that met its specific needs without burdening units with extra reporting requirements. Through enabling seamless information updates, providing focused insights, and supporting real-time review and analysis, Griffin can help organizations respond more effectively to unexpected events and improve overall readiness.

Biographies:

SFC Thomas Mason is a 15T with 19 years of aviation maintenance experience. He served as 4th CAB's BAM Noncommissioned Officer, assisting with recovery efforts after the severe weather event. In his free time, he enjoys hiking with his family.

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By CPT Michelle A. Thompson,
CPT Kimberly M. Whitbeck,
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Many dietary supplements (DS) and energy drinks claim to enhance cognitive function, improve physical performance, aid in weight loss, and promote overall health. Service members have a 32 percent (%) higher use of DS when compared to civilians surveyed in the National Health and Nutrition Examination Survey, or NHANES (Knapik et al., 2021, pp. 3500 and 3503). Research by Bukhari et al. (2021, p. 1052) indicated that service members use dietary supplements primarily to meet U.S. Army standards for body composition, maintain general health, improve physical appearance, and enhance physical fitness. Furthermore, it has been found that 82% of U.S. Army Soldiers consume an average of 285 mg of caffeine daily (Lieberman et al., 2012) and 63% take dietary supplements at least once a week (Bukhari et al., 2021, p. 1049). Among U.S. Army Aviators, 65% reported using caffeine daily to combat fatigue (Bukhari et al., 2020, p. 648).

United States Army Soldiers frequently use DS and energy drinks to meet fitness and occupational demands (Knapik et al., 2022, p. 1860). However, many Soldiers lack knowledge about the safety and effectiveness of these products (Bukhari, et al., 2021, p. 1049). As a result, they often seek advice from peers, social media influencers, and supplement companies regarding what to consume. This makes them prime targets for marketing by supplement companies.

Aviation personnel must focus on safe dietary supplements and caffeine usage, as they must adhere to strict health and safety standards while on active flight status. Understanding the potential adverse outcomes associated with unsafe supplement use before and during flight is crucial. Some of the adverse

effects may include heart palpitations, heart attacks, fainting, dizziness, muscle spasms, excessive sweating, dehydration, and liver failure (National Institutes of Health [NIH], n.d.). This article aims to highlight the gaps in the current Department of Defense (DoD) and U.S. Army Aviation policy and to provide recommendations on safe supplement use for U.S. Army Aviators.

Currently, there are three levels of governance U.S. Army Aviators and aircrews can utilize to help navigate the safe consumption of DS and energy drinks: The Food and Drug Administration's (FDA) Dietary Supplement and Health Education Act (DSHEA) of 1994, the U.S. Army Aeromedical Policy Letter (APL), and the 2022 DoD Instruction (DoDI) 6130.06, "Use of Dietary Supplements in the DoD" guidance.¹ Each governing body or reference provides recommendations or policies that help guide aviators and aircrews in choosing DS and energy drinks to consume appropriately. Even with these policies and letters in place, some gaps still need to be addressed to protect U.S. Army Aviators and aircrews.

A 2020 study examining factors motivating DS consumption found that 34% of U.S. Army Soldiers believed the U.S. government requires DS sold in the U.S. to be safe, and 19% were unsure (Bukhari et al., 2021, p. 1052). The DSHEA gives the FDA oversight over DS and established a standard definition for DS as products intended to ingest and supplement the diet (U.S. FDA, n.d.). Under the DSHEA, any ingredient sold in the U.S. before October 15, 1994, is presumed safe and not subject to review by the FDA before being marketed (Deuster, 2024, p. 103). After October 15, 1994, it is the manufacturer's responsibility to ensure the product has evidence of safety, gets reviewed by the FDA if it contains a new dietary ingredient (derived from a food product), and pulling a product off the shelf requires the FDA to prove evidence of misbranding, adulterated ingredients, or drugs (NIH, 2020).

¹ More information regarding DSHEA can be found at: https://ods.od.nih.gov/About/DSHEA_Wording.aspx

The current Aeromedical Policy Letter is accessible via the Military Health System and Aeromedical Electronic Resource Office websites to those with a valid common access card at: <https://aero.health.mil/>

The DoDI may be found at: https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/613006p.PDF?ver=I3AFSCJVzbcMhd7u_3dw-A%3d%3d

The DSHEA is essential but has limitations due to the lack of government resources to review the safety of supplements before they reach the market. As the billion-dollar supplement industry grows, U.S. Army aircrews risk being targeted by supplement companies. To address these gaps in the DSHEA, the APL has established a U.S. Army-wide standard for dietary supplement and energy drink consumption specifically for aviators and aircrews. According to the APL, most supplements and herbs are prohibited for those on aviation duty, as U.S. Army Aviators often use them for self-treatment or diagnostic purposes (U.S. Army Aeromedical Activity, 2021, pp.128–129). The APL breaks supplement and herbal use into three classes:

- Class 1: May be taken without prior approval of a flight surgeon.
- Class 2: May be taken with prior approval of a flight surgeon.
- Class 3: Specifically lists disqualifying supplements and herbs. Waivers may be applied on a case-by-case basis by a flight surgeon.

Class 3 supplements and herbal products raise significant concerns, as their consumption before flight can lead to the grounding of aircrew members. The following supplements and herbs are classified as disqualifying under Class 3 (U.S. Army Aeromedical Activity, 2021, p. 129):

- Melatonin.
- Any stimulant beyond caffeine.
- Any hormonal modulators (including pro-hormones, pro-steroids, and estrogen blockers).
- Any pre-workout supplements that contain vasodilatory properties and/or nitric oxide (NO) boosters.
- Any supplement, herbal product, or preparation that lacks specific labeling detailing every ingredient and its respective amount or concentration. This applies even if individual ingredients are not considered disqualifying.

Energy drinks are also subject to Class 3 supplement and herbal guidelines. The APL does not explicitly authorize or prohibit the consumption of energy drinks but outlines the following guidelines (U.S. Army Aeromedical Activity, 2021, p. 129):

- All ingredients must be listed.
- Ingredients are deemed aeromedically acceptable if they meet Class 1 or 2 standards.
- Energy drinks should not be consumed in excessive amounts.
- The product must not be part of a proprietary or trademarked blend.

The APL outlines the guidelines for what U.S. Army Aviators can and cannot consume; however, many Soldiers are unaware of how to evaluate their supplements for safety and effectiveness. A 2020 study on caffeine and energy drink consumption among U.S. Army aviation personnel revealed that 61% of aircrew members surveyed consumed energy drinks without the approval of a flight surgeon and 46% had them before or during flights without such approval (Bukhari et al., 2020, p. 646). Bukhari et al. (2020) also reported that U.S. Army aircrews generally believe the benefits of energy drinks outweigh the risks and view them as acceptable within the community, provided they are not abused.

The consumption of DS and caffeine among military personnel typically increases during deployments (Bukhari et al., 2020, p. 646; Varney et al., 2017, p. 2). As a result, the APL should define what constitutes excessive caffeine intake. The FDA recommends up to a maximum daily caffeine consumption of 400 mg (Operations Supplement Safety [OPSS], 2020). For sustained operations lasting 24 hours, the general guideline suggests a total of 800 mg divided into four doses of 200 mg

each (OPSS, 2020). The absence of clear standards for determining excessive caffeine intake causes confusion among aviators and aircrews due to varying interpretations by flight surgeons.

In March 2022, the DoD published DoDI 6130.06, which provides guidance for all service members and individuals involved in health-related services. This guidance emphasizes the importance of using DoD educational resources and tools to make informed decisions regarding DS consumption; however, it does not cover energy drinks. The DoDI 6130.06 established OPSS as the program of record for dietary supplement education within the DoD community. The OPSS team offers evidence-based information on their website to inform the community about current DS and energy drink trends and use (OPSS, 2020). Additionally, this year, they will pilot an OPSSup app to provide service members with easier access to information, helping them make informed decisions when purchasing supplements (Deuster et al., 2024).

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OPERATION SUPPLEMENT SAFETY | OPSS.ORG

CAFFEINE & PERFORMANCE

If needed, you can use caffeine to boost your mental & physical performance in certain situations. If you're going to use it, here's how.

USE UP TO 200 MG AS FOLLOWS:

ENDURANCE PERFORMANCE
(more than 60 minutes of continuous activity)

- 30–60 minutes before activity.

MENTAL PERFORMANCE

- 15–30 minutes before task.

RESTRICTED SLEEP (less than 6 hours of sleep in 24 hours)

- 1 dose on waking.
- Re-dose every 3–4 hours only if needed.

NIGHT SHIFTS WITH DAYTIME SLEEP

- 30–60 minutes before start of shift.
- Re-dose every 3–4 hours only if needed.

SUSTAINED OPERATIONS (no sleep in 24 hours)

- 1st dose at midnight. Re-dose every 3–4 hours only as needed.
- Use during daytime hours only if needed.

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CAFFEINE TIPS:

- Avoid consuming caffeine 4–6 hours before bedtime.
- Do not exceed 600 mg caffeine per 24 hours (800 mg for sustained operations).
- Consider ALL sources of caffeine in your diet, including foods, beverages, and dietary supplements (not limited to the items listed on the next page).
- Caffeine can temporarily improve performance. It is not a substitute for sleep.

Infographic courtesy of OPSS at <https://www.opss.org/infographic/caffeine-and-performance>

The OPSS website² features numerous resources to assist aviators and aircrews in making informed choices about supplement use. One key resource is the *DoD Prohibited Dietary Supplement Ingredients List*, allowing Soldiers to check each ingredient in a supplement to determine if it is banned. Another valuable resource is the *Check Your Supplement* scorecard, which evaluates supplements based on several criteria outlined in the APL for dietary supplements and herbal products to mitigate the risk of either a positive drug test or adverse event. The following list contains the screening criteria on the OPSS scorecard outlined on the *Check Your Supplement* page (see chart on this page):

- Third-Party Certification: “An independent organization has reviewed the manufacturing process of a product” (National Sanitation Foundation [NSF], 2020, para. 1). This process determines if the final product aligns with the specific “safety, quality, or performance standards” (2020, para. 1).

- Informed-Sport, NSF Sport, and Banned Substances Control

Group Drug-Free certifications confirm DS have tested negative for many ingredients banned by the World Anti-Doping Agency (Deuster et al., 2024, pp. 106–107).

- “Free of the words proprietary blend, matrix, or complex” (OPSS, n.d.). When a combination of ingredients for which the total amount of the blend is listed, but the specific amounts of individual ingredients within the blend are not disclosed.³

- Daily value of vitamins and minerals does not exceed 200% (OPSS, n.d.). This refers to the recommended daily amounts of nutrients to be consumed or

not to exceed each day.⁴

- Caffeine per serving is less than equal to 200 mg (OPSS, 2020).⁵

- Free of multiple stimulants: Stimulants are an area of concern due to the effect they have on blood pressure, heart rate, and the nervous system. Taking too much of one stimulant or consuming multiple stimulants can increase your risk of side effects, especially if taken in combination with medication (OPSS, 2022).⁶

- The short-term effects of some supplements and herbals are dangerous and using them can result in sudden incapacitation of flight (U.S. Army Aeromedical Activity, 2021, p. 128).

energy drinks that comply with the APL. It is recommended that the Aeromedical Consultant Advisory Panel (ACAP) collaborate with OPSS to address current issues related to consuming supplements and energy drinks within the military.

The ACAP is composed of senior aviation and aeromedical personnel at Fort Rucker, Alabama. Its purpose is to create a consensus among experts in aeromedicine and aviation. This consensus aims to guide decisions that protect resources, enhance safety, and expedite case resolution in the best interests of both the aviator and Army Aviation. A partnership could lead to the development of updated guidance for dietary supplements and herbal products, filling existing gaps and providing a DoD-approved resource for aeromedical supplement education tailored to U.S. Army aircrews. U.S. Army Aviators and aircrews have expressed the need for clear guidance on using dietary supplements and energy drinks and are open to receiving training and education on this

Key questions you can answer:	Yes=1	No=0
Is any one of these third-party certification seals on the product label?		
Are there less than six ingredients on the Supplement Facts label?		
Is the label free of the words proprietary, blend, matrix, or complex ?		
Can you easily pronounce the name of each ingredient on the Supplement Facts label?		
Is the amount of caffeine listed on the label 200 mg or less per serving? (If caffeine is not listed, mark “1.”)		
Is the label free of questionable claims or statements ?		
Are all the % Daily Values (% DV) on the Supplement Facts label less than 200% ? (If % DV is not listed, mark “0.”)		
Total: Add up the “1s.” 4 or more is okay. Less than 4 is a “no-go.”		

The OPSS scorecard courtesy of OPSS at <https://www.opss.org/opss-scorecard>

- Free of prohibited substances listed on the *DoD Prohibited Dietary Supplement Ingredients List* unless authorized by a DoD health care provider (OPSS, 2025).⁷

These two tools help aircrews make informed decisions regarding DS and energy drinks, reducing the likelihood of consuming substances containing banned ingredients or risking being grounded from flight. Although the OPSS scorecard wasn’t specifically designed to evaluate food labels for energy drinks, it currently serves as the most effective resource for aviators in selecting

topic (Bukhari et al., 2020, p. 1060).

In 2024, the 10th Mountain Registered Dietitians collaborated with OPSS to assess DS at Fort Drum, New York, and Camp Beuhring, Kuwait. They are working to publish two research articles based on the findings from their assessment of the supplement environment at both locations. Initial results indicate that only 17% of dietary supplements available at Fort Drum were third-party certified per OPSS standards, while 38% of energy drinks sold at Camp Beuhring met APL standards.⁸ These findings will offer valuable insights into the number of supplements that comply with current DoDI and APL policies at military installations. Additionally, these data will help inform leadership decisions that aim to shape the future

² <https://www.opss.org/>

³ Available on the OPSS website at: <https://www.opss.org/article/proprietary-blends-what-does-mean>

⁴ Available on the OPSS website at: <https://www.opss.org/opss-scorecard>. For further information about daily vitamin and mineral allowances please visit: <https://www.fda.gov/media/135301/download?attachment>

⁵ Available on the OPSS website at: <https://www.opss.org/article/caffeine-performance>

⁶ Available on the OPSS website at: <https://www.opss.org/article/stimulants-whats-concern>

⁷ Available on the OPSS website at: <https://www.opss.org/dod-prohibited-dietary-supplement-ingredients>

⁸ Please contact the authors for more information about this collaboration and its findings.

of the supplement environment on U.S. Army installations.

In conclusion, all U.S. Army Aviators, aircrews, and healthcare providers must receive education on dietary supplements and energy drinks to understand how their consumption affects daily life, training, and mission readiness. This knowledge will enable them to make more informed decisions. The establishment of DSHEA, APL guidance, and DoDI 6130.06 provide various safety standards, advice, and resources for U.S. Army Aviators and aircrews, although gaps still exist. There remains a lack of awareness and research regarding the safety and effectiveness of DS and energy drinks among U.S. Army personnel. With an increase in DS and energy drink consumption within the U.S. Army

Aviation community, the ACAP should take additional measures to educate and provide clear guidance to ensure the well-being of Army Aviators.

Biographies:

CPT Michelle Thompson, PhD, RDN, CSSD, CSCS, currently serves as the Holistic Health and Fitness (H2F) Nutrition Program Director at the 10th Mountain Combat Aviation Brigade, where she oversees the care of more than 2,000 Soldiers. She was commissioned as a dietitian in the U.S. Army in 2020. CPT Thompson recently returned from a deployment to Central Command (CENTCOM), where she evaluated the use of supplements and energy drinks at Camp Buehring, Kuwait. Her assessment is the first to identify products that will ground Army aircrews before flights in a deployed environment. She consistently applies her knowledge and expertise in exercise and nutrition to support the mission readiness of Soldiers, both at home and abroad.

CPT Kimberly Whitbeck, MS, RDN, CSSD, TSAC-F, is an active-duty Army registered dietitian who

currently serves as the Chief of Nutrition at Fort Drum Medical Department Activity. She acts as co-lead of a DoD Military Nutrition Environment Working Group and Officer-in-Charge of Fort Drum Food Insecurity Working Group. Her areas of interest include assessing the military supplement environment, increasing food access, and treating disordered eating and eating disorders to improve medical readiness for service members and their families.

SPC Gabrielle Edge is currently serving as the H2F Nutrition Care Specialist (68M) for the 10th Mountain Combat Aviation Brigade, where she supports more than 2,000 Soldiers. She joined the Army at the age of 19 to gain a new perspective on life. During her recent deployment in CENTCOM, SPC Edge had the opportunity to travel to multiple countries to support Soldiers in various operational areas. She collaborated with 92Gs in a remote combat zone to help meet the increased calorie needs of Soldiers and contractors. Through this experience, she gained firsthand knowledge of how a 68M can support Soldiers beyond traditional roles and responsibilities. SPC Edge hopes to use the skills she has learned to one day teach future 68Ms.

Photo courtesy of www.pexels.com/



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Army Aviation in the Littoral: Filling Operational Gaps in an Indo-Pacific Command Large-Scale Combat Operations Campaign

By CPT Collin A. Cooley

Photo courtesy of Pexels.com

The Army is at a critical inflection point as our organization wargames how to train, fight, and win Large-Scale Combat Operations (LSCO) in a multidomain operational environment. As the Department of Defense pivots from the Global War on Terror in the Middle East to great power competition against near-peer adversaries, our current doctrine, capabilities, and overall posture must rapidly adapt to sufficiently deter our rivals in the geopolitical arena. Large-Scale Combat Operations (LSCO) require our military to fight as a joint force under a geographic combatant command and utilize each service's component command to complement each other within their assigned theatre. No theatre is as diverse and challenging to manage as the Pacific Theatre. Home to 38 nations consisting of roughly 60 percent (%) of the world's population, the Indo-Pacific Command's (INDOPACOM) and U.S. Army Pacific's (USARPAC) area of responsibility is vital to maintaining a positive presence in this region for American force projection and adversarial deterrence (INDOPACOM, 2024). Moreover, this theatre features over 3,000 languages, is home to the world's busiest international sea lanes, nine of 10 of the world's largest

ports, and is arrayed across the largest ocean in the world (USARPAC, n.d.). Indo-Pacific Command faces a strategic problem set like no other combatant command due to its size, diversity, and global importance (INDOPACOM, 2024). While the large stretch of ocean naturally favors naval responsibility, especially for shaping operations that set the theatre in conflict, Army Avia-

erability with the Navy, U.S. Army Aviation is uniquely positioned to train, fight, and win globally in the littoral. Specifically, in an INDOPACOM campaign, the Army must utilize its aviation assets to rapidly move personnel and equipment across the littoral to extend operational reach and fill operational and sustainment shortfalls.



Indo-Pacific Command area of responsibility (U.S. INDOPACOM, 2024).

tion can contribute to the U.S. Navy's efforts along the littoral regions with the advancement of overwater competencies.

By developing a robust overwater flying and deck landing qualification (DLQ) program that increases joint interop-

Drawing from my experience serving with the 16th Combat Aviation Brigade (CAB) at Joint Base Lewis-McChord, Washington, I have seen firsthand the need for the Army to develop a cogent overwater training program implemented by all coastally based CABs. The success of the Army's operations in the littoral regions hinges upon constant interfacing with the Navy to maintain DLQ capabilities at echelon. This article assesses the Army's current maritime operations (MAROPS) practices and posits recommendations to improve the program to become more capable of operating within the littoral region, using the Training and Doctrine Command doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy (or commonly referred to as DOTMILPF-P) framework as a lens.

Insight

While operating across INDOPACOM, I observed that sustainment operations were among the most difficult aspects of an operation to plan, despite being the most crucial warfighting function to project and maintain Army Forces. Contemporary examples in the Russo-Ukrainian War suggest that robust sustainment planning cannot be overstated. The size of the Pacific is not the only challenge to sustaining a prolonged conflict. There are more than 20,000 islands of all sizes and ecosystems in the Pacific (Pacific RISA, 2024). Many of these islands and archipelagos have shallow port depths and lack the appropriate infrastructure to accommodate our equipment specifically, dilapidated ports, airfields, and road/rail networks (D. Carpenter, personal communication, June 1, 2024). To operate within the littoral region, the relevant infrastructure must be available to expand the lodgment and hold on to seized key terrain during a conflict.

Joint Publication 1-02, “DOD Dictionary of Military and Associated Terms,”

defines the littoral region as “two segments of [the] operational environment: 1. Seaward: the area from the open ocean to the shore, which must be controlled to support operations ashore, 2. Landward: The area inland from the shore that can be supported and defended directly from the sea” (Joint Chiefs of Staff, 2017, p. 144). Common societal trends like “rapid population growth, accelerating urbanization, littoralization (*the tendency for people and infrastructure to cluster on coastlines*), and globalization,” (Schwartz, 2024, p. 47) allude to the difficulties conducting operations within this region, specifically in the littoral (Kilcullen, 2013). One of the Navy’s core tenets is maintaining sea lines of communication and conducting strategic sealift to maneuver combat power from pre-positioned stocks or the continental United States into the Pacific Theatre. Meanwhile, Marines can launch an amphibious assault to secure beachheads and other key terrain along the littoral. However, the Army must be prepared to muster adequate levels of combat power for an extended land campaign within INDOPACOM. This role in facilitating the transition from assault

to stabilization of the lodgment within a joint forceable entry (JFE) operation was commonplace during the Pacific Theatre of World War II (Joint Chiefs of Staff, 2021b, IV-2).

The fundamental objective of JFE is to “**rapidly build combat power to establish the landing force ashore** ... normally, starting with zero combat capability ashore” (Joint Chiefs of Staff, 2021a, p. II-11). Unlocking the littoral region is essential to allow the Army to use its predominantly Compo 2 and Compo 3 sustainment fleet to move smaller equipment from ship to shore. However, most naval and commercial strategic sealift vessels require deep water ports, which are limited in this region, especially on the smaller islands. The Army and Navy collaborated to create the joint logistics over-the-shore (JLOTS) system to remedy this issue. Joint logistics over-the-shore creates a floating causeway to connect ships in deep water to the shore and rapidly move equipment into combat operations (MacCarley & Coleman, 2009, p. 25). However, security operations are necessary to protect the JLOTS system



Two Army AH-64s from the 16th CAB join 1st Marine Expeditionary Unit and Thai Marines during a Joint Forceable Entry Amphibious Assault at Cobra Gold 24 in Thailand. Photo provided by SGT Brandon Bruer, 16th CAB “Raptor Brigade” Public Affairs Noncommissioned Officer in Charge (NCOIC).

and can only be installed after securing the landing zone. The Army has an existing gap from arrival into theatre to arrival at combat zones. Army Aviation can fill the gap with adequate training and joint collaboration.

Seabasing is a critical method to facilitate joint operations before seizing deep-water ports and airfields capable of housing U.S. Air Force aircraft from the air mobility command.

Joint Publication 3-02, “Amphibious Operations,” posits that seabasing is the deployment, assembly, command, projection, reconstitution, sustainment, and re-employment of joint power from the sea without reliance on land bases within the JOA [joint operations area]” (Joint Chiefs of Staff, 2021a, p. IV-18). Specifically, the seabasing of supporting Army Aviation resources enables the joint force commander (JFC) and joint force land component commander (JFLCC) to extend operations and provide an immediate rotary-wing asset to assist with the JFE assault and sustainment operations (Department of the Army, 2022). However, as stated in Field Manual (FM) 3-0, “Operations,” “intra-theater rotary-wing movement ... requires aircrews trained and equipped for deck landing and overwater flight operations” (Department of the Army, 2022, p. 7-18). This blanket statement rooted in doctrine has not been proliferated across Army Aviation and CABs outside of USARPAC. In fact, only 2 CAB, 16 CAB, 25 CAB, and the 160th Special Operations Aviation Regiment have developed sustained overwater and DLQ programs (K. Haw-



The Army's JLOTS system approaches the beach during Pacific Strike 2008 at Camp Pendleton, California. U.S. Navy photo by Mass Communication Specialist 2D Class, Brian P. Caracci.

ley, personal communication, July 23, 2024). Operating from a ship capable of housing Army equipment and personnel is a combat multiplier to the JFC. This capability allows the joint force to overcome anti-access and aerial denial (A2/AD), which has become a defensive tool China uses across the South China Sea. Furthermore, seabasing reduces the sustainment and force protection requirements associated with landbasing (Department of the Army, 2020, p. 1-17).

With the proper updates to doctrine,



A U.S. Army UH-60M Black Hawk Helicopter assigned to the 2-158th Assault Helicopter Battalion, 16th CAB, conducts a deck landing qualification off the shore of Washington State. Photo provided by SGT Brandon Bruer, 16th CAB “Raptor Brigade” Public Affairs NCOIC.

policy, materiel, and training, Army Aviation can capitalize on its strategic advantage of extending operations across the area of operations for the

JFLCC. Moreover, Army Aviation’s core competencies of seeing, striking, moving, and extending across an operational environment can support the joint force more effectively to facilitate landing on a shore. Our days of operating as a primarily land-based maneuver force are over. To maintain primacy in INDOPACOM, the Army must continue to adapt and become proficient at conducting operations adjacent to the Navy and Marines to dominate the littoral as a combined arms team.

Lessons Learned

There are several nuances associated with overwater operation proficiency and interfacing with the Navy and Marines to become a trained and proficient force capable of conducting JFE operations. While fundamental doctrine, namely FM 3-0, has been updated to reflect the importance of overwater operations, other doctrinal areas still lack this

understanding. These doctrinal areas must be updated to ensure that the requisite impetus is prevalent and that units conduct these unfamiliar operations routinely and safely. Moreover, Department of Defense policy must be updated to reflect and codify the importance of interoperability between the Army and the Navy. This will legally bind training obligations that would only strengthen our joint capabilities. Materiel must be acquired across the Army so it can be

positioned to conduct these operations. Finally, challenging, realistic training must occur more frequently to ensure a proficient and capable fighting force.



A UH-60M helicopter from the 16th CAB conducts a deck landing on the USS Somerset (LPD-25) during Cobra Gold 2024. U.S. Army photo by SGT Brandon Bruer.

Pertinent recommendations for each of the aforementioned areas are detailed below:

Doctrine

The Army's revised FM 3-0 features a chapter on MAROPS, signaling an update to subordinate literature. Army Aviation must relook its publications to cover this domain appropriately. Field Manual 3-04, "Army Aviation," only includes two paragraphs on MAROPS (Department of the Army, 2025, pp. 23-24). Field Manual 3-04 must be expanded to include more MAROPS content that emphasizes the necessity of maintaining a MAROPS capability in Army Aviation. This information should detail the specifics of operating in blue water vs. the littoral as a member of the combined arms team. Alternatively, I believe reproducing FM 1-564, "Shipboard Operations," a 28-year-old redacted FM covering overwater operations, could provide an in-depth analysis of MAROPS and the associated training progressions and standards associated with overwater flight (Department of the Army, 1997).

The Army Aviation Center of Excellence's Directorate of Training and Doctrine (DOTD) has published many products in its MAROPS training support package.¹ However, they are 4 to 10 years old and lack awareness into the present conduct of MAROPS in a contested A2/AD environment. I believe that an *updated training support*

package and corresponding standard operating procedure would enable units to follow a coherent training glide path to better train MAROPS combat-ready crews. *Moreover, updating unit mission-essential task list training and evaluation outlines to emphasize MAROPS* would require units to adopt a training pipeline that codifies MAROPS capabilities.

Policy

Perhaps the most significant barrier to entry of MAROPS is the availability of naval vessels to conduct DLQs and sea-based operations (K. Hawley, personal communication, July 23, 2024). A Memorandum of Agreement (MOA) between the Navy and sister services for DLQs and shipboard landings states, "The Navy shall schedule deck time to support USA/USAF DLQ training requirements" (U.S. Navy, 2023, p. 1, attachment 7).² This statement lacks any direction on the frequency of support. In my experience, DLQ opportunities have occurred sporadically and are generally conducted in windows of opportunity for the Navy, outside of a dedicated schedule. *Formalizing the relationship between the Army and the Navy* on the conduct of DLQs and dedicating training windows creates a predictable training pathway to ensure the appropriate continuity of qualification and currency requirements.

To this end, *Army Regulation 95-1, "Flight Regulations," must be updated to reflect the growing importance of MAROPS.* Army Regulation 95-1 only references

overwater flight in one paragraph to discuss requisite survival equipment (Department of the Army, 2018, p. 50). Topics such as flight procedures, naval coordination, and an expanded survival section should be included to enact shared understanding across all Army Aviators.

Materiel

To extend operations across the littoral, increased on-board fuel storage will be required to conduct shipboard operations with limited access to forward arming and refueling points (FARPs) across the maritime operational environment. Specifically, the Army must *increase the requisite amount of auxiliary fuel cells to no less than 50% of its modified table of organization and equipment allotment of aircraft.* These systems are pivotal in extending the range and flight time of Army aircraft, allowing them to fly farther or conduct more turns, depending on how far the FARP or refueling vessel is. The increased acquisition of crashworthy external fuel systems for UH-60 Black Hawks and internal self-sealing fuel tanks for AH-64 Apache and CH-47 Chinook platforms create flexibility for the JFC. Additionally, they ensure aircraft can sustain themselves long enough to be effective platforms of combat power in the littoral.

Moreover, the Army must *construct field deck landing pattern (FDLP) pads near every Army Airfield (AAF).* No less than five FDLP bounces must be conducted before executing any shipboard DLQs

¹ This document is available through the external DOTD SharePoint site at <https://armyeitaas.sharepoint-mil.us/sites/TR-ACOE-DOTD/SitePages/Directorate-of-Training-and-Doctrine.aspx>. Click on AVN TSP Documents at the bottom right of the page, and then select Maritime Operations TSP.

² You may find this Memorandum of Agreement at: <https://armyeitaas.sharepoint-mil.us/sites/TR-ACOE-DOTD/Flight%20Training%20Branch%20Documents/Forms/AllItems.aspx?id=%2Fsites%2FTR%2DACOE%2DDOTD%2FFlight%20Training%20Branch%20Documents%2FTSPs%2FMaritime%20Operations%20TSP%2F231011%20DLQ%20MOA%202023%2Epdf&parent=%2Fsites%2FTR%2DACOE%2DDOTD%2FFlight%20Training%20Branch%20Documents%2FTSPs%2FMaritime%20Operations%20TSP>

(U.S. Navy, 2023, pp. 2–3). Maintaining FDLF pads across every CAB facilitates MAROPS training—even without open ocean or available vessels for land-locked CABs—and ensures proficiency is transcended to all pilots. A recommendation would be to create these pads in the open space of a unit’s training area to deconflict them with the standard AAF’s traffic pattern. Field deck landing patterns can also be conducted in the simulator, especially when adverse weather impacts optimum flying conditions. Ensuring units are equipped with *updated simulators that meet the DLQ MOA standards* facilitates this requirement and allows units to train DLQs year-round.

A significant limiting factor to seabasing is the increased maintenance costs associated with corrosion prevention and control. In Fiscal Year (FY) 2017, the Navy spent \$997 million on total maintenance across all MH-60 variants (Herzberg et al., 2019, p. 2-3). In FY 2016, \$281 million, or 28.2%, of the MH-60 maintenance budget, was spent by the Navy directly on corrosion prevention and control activities (Herzberg et al., 2019, p. A-3). In contrast, Army Aviation only spent 19.1% of its total maintenance budget on corrosion prevention

and control during the same period (Herzberg et al., 2019, p. A-3).

To operate in a maritime environment, the Army must increase its capacity to conduct organic corrosion control and nest corrosion prevention strategies with that of our sister services. Recommendations include shortening the maintenance intervals between corrosion control inspections from 30 to 15 days while operating in strictly maritime environments. The two work packages with the highest corrosion-associated costs are the airframe and the engines (Herzberg et al., 2019, p. 2-5). Utilizing sealants that the Navy installs on its aircraft will protect the bodies of Army aircraft. Moreover, conducting regular engine flushes, prescribed in the various helicopter technical manuals, will continue to preserve engine life. *Determining new methods to safeguard these essential systems from corrosion should be posited in future research as Army Aviation continues to develop efficiency in MAROPS.*

Training

A considerable hurdle to MAROPS is the initial qualification in the modular

egress training simulator (METS), or Dunker Training, and renewal in the shallow water egress trainer (SWET). I believe that *METS training should be renewed during Initial Entry Rotary-Wing (IERW) training at Fort Rucker, Alabama*. Removing Dunker from IERW has caused a training backlog for CABs to figure out. Most CABs do not have a Dunker facility, so they outsource training to nearby naval or international METS facilities. This has created throughput issues that reduce the number of available aviators to conduct MAROPS. To curtail this issue, renewing METS during flight school would ensure that all aviators have a baseline understanding of overwater survival training and baseline MAROPS knowledge. Moreover, they can arrive at any unit and be immediately involved in MAROPS flight training progressions.

Shifting to the unit level, starting a DLQ program from scratch is inherently difficult. When 25 CAB started its DLQ program in 2014, it brought subject matter experts (SMEs) from the 160th Special Operations Aviation Regiment to train the trainers (K. Hawley, personal communications, July 23, 2024). Once instructor and standard-



Rim of the Pacific is held biennially and is the world’s largest international maritime exercise. Featuring 29 nations, 40 surface ships, three submarines, and 14 land forces, this is the largest exercise to date. U.S. Navy photo by Mass Communication Specialist, John Bellino.

ization pilots were trained, they could instruct their pilot-in-command population. At 16 CAB, we brought 25 CAB SMEs to perform the same progression in 2023. Other CABs can follow this same model, especially those within 200 miles of the ocean. The training pipeline includes ground academics, FDLs, simulator DLQs, day DLQs, and night-vision goggle DLQ iterations. Once trained, currency becomes an issue. Single-spot DLQs are current for 6 months, while multi-spot DLQs are current for 1 year (U.S. Navy, 2023). Having codified relationships with the Navy mitigates the currency dilemma.

Finally, zooming out to training at echelon, the only way to become proficient at LSCO is to stress LSCO capabilities and leaders across the joint force. Operation Pathways, formerly Pacific Pathways, does just that. Specifically, Operation Pathways “sets the theater, building readiness at echelon, and brings all enablers together to function under the umbrella of a large-scale operation” (Center for Army Lessons Learned, 2016, p. 41). These bilateral military exercises are excellent tools to build operational competencies between the joint force and foreign partners (D. Carpenter, personal communication, July 19, 2024). However, there is room to improve these exercises to force joint interoperability. First, *Army equipment must be transported by the Navy’s strategic sealift command and the Army’s*

watercraft fleet. Operating in a contested maritime operational environment will require equipment to be transported by vessels capable of protecting themselves. Moreover, conducting sea-based JFEs will require deck-landing capable vessels to house the Army’s aircraft inventory and project them into the littoral.

To move equipment on Army-flagged watercraft within a naval fleet, the Army should *incorporate more Compo 2 and Compo 3 units during Pathways exercises*. Upward of 70% of the Army’s sustainment capabilities exist in Compo 2 and 3 units; yet, they have fewer opportunities to train (compared to Compo 1 units) and are generally not involved in the current Operation Pathways framework (MacCarley & Coleman, 2009, p. 25).

Finally, the *Army must stress joint force integration to maintain interoperability*. I observed several Pacific Pathway iterations where the JFC underutilized Army Aviation due to lack of overwater capabilities. The development of MAROPS proficiency at the unit level provides the flexibility for the JFC to “utilize Army Aviation on extended legs” and incorporate them into joint operations more effectively (K. Hawley, personal communication, July 23, 2024). Incorporating Army Aviation into these exercises from a shipboard posture facilitates the Army’s ability to integrate and extend

combat power in the littoral.

Conclusion

The Army’s transition to large-scale multidomain combat operations confirms the pivot to operating within the littoral regions. Army Aviation is the Army’s greatest opportunity to extend combat power from ship to shore and create flexibility for the JFC to facilitate combat and sustainment operations. Seabasing aircraft and personnel to stage for a JFE and follow-on operations is no small feat. With the modernization of specific doctrine, materiel, policy, and training, Army Aviation can bridge an operational gap that projects combat power well into the littoral. Codifying expectations for units to train and execute DLQs and maritime flight training is essential to capitalize on this strategic advantage. The Army must adapt to become comfortable with conducting overwater operations to dominate the littoral and provide the JFC with a usable asset in INDOPACOM and across all littoral regions.

Above the Best!

Biography:

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Modernizing Logistics: The Case for Fuel Blivets Over M978 Heavy Expanded Mobility Tactical Trucks

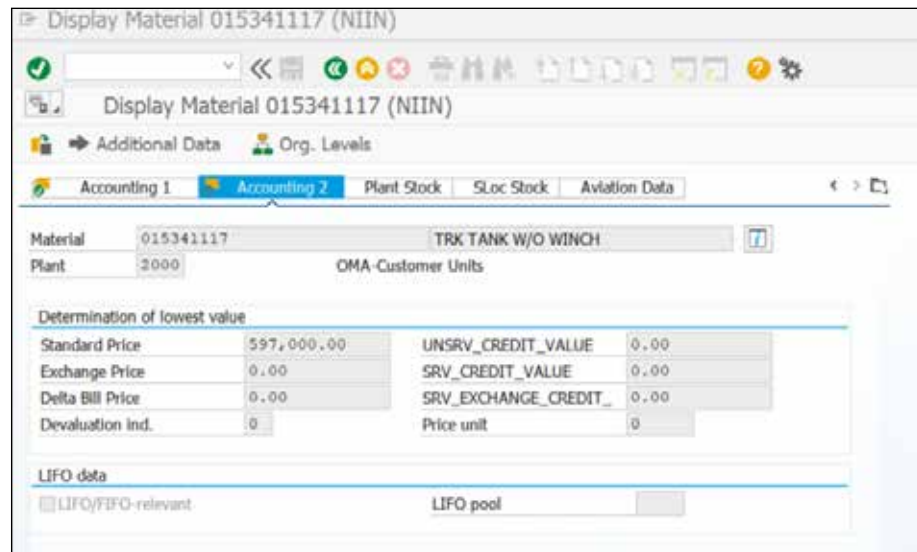
By CPT Jason D. (David) Toguchi

Army Aviation is undergoing a massive overhaul and transformation. A key challenge that persists is the strategy for sustaining forward refueling operations during Large-Scale Combat (LSC) in close areas. To address this challenge, Army Aviation should leverage the potential of fuel blivets. Unlike M978 Heavy Expanded Mobility Tactical Trucks (HEMTTs), fuel blivets are cost-effective, easily serviced, and flexible assets that have been largely overlooked.

Heavy Expanded Mobility Tactical Trucks are high-value targets for adversaries, often vulnerable due to their stationary mission set, and they require a higher degree of maintenance compared to fuel blivets. Unlike Advanced Aviation Forward Area Refueling Systems (AAFARS), fuel blivets offer similar capability at a lower cost. Heavy Expanded Mobility Tactical Trucks should remain in the rear area for greater protection and sustained logistical support. In contrast, fuel blivets should be exploited in close areas due to their lower cost and comparable operational effectiveness. By leveraging fuel blivets in these high-risk zones, we can enhance operational flexibility and reduce the vulnerability of critical supply assets.

The Case for Cost-Effectiveness

Cost wise, a single M978A4 HEMTT costs \$597,000.00, according to the Global Combat Support System (GCSS)-Army (GCSS-Army, 2025). In contrast, one 500-gallon fuel blivet variant, which is mostly commonly used with aviation as-



Display Material 015341117 (NIIN)

Additional Data Org. Levels

Accounting 1 Accounting 2 Plant Stock SLoc Stock Aviation Data

Material 015341117 TRX TANK W/O WINCH

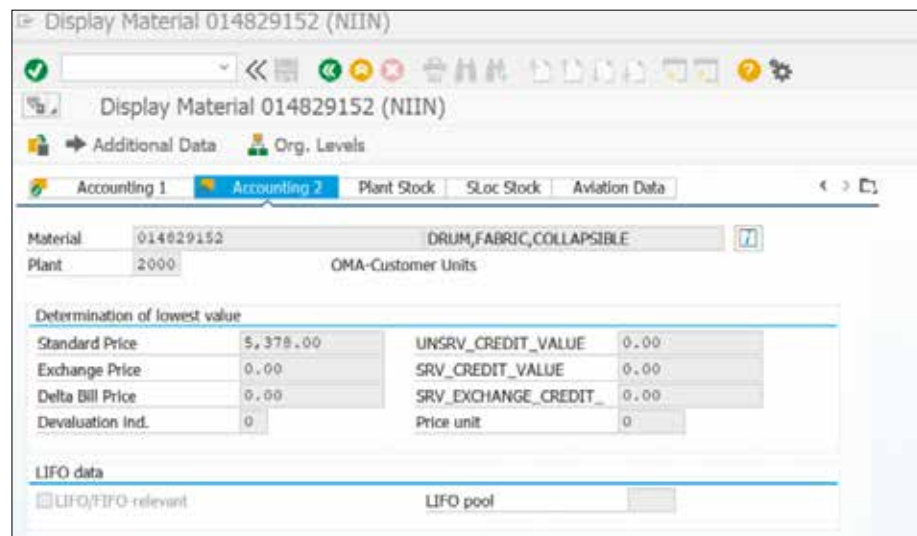
Plant 2000 OMA-Customer Units

Determination of lowest value			
Standard Price	597,000.00	UNSRV_CREDIT_VALUE	0.00
Exchange Price	0.00	SRV_CREDIT_VALUE	0.00
Delta Bill Price	0.00	SRV_EXCHANGE_CREDIT_	0.00
Devaluation Ind.	0	Price unit	0

LIFO data

☐ LIFO/FIFO-relevant LIFO pool

M978A4 HEMTT cost in GCSS. Photo provided by the author.



Display Material 014829152 (NIIN)

Additional Data Org. Levels

Accounting 1 Accounting 2 Plant Stock SLoc Stock Aviation Data

Material 014829152 DRUM, FABRIC, COLLAPSIBLE

Plant 2000 OMA-Customer Units

Determination of lowest value			
Standard Price	\$, 378.00	UNSRV_CREDIT_VALUE	0.00
Exchange Price	0.00	SRV_CREDIT_VALUE	0.00
Delta Bill Price	0.00	SRV_EXCHANGE_CREDIT_	0.00
Devaluation Ind.	0	Price unit	0

LIFO data

☐ LIFO/FIFO-relevant LIFO pool

500-gallon fuel blivet cost in GCSS. Photo provided by the author.

sets, costs \$5,378.00 (GCSS-Army, 2025). M978 HEMTTs are capable of carrying up to 2,500 gallons of fuel (Bolon, 2014), and aviation units typically operate with 500-gallon fuel blivets (Bolon, 2014). Although M978 HEMTTs can transport

more fuel, without factoring in depreciation, it costs an average of \$238.00 to hold a single gallon of fuel in an M978 HEMTT compared to \$10.76 per gallon in a 500-gallon blivet (GCSS-Army, 2025; Bolon, 2014). Army Aviation saves

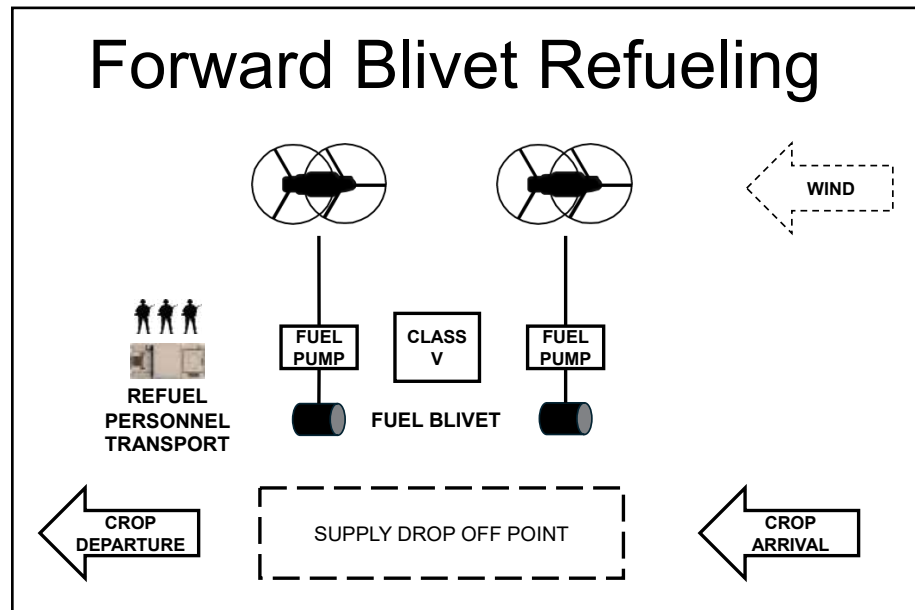
approximately 95 percent (%) per gallon of fuel storage with fuel blivets compared to M978 HEMTTs.

Not factoring in depreciation, the result of an indirect fire (IDF) attack on an AAFAR site with the loss of two M978 HEMTTs filled with fuel at an average cost of \$6.22 per gallon would amount to \$1,225,100 (GlobalAir.com, 2025). In contrast, if struck by effective IDF, a forward blivet refueling (FBR) site with 10 fuel blivets—each filled with fuel at the same price—would incur a loss of approximately \$84,880. In this scenario, Army Aviation would save up to 93% if an IDF attack destroyed an FBR site with 10 blivets, as opposed to an AAFAR site with two HEMTTs. While both the AAFAR and FBR provide the same amount of fuel, the latter offers significant cost savings in the event of a catastrophic loss.

Army Aviation is leveraging industry assistance to address challenges in LSC sustainment. The current Army acquisition process is arduous, costly, and lengthy. Meanwhile, as the Army continues to procure more survivable sustainment equipment, it should utilize existing sustainment inventory, such as fuel blivets, to bridge the gap. Fuel blivets present a viable solution for sustaining aviation in close areas, as the Army is already proficient in its operational integration and servicing requirements. Increasing the use of fuel blivets and incorporating them into training will enhance the familiarity and preparedness of our Soldiers, ensuring that fuel blivets are effectively integrated into aviation sustainment planning and operations. This approach will make Army Aviation sustainment more survivable and cost-effective in a LSC environment today, rather than waiting for the acquisition process to be complete in the coming years.

The Case for Easier Servicing

M978 HEMTT servicing requirements can be demanding and often unpredictable. These HEMTTs require strict adherence to safety regulations and routine maintenance. Their engine, electrical, transmis-



Forward blivet refueling example. Created and provided by the author.

sion, and other associated systems may have numerous problems that could compound over time. A failure in just one system can result in a lack of mission capability for the owning unit. On the other hand, fuel blivets typically require minimal servicing including inspection, cleaning, and storage. Compared to HEMTTs, blivets are much less labor-intensive, which is ideal for operations in close areas where routine maintenance may go unaddressed for days or weeks. Furthermore, considering the routine maintenance and the increased likelihood of unforecasted maintenance in a LSC environment, fuel blivets require minimal maintenance and attention, making them ideal for sustainment in the close area.

M978 HEMTTs are susceptible to poor terrain and the probability of rollovers on unimproved roads or off-road terrain, making their loss more likely in the close area. M978 recovery in the close area is a significantly more demanding event compared to the recovery or loss of a fuel blivet in the same location. Leaving HEMTTs primarily in the rear area ensures they receive the servicing and attention they deserve, while deploying blivets to the close area reduces the labor requirement on forward operators and allows them to maintain lethality and remain focused on their mission set.

The Case for Improved Flexibility

Fuel blivets are flexible and maneuverable. They can be transported via trailers or Containerized Roll-In/Roll-Out Platform (CROP) flatbeds and deployed quickly at designated locations in close areas. This enables the CROP to proceed on its route without the prolonged stationary periods required by HEMTTs during forward arming and refueling point (FARP) operations. Once blivets are dropped off and their fuel is consumed by the aviation assets, they can be easily recovered for future use.

There are various forms of deployment for fuel blivets. Recently, fuel blivets have been modified to be transported to the standardized 463L pallet, allowing CH-47Fs to quickly relocate much-needed Class III (petroleum, oils, and lubricants) supplies. This modification has the potential to supplement the popular CH-47 Fat Cow (rapidly deployed FARP) operation. Instead of a Fat Cow CH-47 remaining stationary for a substantial period of time at a forward refueling point, this blivet modification enables the CH-47 to quickly offload several fuel blivets with a refueling crew and continue its route of flight. The refueling crew is then able to conduct the refuel operation and be recovered later by aircraft or ground convoy. Fat Cow operations could be risky due to its stationary requirement at a forward location, but

fuel blivets have the potential to mitigate risk for high-value assets.

The 82D Airborne Division previously conducted a “low-cost low-altitude” operation using modified 400-gallon fuel blivets (MacLeod, 2011). The 82D’s operation demonstrated the ability to quickly deliver blivets and supply fuel to an austere environment. The modified blivets, when collapsed, can be handled and stacked by a single person, allowing for ease of storage and transportation. Fuel blivets can be delivered by ground, sling load, or airdrop, offering a more flexible option than M978 HEMTTs alone. This adaptability highlights their potential to be the ideal solution for sustaining operations in high-risk zones.

AAFAR vs. FBR

This discussion will not fully delve into the details of the FBR process, as it would necessitate a separate conversation. However, there are a few highlights worth addressing between AAFAR and FBR. Advanced Aviation Forward Area Refueling System operations require HEMTTs to remain stationary in wooded or dense terrain to increase survivability; however, HEMTTs are likely to suffer in these environments since they are intended for improved and unimproved roads and not continuous traversing of hills, ditches, and dense forest. Fuel blivets are likewise stationary unless secured to a vehicle or trailer for maneuverability. Fuel blivets may also require a larger footprint when compared to M978 HEMTTs for the same fuel amount. However, if fuel blivets are stationary, stacked, and/or concealed in a trench or covered in camouflage netting, their vulnerability to detection may decrease. Additionally, by extending the fuel hoses, blivets

can be kept in wood lines similar to HEMTTs, with the hoses concealed and extended to reach aircraft for refueling operations. Extended hoses may reduce pressure in the refuel system, resulting in a slower refuel rate. However, this issue could be mitigated by implementing industry solutions, such as an improved pump system or introducing innovative techniques.

M978 HEMTTs have the unique capability of self-recovery and self-refuel operations, whereas fuel blivets depend on external assets for sustaining refueling operations. To address this issue, Army Aviation should proliferate the supply of blivets within combat aviation brigades (CABs). Operations can be conducted where blivets are recovered and replaced by filled blivets on flat racks or, in rare

close area, ultimately reducing the risk and improving operational efficiency.

Personal Experience

Both FBR and AAFAR are exposed to the inherent risk of an effective IDF attack in the close area, therefore making safety of refueling personnel a chief concern. The AAFAR is intended to allow refueling personnel to quickly disconnect and conduct a scatter plan for survivability. Forward blivet refueling is expected to require a minimum of three personnel to conduct refueling. It takes one person to open the fuel valve at the blivet, another to hook up the hose to the aircraft, and a third person armed with a fire extinguisher to monitor and respond to fires. It is recommended that per-

sonnel be supplemented with a High Mobility Multi-purpose Wheeled Vehicle to allow for quick escape in the event of IDF. While personnel safety is not significantly enhanced with FBR compared to AAFAR, the risk of losing a high-value HEMTT is mitigated.

One reason fuel blivets may have been previously overlooked as a viable option in Army Aviation LSC operations is the lack

of training and experience within CABs. For instance, during my service in the 3D CAB (3 CAB) from October 2021 to August 2024, we never utilized fuel blivets for refueling. This was not due to the unavailability of fuel blivets, but rather because the training conditions did not necessitate their use. This example highlights how a CAB and its personnel might be unfamiliar with fuel blivets and their benefit to an operation.

During my tour in Honduras with the 1-228th Aviation Regiment, we frequently relied on fuel blivets. In response to Hurri-



SPC Prentis Ficklin inspects fuel blivets to ensure they are ready to be sling loaded. U.S. Army photo by SPC Rochelle Krueger.

cases, refueled by HEMTTs. While having M978 HEMTTs refuel forward blivets may seem to defeat the purpose of an FBR, this process would cut HEMTT stationary time in half compared to an AAFAR operation and maintain the survivability value for HEMTTs. Instead of remaining stationary at an AAFAR site for prolonged periods, a HEMTT would refuel the blivets and then continue its movement to maintain survivability, returning to the safety of a tactical assembly area in the rear. This approach minimizes the exposure of HEMTTs compared to AAFAR operations in the



A U.S. Army SGT pulls a fuel line to a Black Hawk helicopter during a "fat cow" refueling exercise at Aibano Training Area, Japan. U.S. Army Reserve photo by SGT Jacob Lockhart.

canes Eta and Iota in 2020, we utilized fuel blivets for refueling in various scenarios while conducting humanitarian aid operations. Our unit staged at El Aguacate, Honduras, a civilian airfield serving as a hub for aircraft refueling and humanitarian supply distribution. Given the austere environment and limited refueling options in central Honduras, we depended on fuel blivets to sustain life-saving operations. We deployed our CH-47s to perform a Fat Cow operation, filling the fuel blivets on El Aguacate's barren tarmac. This enabled UH-60s to continue their humanitarian supply delivery and medical evacuation operations. We conducted this Fat Cow operation until HEMTTs could arrive. Such experiences demonstrate the

practicality and flexibility of fuel blivets in austere environments.

Conclusion

The implementation of fuel blivets for close area forward refueling operations in LSC scenarios provides significant advantages to Army Aviation. The cost-effectiveness, flexibility, and reduced maintenance requirements of fuel blivets make them a practicable solution for the close area where routine maintenance can be challenging, and high-value assets are at greater risk. Overall, M978 HEMTTs should not be entirely replaced in the close area. Instead, their role should be greatly reduced and their

mission augmented with a more cost-effective adaptation. Fuel blivets can bridge this gap until industry can produce a more survivable method of refuel in the close area. By utilizing fuel blivets, Army Aviation can enhance operational flexibility, ensure continuous fuel supply, and reduce the vulnerability of critical supply assets.

Biography:

CPT David Toguchi commissioned into Army Aviation in 2019 after graduating from East Carolina University. He is a CH-47F Chinook pilot-in-command and air mission commander. He served in Central America with the 1-228th Aviation Regiment as an Assistant S3 and with the 2-3 Aviation Regiment at Hunter Army Airfield, Savannah, Georgia. Additionally, he served in Europe as a heavy lift Platoon Leader and Assistant S3.

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How to Return Money to the Warfighter:

A Replicable Acquisition Success from the 2D Combat Aviation Brigade

By CPT Eugene S. Thagard, CW3 Timothy L. Claflin, and MAJ Lee M. Oeschger

The world is changing...fast. New threats and capabilities emerge constantly, and the pace of commercial innovation seems to surpass the Army's ability to keep up. From updated aircraft survivability equipment to experimental small and tactical unmanned aircraft system (UAS) platforms, to the acquisition behemoth that is the Future Long-Range Assault Aircraft, Army Aviation stands neck deep in this modernization transformation.

Unfortunately, all of these changes and acquisitions require money, and as technology evolves, the number of zeroes on the bills are multiplying, not decreasing. The Army's investment in the Bell V-280 Valor tiltrotor aircraft alone is expected to run approximately \$70 billion across its lifespan (U.S. Army Public Affairs, 2022).

But, as all comptrollers, S-8 sections (budget and manpower resources), S-4 sections (supply, transport, logistics, and budget issues), and commanders know, good ideas are endless and priorities are plentiful; yet, resources are painfully finite. Thus, there exists a clear impetus

in achieving operational efficiencies. Every success in reducing costs, building redundancy, acquiring new capabilities, and maximizing the Army's return on investment (ROI) not only returns critical funds to training opportunities (read: creating more lethal operational units) but also provides the first snowball for savings morphing into further modernization opportunities.

Unsurprisingly, no one in the Army is a consultant at the McKinsey, Bain, or Deloitte firms, steeped in the dark arts of management and operational consulting. We are unable to shift funds on a whim or delete departments, but there still exist plentiful opportunities for success in the margins. By retiring outdated equipment or acquiring new systems, meaningful sums of money can be saved and reinvested into the force. When adopted with zeal, at scale, and across the Army, these successes quickly add up. The 2D Combat Aviation Brigade (2 CAB) out of Camp Humphreys, South Korea, recently achieved an operational efficiency worth sharing due to its replicability.

Success in Korea

Similar to other CABs, 2 CAB found itself suffering from excessive costs related to the servicing, maintenance, and utilization of the Aviation Ground Power Unit (AGPU). The AGPU is a critical piece of aviation ground support equipment (AGSE), capable of providing electrical, pneumatic, and hydraulic power to aircraft requiring maintenance or an external power source. Unfortunately, 2 CAB's AGPU fleet is dated and due to its versatility, remains in constant demand, consequently leading to breaks and increased maintenance requirements.

In an effort to alleviate demand on the AGPU fleet, 602D Aviation Support Battalion's (ASB) Production Control Officer, CW3 Tim Claflin, identified a potential fix in acquisitioning Ground Power Units (GPUs). While lacking certain capabilities of an AGPU, these GPUs provide the same electrical output at significantly reduced cost and increased efficiency, thus alleviating the AGPU's most common demand by providing a redundant capability.



Soldiers hoist the engine of an Aviation Ground Power Unit off a maintenance stand at Fort Eustis, Virginia. U.S. Army photo by SSG George Prince.

In fact, many CABs possess a few GPUs to augment their AGSE fleet.

Yet, the simple fix of purchasing one or two GPUs was insufficient. Key questions such as “how will we train Soldiers to properly utilize the equipment?” and “what happens when this equipment breaks?” stood unanswered, so CW3 Claflin sought a more robust solution. Thus, over roughly 2 years, he successfully coordinated with the U.S. Army Aviation and Missile Command and the 411th Contracting Support Brigade to draft a contract requirement, resulting in a significant win for Army Aviation. In total, using conservative estimates, we project that the 2 CAB will save millions of dollars within a few years, purely from maintenance and energy costs. It discards the stopgap solution of a one-off acquisition to invest in a complete solution.

These projected savings stem from a number of varying avenues and deserve exploration in greater detail. In the torrent of duties and increasing demands on Army Aviation, such analysis is typically impeded. Thus, we hope taking time to accurately delve into the potential impact of a single GSE investment should motivate CABs across the Army to expand their search for operational efficiencies.

Sparing the GSE Workhorse

Despite the age of many AGPUs across the fleet, it remains the AGSE workhorse

for Army Aviation, yet this over-reliance and lack of redundant capabilities comes at the cost of maintenance. Like many CABs across the Army, 2 CAB spends exorbitant amounts for the routine maintenance of its AGPUs. To the untrained eye, spending a small fortune annually seems to be disproportionate cost for the annual maintenance of a single type of supporting equipment, but the AGPU is truly that important. Yet one must ask: Is there another way to chip away at these costs?

Through the acquisition of a fleet of GPUs, 2 CAB accomplished those savings by alleviating the greatest demand requirement on the AGPU, which is external electrical power. While the math in calculating savings from future maintenance parts can never be exact, we can make educated assessments. Approximately, 60 percent (%) of the 2 CAB fleet almost exclusively utilizes the AGPU for its electrical component, meaning the GPU could fill this maintenance requirement. If we project that 10% of those maintenance tasks require more than just the electrical component, then one can estimate that 2 CAB stands to reduce AGPU use and required maintenance parts by nearly 54%. Utilizing these calculations from maintenance savings alone, the GPU investment covers its own cost.

Although inexact, this math offers a useful picture of the positive effects provided by acquiring redundant capabilities.

Furthermore, the GPU serves to extend the AGPU lifespans, increasing the ROI for both the AGPU and GPU.

Electricity > Gasoline

Cost-savings do not stop with maintenance. They also extend to the routine use of each piece of equipment. The acquisition of the GPU substitutes a piece of GSE reliant on JP-8 fuel (jet propellant) with one drawing power from grounding points found in nearly every hangar. These cost savings are significant, not to mention supportive of the Army’s environmental and sustainability goals.

For reference, across the AGPUs in 2 CAB’s AGSE fleet, we conservatively estimate that they operated for nearly 2,500 hours over the previous 12 months. We calculated the data by taking the current AGPU hours from 602D ASB’s oil analysis sample submissions and extrapolated the numbers across the CAB. With Army Aviation’s known deficiencies in accurate reporting of man-hours and equipment hours, we can safely assume this estimate is on the low end, and any predicted savings will be in excess of those stated in this article.

Currently, the AGPU acts as an additional burden on the Army’s fuel system, burning 17 gallons per hour when exclusively providing electrical power (Department of the Army [DA], 2017, p. 0004 00-6). According to Defense Logistic Agency’s Fiscal Year (FY) 2024 Standard Fuel Prices (Defense Logistics Agency, 2023), a gallon of JP-8 [FY24] costs \$3.50, which means the AGPU’s operational cost is \$59.50 per hour. Conversely, the Department of Public Works for Camp Humphrey’s average electricity cost is \$107.41 per megawatt-hour (2024). This means, at maximum electrical capacity, the contracted GPU’s operational cost is a meager \$2.92 per hour, saving the CAB \$56.58 an hour. Admittedly, this seems minuscule in the behemoth that is the CAB budget, but these savings climb rapidly. If the previous generalized figure of reducing the usage rate by 54% carries, then the new GPUs can expect to be utilized for 1,350 hours annually, saving the CAB \$76,383 over the course of an FY.

Broader Implications

As we evaluate the potential gains from 2 CAB's GPU contract, there are several other elements worth considering. The first is the benefit to the maintainers' health and welfare. In addition to its operational costs, the AGPU is also incredibly loud, shrieking at 96 decibels (dB) at the work panel (DA, 2017, p. 0004 00-4). This level of noise causes damage after just 30 minutes (National Institute for Occupational Safety and Health, 2024).¹ Alternatively, the GPU typically operates at 60 dB, right around the range of normal conversation (Illinois Tool Works, n.d., p. 3; Decibel Pro, 2025).² Pairing an opportunity to achieve operational efficiencies while protecting our Soldiers is a no-brainer.

Secondly, this investment achieves an incalculable but significant savings in man-hours. By sharing workload across GSE and reducing maintenance issues due to overwork, a significant amount of time will be returned to our contracting services handling AGSE maintenance. As a result, these essential teammates can now dedicate their substantial

resources to other high-value tasks.

Finally, this acquisition establishes a positive relationship with a new contractor, rewards disciplined initiative, highlights the benefits of innovative problem solving, hones skills in evaluating the market, and provides a framework to secure more acquisitions and achieve greater operational efficiencies going forward. For instance, the contracting company recently released an electric GPU (eGPU) that projects to be a field deployable asset. In experimental testing within the 602D ASB, it proved remarkable. Due to the savings secured by the GPU contract, the CAB could make a similar investment in one eGPU per battalion, while still achieving a surplus of savings. This marks a singular example, but the snowball effects of savings are real.

The Future

While the use of GPUs within Army Aviation is not novel, the structuring, negotiation, and securing of a favorable government contract is significant and, most importantly, replicable. The savings discussed throughout this article highlight the benefits reaped for a single year, but these savings quickly begin to mount as the Army trudges along.

An exciting element of this success is that it inspires efforts to find even more

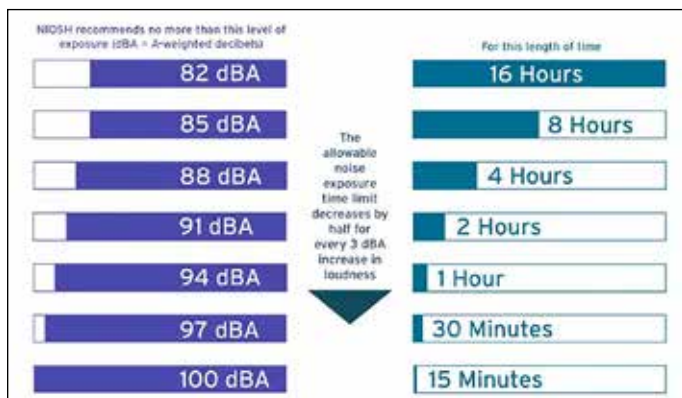
operational efficiencies. The world is indeed changing quickly. New products and technologies are being invented and becoming available constantly. It is incumbent upon those in aviation to continue exploring ways to pull these private enterprises into our workshops. Success in the acquisition theater makes us more redundant, more flexible, more ready, and more lethal. It requires an innovative mindset in which we remain unsatisfied with the status quo and are hungry to make our organizations better. In this age of transformation, the risks of being left behind are great; we must transform too.

Biographies:

CPT Gene Thagard is an AH-64E pilot currently serving as Production Control Officer-In-Charge (OIC) for Company B, 602D ASB, 2 CAB. His prior assignments include Gray Eagle Executive Officer and Platoon Leader for Company B, 1-101 Aviation Regiment, headquartered at Fort Campbell, Kentucky.

CW3 Tim Claflin serves as the Production Control Officer for 602D ASB at Camp Humphreys, South Korea, where he leverages his expertise as an Aviation Maintenance Technician. Throughout his career, he has held various leadership roles, including Aviation Maintenance Manager, Gray Eagle Maintenance Platoon Leader, Armament Platoon Leader, Quality Control OIC, and Technical Supply OIC. With a unique blend of experience, CW3 Claflin has served 7 years in the Marine Corps as a Sapper/Combat Engineer and 15 years in the Army, bringing a total of 22 years of military service to his current position.

MAJ Lee Oeschger is a UH-60M pilot and Aviation Maintenance Officer currently serving as the Company Commander for Company B, 602D ASB, 2 CAB. He is a graduate of the Command and General Staff Officers Course (Fort Leavenworth, Kansas), and his prior assignments include Observer/Coach/Trainer at the Joint Multinational Readiness Center (Hohenfels, Germany), Aviation Maintenance Company Commander at the 1-214th General Support Aviation Battalion (GSAB) (Wiesbaden, Germany), S4 OIC at the 1-214th GSAB, Production Control Officer at the 601st ASB (Fort Riley, Kansas), and Component Repair Platoon Leader at the 3-1 Aviation Helicopter Battalion (Fort Riley, Kansas).



Exposure level per the National Institute for Occupational Safety and Health's recommended exposure limit. Chart retrieved from the Centers for Disease Control at <https://www.cdc.gov/niosh/noise/prevent/understand.html>

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¹ "Noise above 85 dB is considered hazardous" (National Institute for Occupational Safety and Health, 2024).

² "A normal voice level is between 60-70 dB" (Decibel Pro: dB Sound Level Meter, 2025).

U.S. ARMY EUROPE AND AFRICA'S THEATER FIXED-WING UNIT: TRAINING TO BE ANYWHERE, ANYTIME

A C-12 Huron airplane is shown from a front-three-quarter view, parked on a tarmac. The aircraft is white with black markings, including the word "DANGER" on the side. The background shows a clear sky and other aircraft in the distance.

A C-12 Huron airplane awaiting Army Flight School students conducting training flights out of Dothan, Alabama. U.S. Army photo by 2LT Hannah Lamb.

By MAJ Brendan A. Fields

United States (U.S.) Army Aviation forces must be organized, trained, and equipped to execute missions against a wide range of threats in various environments. These diverse requirements pose complex problems for today's aviation commanders. Mission demands and limited training opportunities present challenges for commanders who must fight for the time and resources to ensure shared understanding across all levels and implement deliberate aircrew training plans. In this article, I will share lessons learned from Easy Company, 1-214th Aviation Regiment's efforts to establish an organizational vision, develop a training plan, and establish a climate in an effort to mitigate risks associated with Army Aviation's experience gap and the complexities of a demanding operational environment (OE).

Easy Company "Barons," 1-214th Aviation Regiment, 12th Combat Aviation Brigade (CAB), is the only Army fixed-wing asset assigned to U.S. Army Europe and Africa (USAREUR-AF). The unit's mission is to provide C-12 Huron cargo and Cessna UC-35 utility aircraft to conduct theater mission command and transport staff, equipment, and supplies. At its core, Easy

Company supports USAREUR-AF's efforts to set the theater and ensure an agile flow of forces into and throughout the African and European theaters in the event of a crisis or contingency. Specifically, the unit provides rapid intra-theater fixed-wing transport for Army senior leaders, critical equipment, and other personnel. Successful mission execution requires the unit to perpetually maintain the highest level of readiness, while fighting to find time and space to train.

The USAREUR-AF theater covers over a quarter of earth's landmass, and supporting this expanse is challenging even with experienced aviators. Doing so with aircrews who, like most in Army Aviation, are increasingly junior requires a thorough and deliberately designed training plan. The company routinely finds itself in a myriad of challenging OEs, each with its own unique planning considerations. Extreme cold weather north of the Arctic Circle; high altitudes and hot deserts in Africa; oceanic routing with poor weather and limited alternate airfields; and the denied, degraded, and disrupted space OE (D3SOE) are just some of the planning factors air-

crews consider daily. Executing missions in these OEs with inexperienced aircrews incurs a high level of risk. To effectively mitigate that risk, the company needed to take deliberate steps to focus its time, priorities, and resources.

ORGANIZATIONAL VISION— ESTABLISHING THE WHY

The first step in risk mitigation was to establish the unit's vision and ensure shared understanding across the formation. Clear and concise verbiage nested with higher headquarters' vision and individualized face-to-face counseling were paramount in this effort. For the unit to effectively achieve its mission, each aircrew member should understand the why and the how. Particularly, pilots-in-command must understand the mission, purpose, and end state, so they can react to any number of factors while hundreds of miles away from station. Deliberate and consistent engagement from the command and senior leaders with individuals, crews, and the company ensure that the unit can maintain its shared understanding.



A C-12U turboprop aircraft flown by Company E, 1-214th Aviation Battalion, sits in the hangar at Wiesbaden Army Airfield, Clay Kaserne, Germany. U.S. Army photo by MSG Ryan C. Matson.

The unit vision serves as a target for the entire organization. It is the foundation upon which the commander communicates intent. Additionally, it enables leaders to work together in a decentralized manner toward a common purpose. In Easy Company, we aim to begin inculcating our vision at the earliest possible moment for all assigned aircrew members. This typically starts with effective sponsorship, followed by a very thorough onboarding process.

Commanders can determine a unit vision in a variety of different manners. They should consider the composition, size, and other unique traits within an individual organization to decide the best development method. Some methods include polling the organization with pointed questions, holding a summit with representatives from different entities within the unit, or determining it on your own or with input from a few senior leaders. For Easy Company, I developed the vision in collaboration with a select set of senior leaders. With the vision created, it was time to implement it.

To cement the vision amongst the unit, it is important to have a one-on-one conversation with each aviator. Initial counseling is a great time to discuss your vision. It is not enough to print the unit vision out on a slide and post it around

the company areas. I found that deliberate face-to-face conversations outlining what the vision is, why it is important, and how it nests into higher headquarters' mission and vision vastly increased shared understanding across my formation. If the leaders within an organization can understand and articulate the mission and vision, as well as why they are important, then they can better synthesize the risk tolerances set by the command.

DEVELOPING THE TRAINING PLAN—HOW TO GET THERE

After establishing the vision, Easy Company developed a gated training strategy involving various OEs, missions, and theater challenges to build experience among junior aircrew members. Long-range planning deconflicted with known high operating tempo periods, methodical crew selections, and communication of training priorities at all echelons ensure that training events achieve their desired end states and maximize readiness building.

Our first quarter's training plan, "Operation Permafrost," focused on cold weather environments to prepare for missions throughout the winter. The operation's purpose was to equip the aviators with the knowledge and experience required

to safely operate in Arctic regions. This training built Easy Company's operational capability, while increasing the individual aviator's proficiency and confidence in extreme cold weather conditions above mountainous terrain. The key tasks included remaining overnight North of the Arctic Circle, operating in icing and other winter hazards, and executing de-icing procedures. Our secondary objectives included oceanic route planning and operating in a D3SOE.

Deliberate pairings of experienced and junior aviators were given the purpose, key tasks, and end state for each training event. Other than these main planning criteria, crews were free to develop their own training routes. Prior to execution, the pilot-in-command briefed how their plan met the commander's intent at Easy Company's weekly training meeting. These methods promote the development of junior aviators' planning and communication skills while ensuring they are meeting the purpose, key tasks, and understand the training's intent. It is also an effective method of mitigating risk prior to the mission by ensuring aircrews have a clear understanding of the complex OEs they will encounter. After each mission, aircrews reported their after-action review comments at the training meeting to improve future iterations.



Pilots from Company E, 1-214th Aviation Battalion, fly a C-12U aircraft on a humanitarian flight to Kosovo. U.S. Army video still by SGT Joseph McDonald.

Aligning quarterly training objectives is an effective way to build expertise, but commanders should also design supplemental training. For example, every aviator assigned to Easy Company, regardless of position, spends their first few weeks at the company working in the operations and planning cell. This provides them with the opportunity to gain an understanding of our mission without major distractions. This simple shift in how an aviator is onboarded has proven to be extremely effective at increasing shared understanding and rapidly building expertise, even when flight hours are limited.

This deliberate training strategy delivered on the expected outcomes, but I also observed several positive results. Aircrews that conducted Operation Permafrost were not only more proficient at operating in cold weather environments, but they also showed an increased ability to execute in other OEs. They adapted faster, thought more critically, and applied problem-solving techniques more readily. This resulted in increased readiness while measurably decreasing the risks associated with our complex mission set.

ESTABLISHING A CLIMATE— REINFORCE THE VISION

The final, and most difficult aspect of this problem set, is fostering an organizational climate. This climate must strive for mission accomplishment, prioritized training, and execution of deliberate risk management processes. Additionally, it must balance each of these perpetually. Change is hard. Establishing new

processes and ideas takes concerted efforts over long periods of time. Empowering subordinate leaders, supporting decentralized decision-making, and fostering an understanding of risk management are keys to achieving the climate of a winning organization.

It is critical to quickly onboard and empower your subordinate and informal leaders within the organization. Gaining the buy-in and support from a senior WO or a well-respected pilot-in-command early in your efforts can be a tremendous advantage in the long run. Take additional time with these individuals to lay out the vision and be open to their feedback and input. By including them in the vision from the start, you create a foundation for long-term success even after you depart the unit.

Additionally, emphasizing decentralized decision-making is important in establishing a climate. By empowering junior leaders to make decisions, you can frequently observe if they have a thorough understanding of the vision, mission, and training objectives and correct them if they do not. This iterative process conditions junior leaders to accomplish training with the unit vision in mind and make decisions in line with the commander's intent, even when the commander is not present.

A final, but vital, aspect of the climate must be the execution of deliberate risk management processes. Risk is inherent in everything we do as aviators, and ensuring that subordinates have a deep understanding of this concept is extremely

important. It is essential that every aviator can identify risks, understand how to mitigate them, and can communicate this using the Risk Common Operational Picture (R-COP). Analyzing R-COP trends and having discussions between the commander, pilots-in-command, and mission briefing officers amplifies shared understanding within the unit. Energizing my aviation safety officer to facilitate this conversation at pilot-in-command boards is one method we have found to be extremely effective.

CLOSING COMMENTS

While these examples are specific to its mission to support USAREUR-AF's efforts in setting the theater, the problem set faced by Easy Company is neither new nor significantly divergent from those faced anywhere else in Army Aviation. Preparing for a wide array of situations and threats in unknown OEs is a reality faced by all aviation commanders. Likewise, while each unit's specific circumstances differ, it is essential that commands adopt a deliberate and gated training strategy to achieve their vision.

By developing a unit vision, a commander can illustrate a clear and specific end state for their subordinates. They can use this vision as the guiding principle behind everything the organization does. Integrating this with a training plan to achieve the mission further clarifies what the commander expects from their organization and fosters increased shared understanding among the leadership. Then, through empowering subordinate leaders and calibrating their decision-making and risk management ability through mentorship, the commander can solidify a durable, constructive climate for the organization. Establishing a vision, developing a detailed training plan, and nurturing a climate around the unit vision will effectively mitigate risks and make your unit ready—anywhere, anytime.

Biography:

MAJ Brendan Fields currently serves as the commander of Company E, 1-214th Aviation Regiment, 12th CAB, stationed in Wiesbaden, Germany. He is qualified in several fixed-wing platforms and has previously served in various company and battalion leadership roles across the globe.

Institutional knowledge is beyond what can be captured by any training manual or publication because it demands the presence of the human element. Just as our aircraft demand that same human element, it is the collective knowledge and expertise humans provide that allow for their safe operation. The evanescent of individuals carrying the lessons learned forged in the Global War on Terror are causing a dangerous gap in experience (Judson, 2024). So then, how do we preserve, perpetuate, and grow institutional knowledge to fill the gap? I propose that we take a page out of American cognitive psychologist and author, Howard Gardner's book, *Frames of Mind: The Theory of Multiple Intelligences* (1983). Howard Gardner's theory of multiple intelligences (MI) could very well be a key factor in allowing us to maximize our potential as Army Aviation so we can truly rise to our motto of "Above the Best." Through my own experience, I know this is possible by first identifying the type of intelligence an individual possesses. In conducting tactical training just this week, I made the effort to collaborate alongside a junior pilot in planning a mission because I recognized that they were of an interpersonal intelligence and would grow faster from collaboration. With that said, it must be understood what types of intelligences there are.

While Gardner was not the first to theorize MI's existence, he was the first to clearly distinguish them throughout the late 1970s and 80s (Davis et al., 2011, p. 487). These additions resulted in a total of nine identified intelligences (Margolis et al., 2022). Divided into linguistic, logical-mathematical, spatial, musical, naturalist, existential, bodily-kinesthetic, interpersonal, and intrapersonal, these profiles of intelligence establish a basis of learning for the individual (Margolis et al., 2022). The individual's preference is being driven and depends on the domain or discipline in which they find themselves. These expand greatly from the generic

Differentiating Aeronautical Knowledge for Multiple Intelligences

Image courtesy of pexels.com/Tara Winstead



VAK (visual-auditory-kinesthetic) model¹ reintroduced throughout our military education.

It is easy to forget that many of the aviators in the Army have no previous aviation education but are instead multidisciplinary in their secondary and post-secondary educational endeavors. What does that mean to me as an instructor? As a commander? As a course developer? It means that the pilot just out of flight school has received about a quarter of the amount of instruction and experience than they received during their undergraduate studies. The experience obtaining that degree, as well as any occupational follow-on experience, will ultimately be the basis for the law of primacy² as to how that individual learns (Terada, 2018). If that individual's education was in environmental sciences, they may well be a naturalist learner and if it was in music education, they may be a musical learner, and so on.

As our formations welcome new aviators, we need to approach them understanding that the VAK model does not accommodate everyone. Rather than attempting to have them try to fit into that cookie cutter model, we should instead welcome new methods of instruction and understanding. This will ultimately elevate the fighting force, as stimulating growth in an individual's learning profile will allow them to combine it with

learning the aviation discipline. This is how we grow leaders, by inspiring diverse critical thinking and allowing multiple avenues toward a solution to be developed (Morgan, 2021, p. 138).

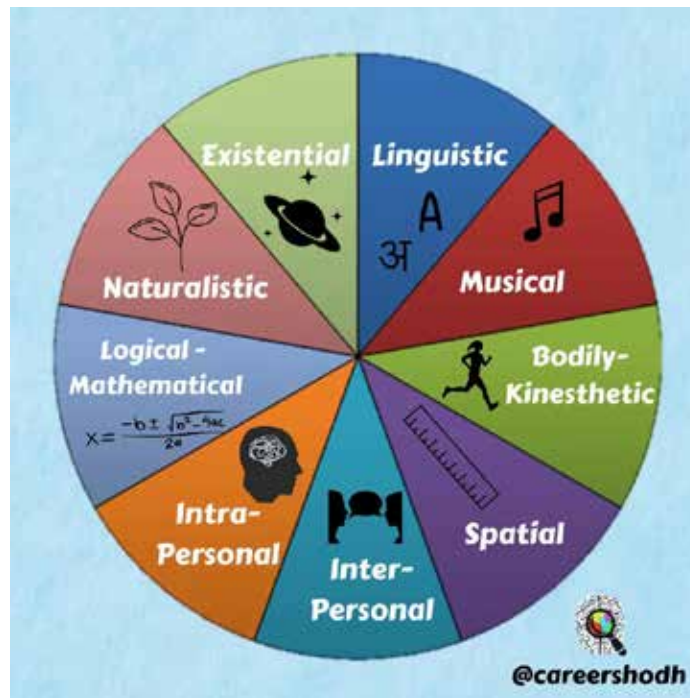
Implementation of an MI approach to learning requires stepping into some uncomfortable territory for current leaders. It requires you to get to know your people. This is more than just asking, "How was your weekend?" or "How ya doing?" It demands one to learn the stimuli that another responds to and what stimuli they respond to best. It requires posing critical thinking questions and witnessing the route the individual takes to arrive at a solution. You, as a leader, must then process what you observe and take advantage of what the individual did well or improved upon. This is in stark contrast to the majority of after-action reviews we experience, as with this learner centric approach we must first identify the "sustains" (water and nurture the good, then hack the bad to bits).

Improving the habits and knowledge base that we identify as "good" within our field can be accomplished by tailoring instructional blocks to the learner. A leader should understand that someone who is an existential learner and wants to know the "Why" may only need to be given a manual on how an aircraft system works. In juxtaposition, the leader should also understand that an intrapersonal

¹ "The VAK Learning Styles Model was developed by psychologists in the 1920s. It indicates the most common ways in which people learn and consists of three classifications, namely the Visual, Auditory, and Kinesthetic learning styles" (Mulder, 2023).

² "The law of primacy refers to one of the laws of learning identified by Edward Thorndike. This law of learning states that first impressions of information will be the most pervasive and longest lasting" (Arora, 2024).

sonal learner may need space and time to correlate how their actions relate to that of the aircraft, creating a zen-like mesh where the aircraft becomes an extension of the individual. These successes in learning through methods that the individual is comfortable with can serve as building blocks transitioning that individual to develop via intelligences other than their dominant one. This is difficult water to tread though, as research by Lev Vygotsky on the zone of proximal development³ proves (Davis et al., 2022, p. 238; Morgan, 2021, p. 133). Vygotsky's research results identify that there is a point at which nothing can be attained from a learning experience if presented poorly (Davis et al., 2022, pp. 238–239; Morgan, 2021, p. 133). Vygotsky's work and observations of the brain proved that certain chemical releases must occur, driven by stimuli that challenge the individual but do not overwhelm them (Davis et al., 2022, pp. 238–239; Morgan, 2021, p. 133). The goal then is to tailor an experience and environment fostering the creation of a zone of proximal development that is neither too challenging nor too simple (Davis et al., 2022, pp. 238–239; Morgan, 2021, pp. 133–134). The difficulty in creating this zone of proximal development is that it is subjective to the instructor creating it. This is generally why we can learn better alongside certain individuals, but among others it is almost impossible. As



Gardner's Theory of Multiple Intelligence. Graphic retrieved from careershodh.

instructors, the ability to perceive how someone learns is the key aspect to all of this, as without that ability, little learning can be accomplished.

With our view of each other being subjective, it is important to recognize that Gardner's MI is not meant to be a way to label an individual (Davis et al., 2011, p. 496). We must understand that individuals are of various intelligences and may rely on certain experiences to be learned via one of those specific avenues, while another learning experience may be processed via several of them. Our perception of the way someone learns is through observing that individual when provided multiple ways to access information. Their choices in how to

access and manipulate that information should drive how we differentiate our instruction to them (Terada, 2018). What is vital to ensuring another's success is providing them those multiple points to access information. Reality tells us that this is not always possible; however, every effort should be made to differentiate information and instruction for each individual in our formation. To tear down any barriers to learning, we must live up to being our brothers and sisters keeper and continue to strive to understand how they learn. I believe that our collective recognition of MI theory as leaders across the Army Aviation Enterprise is critical to our future success. Sometimes

we seem to know more about our enemies than each other. Perhaps it's time we invested a similar level of effort in understanding and strengthening our collective intelligence.

Biography:

CW2 John Fitzmaurice is an instructor pilot currently assigned to 1st Combat Aviation Brigade, Company A, 2-1 General Support Aviation Battalion at Fort Riley, Kansas. He has served in the U.S. Army for 10 years and has had a diverse range of assignments while in the service. Starting his career in the Army Band field, he transitioned to Army Aviation after experiences while deployed to Bagram Airfield, Afghanistan. Prior to service in the Army, he served as a music educator in the public schools, as well as instructing collegiately. He currently instructs in the UH-60L platform at Fort Riley, with prior UH-60L experience attained while stationed at Fort Benning, Georgia, as part of the 4th Ranger Training Battalion.

³ Proximal development "refers to the range of abilities an individual can perform with the guidance of an expert, but cannot yet perform on their own" (Cherry, 2023).

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Everyone is a Safety Officer

By CW5 Michael J. Muehlendorf

I've been flying Army helicopters for 20 years now. As my aviation career approaches the legendary unicorn status, reflection on my own ability to contribute and remain relevant in today's Army is my most pressing motivation. I was fearful I might "check out" and ride out the last couple of years doing as little as possible. "What can they do to me?" is the thought that crosses our minds when the fear of not making it to retirement vanishes completely. Over the last few years, a love for my profession has emerged more and more, unhindered by the fear of failure. As I reflect on the close calls and near disasters I've witnessed, I feel immensely blessed to have come to this point. What's more, I feel a new imperative on my role, and that is to communicate the urgency of risk management.

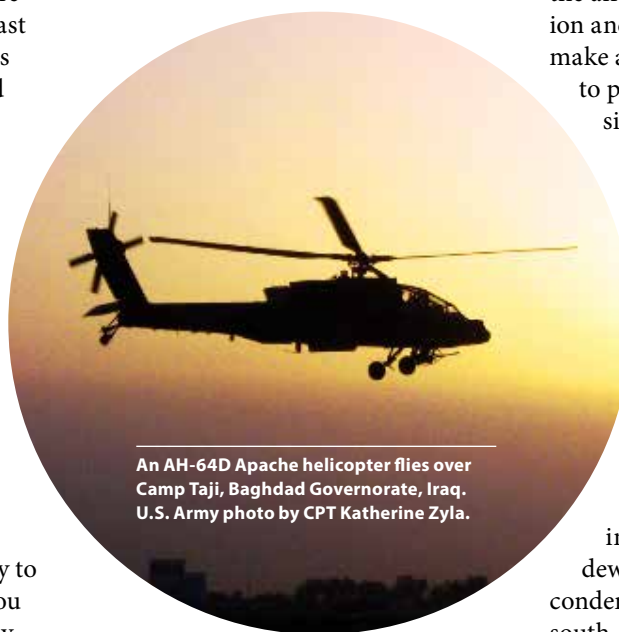
"Everyone is a safety officer!" If you've been in Army Aviation awhile, it is hard to avoid cynicism when we hear this. Yet here I sit, 21 years in and hitting a new stride. If there's anything I wish I could convey to my peers and junior crews, it's that you have to be mindful of risk and actively manage it in every moment. The easy part is that you already do it. Assuming you're a "normal" person (whatever that is), you are already concerned with your safety 100 percent of the time.

Most safety decisions are nested in our routines and the infrastructure our society has built so we don't think about them (i.e., they are on the subconscious level); however, the instant one of these assumptions fails us, fear strikes and we are left insecure. We feel the need

to analyze and categorize what went wrong so we can avoid that danger in the future. Whether it is a trip on a sidewalk or foreign object damage in a confined landing zone, we take a step back and look at what went wrong. We consider how much worse it could have been and decide if the likelihood of it happening again motivates a change in our behavior. Should we start preparing for this to

violating the trust they've placed in me, I'm eroding away my own credibility in their eyes—mine and the WO cohort. That may be unfair, but it is reality. It is almost an art to decide what aspects of mission execution to emphasize and what risks need to be addressed in each forum. Some risk has to be trusted to lower echelons or we'd never launch. My most important goal now is to protect the aircrews and Soldiers in my battalion and protect my boss from having to make any uninformed decisions. I want to protect them, because I want every single one of them to make it to the 21 year mark and further. I want us all to do our jobs and go home to the nation we love so much. Let me use the following vignette to take a look at how the risk management process works.

So there I was, in Taji Army Airfield, Iraq. As it happens, it was national "burn your trash day" (as it was every day) in Baghdad. Something about the dew point and temperature spread, condensation nuclei, winds from the south, and the visibility were quite suspicious. We taxi to Taji pad, pick up our passenger, and decide to launch and assess the visibility in flight. The tower was reporting more than 3 miles of visibility but it was noticeably less to our south (Taji is just North of Baghdad). In the air, things got reeeeeeally quiet for a few drawn out moments as we took up a heading for the assigned departure sector. Radio silence was broken by my sister ship asking, "what do you think?" Now let's clear something up right here. When a salty, high-fiving, line-cutting,



An AH-64D Apache helicopter flies over Camp Taji, Baghdad Governorate, Iraq. U.S. Army photo by CPT Katherine Zyla.

happen and plan our response?

As a Senior WO and "expert advisor" (I still feel like a stupid kid most of the time), I find it is essential to know my leaders and what is important to them. I care what they think about me, because I want them to listen to me when I'm bringing up concerns or problems they may not recognize yet. If I'm dying on every hill and never concerning myself with their impression of me, or if I'm

sleeve-rolling WO, whose unbloused boots are the only thing extending lower than his sideburns comes over the radio and asks what you think, he is not at all concerned with what you actually think. It is the closest he can get to saying, “this looks bad, and I really wish I was on the ground” without totally surrendering his ego. It’s not unlike having a bad hand dealt in poker and being so positioned in the betting to “call” before having to fold. Now I need to play my hand without revealing my “tell” or my poker face. I need to protect my own credibility in the “cool pilot” club.

“Looks like we can make it,” says the 600-hour CW2 who hasn’t logged 5 minutes of weather in the last year because we’ve been visual flight rules only in combat (that’s me). In reality, the visibility was probably a quarter to a half mile at most, but at 200 feet above the ground we could see it well and maintain controlled flight visually. What we couldn’t do was see hazards in front of us very well. We’d flown these sectors and corridors hundreds of times, and we knew every set of wires and all the towers by memory.

Fortunately, we made it through the fog bank and into the city, which was already starting to heat up enough to burn off any trace of moisture in the atmosphere. Looking back at our conversation, one thing we never asked ourselves was if the weather below was what we were briefed and approved for. Our risk assessment worksheet had 700-foot ceilings and 2 statute miles of visibility annotated as the lowest weather in which our final mission approval authority



A typical morning flying into Baghdad from the north. Photo credited to Josh Muehlendorf, 2006.

authorized for us to conduct missions. We were concerned with what we **could** do and not what we were **allowed** to do. I don’t think I had this epiphany until several years later. Having come to this understanding on how the risk management process works, my memory flooded with personal scenarios where I had made decisions outside of my level of approval.

So what is my role as a WO, a pilot-in-command (PC), air mission commander, mission briefing officer, or even final mission approval authority in the aviation risk management process? Let’s narrow that down to the PC in hopes you might make it to the end of the article.

I am only the PC because a commander at some level has looked at the assigned missions for the day and done some initial risk mitigation by pairing me with another pilot and crewmembers. At this point, I don’t know what the reasoning is, but a safe assumption is that my commander expects me to operate the aircraft to standard and to conduct the assigned mission inside of the acceptable risk level as will be indicated on the risk common operational picture, or R-COP, and/or their commander’s intent. That intent may be written out in a standard operating procedure (SOP) or on a slide

in the air mission brief.

The only time I get to interpret my commander’s risk tolerance level is when contingencies arise. Even then, a well-written SOP or mission rehearsal can provide guidance. Armed with those and possibly more information, I can conduct what the Army has coined *Real-Time Risk Management*. Effectively performed, I’m identifying new risks

as they present themselves and devoting the proper amount of decision-making to that risk based on the known (or perceived) risk tolerance of my commander.

Ask any seasoned aviator and they’ll tell you that the secret to making good risk decisions in contingencies is rehearsing those contingencies on the ground. My mission-planning heroes and mentors grew up planning the most complex missions our nation conducts with helicopters. They plan to capture our nation’s most wanted terrorists and strike the most heavily guarded targets in the world. Anytime I approached one of those flight leads to ask how they solved problems or planned missions, they all had one consistent approach. They had exhaustive lists of requests for information, and they spent the bulk of their planning efforts talking about and rehearsing contingencies. None of them walked around spouting off cheesy slogans like “everyone is a safety officer” but you can guarantee they were looking to survive and accomplish the mission with everyone coming home. They intimately knew their acceptable risk like they knew their commander’s intent and it was the first question at the after-action review; “was the mission accomplished to standard?”



Apache helicopter pilots discuss safety briefing information before flight. U.S. Army photo by SPC Armani Wilson.

The bottom line is that there is no better recipe for success than anticipating what can go wrong and rehearsing the possible solutions. During the conduct of rehearsal, the risk level should be identified and discussed with the commander. Typically, a commander's risk tolerance changes based on the mission's phase. A commander's tolerance will likely increase after key events, such as a border (phase line) crossing or infiltration to the objective. Every mission hits a point of no return, and risk decisions have to be made reflecting that mission's phase. It is not often that we get to experience risk decisions during a mission that would be elevated to the extremely high level if the hazard were known about in

permission planning. It is possible to reach the level that subsequent risk increase will significantly reduce the likelihood of success. Then, the mission is aborted no matter the phase. Those risk levels exist for every mission. You may encounter unpassable weather on a medical evacuation mission and have to turn around. The enemy threat on the objective may be so overwhelming that not only will our ground force be overrun, but any exfiltration attempts will also be engaged and eliminated. What is the emerging risk, and what is my commander's tolerance for this risk? Commanders are making hard decisions that weigh mission success tonight against our future ability to conduct missions.

Our ability as PCs to know our commanders' risk tolerance and execute a mission inside of their intent is key to not only our survival but mission accomplishment and continual building of the sacred trust between the commander and their expert technical advisor...the safety officer.

Biography:

CW5 Michael Muehlendorf is the Senior Aviation Advisor to the III Armored Corps G3. He previously served as Senior WO Advisor and Battalion Standardization Pilot (SP) for 2-3 Aviation Regiment, flying UH-60L/M and HH-60 Black Hawks. He also served in the 1st Cavalry Division and the 12th Aviation Battalion, as well as at the U.S. Army Aviation Center of Excellence as an SP and in D/1-160th SOAR(A) as a Fully Mission Qualified Pilot.



Streamlining the Training Development Process:

The Directorate of Training and Doctrine's Digital Department of the Army Form 2028



An Apache helicopter conquers the sky over Baumholder, Germany. U.S. Army photo by Ruediger Hess.

By SFC Deanna M. Lucchesi and Ms. Heather N. Meyerhoff

The evidence of a good leader is revealed after they leave the corporation, business, or organization they are a part of, and their established processes still function in their absence, continuing long after they have gone. By encouraging others to collaborate and share ideas, new innovations come to light to help better the organization.

Solutions that truly make a lasting difference and sustain continued, positive change are those that provide systematic changes to the larger system. This requires leaders to see not only their internal problems and solutions from their tiny foxhole but also the bigger scope of the entire organization, division, or even the Army's initiative.

For example, training product development is a never-ending cycle. While some products change very little over their 3-year management cycles, others change rapidly and need to be consistently monitored for doctrine, organization, training, materiel, leadership, education, personnel, facilities, and policy (DOTMLPF-P) changes. As the new and improved information, equipment, procedures, and policies are implemented, training products such as individual tasks, collective tasks, lesson plans, training support packages (TSPs), POIs, publications, Aircrew Training Manuals, etc., must keep pace. Hours upon hours are spent in the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) process to review changes and update training materials, as well as all the other associated products affected by those changes.

Streamlining and improving the Directorate of Training and Doctrine's (DOTD) already established processes, guided by the U.S. Army Training and Doctrine Command's (TRADOC) training and doctrine regulations, allows for

"As with any robust operation, it is essential to conclude with an afteraction review ... it is crucial to plan how and when the Army will gather feedback on system usage and POI [programs of instruction] adjustments. Establishing this feedback loop will be vital for refining our processes and ensuring that the transformation of TUAS [tactical unmanned aircraft system] training continues to meet the operational needs of our forces effectively."

— LTC Kent Monas &
CPT Corbin Heard (2024)

more flexibility when triggering events (e.g., changes in equipment, materiel items, doctrine, policies) force the restart of the ADDIE process. This restart causes a strain on training developers but serves as a forcing function to ensure training products maintain relevancy.

The DOTD for the Aviation Center of Excellence (AVCOE) currently maintains approximately 5,600 products within the Training Development Capability¹ database. Each of these products operates

on a 3-year cycle for review; however, changes can occur more frequently as the DOTMLPF-P process requires.

Within the Enlisted Training Branch (ETB) at DOTD currently, six military training developer subject matter experts collaborating with their civilian Instructional System Specialist manage close to 500 Individual Critical Tasks (ICTs) alone. This doesn't even include the concurrent course POIs and lesson plans, plus other inherent resourcing documents like TSPs.

One-hundred twenty-four out of 500 ICTs belong to the 15M Gray Eagle unmanned aircraft system (UAS) Repairer military occupational specialty (MOS). As a result of the 15M Critical Task Site Selection Board (CTSSB) hosted by ETB-DOTD in May 2023, 65 tasks were added to the Individual Critical Task List (ICTL), to include 33 total 20-level tasks and 14 total 30-level tasks. This was a massive increase in ICTs for the MOS, which clearly demonstrated operational need for ETB training product development. The main training gap that the 15M CTSSB captured was the absence of 20- and 30-level tasks, except for what was being established through locally created unit standard operating procedure and commander-approved Aviation Maintenance Training Programs. This also meant a much longer analysis process for the ETB training development team. Additionally, it also required resource collection from those hard-charging Gray Eagle units creating their own ICTs and the Combined Aviation Maintenance ICTL, which directs the learning objectives for lesson plans taught at the AVCOE, Eastern Army

¹ "TDC is the primary automated tool used by Army (TRADOC and non-TRADOC) schools and centers to create, edit, and manage all training and education products that support both the institutional and operational forces" (Training and Doctrine Command [TRADOC], 2021, p. 26).

National Guard Aviation Training Site, Western Army National Guard Aviation Training Site, Noncommissioned Officer Academy's (NCOA) Advanced Leader Course, and Senior Leaders Course (SLC) for Aviation Maintenance.

After a year of walking through the entire ADDIE process with the 15M ICTL and finally arriving at the "evaluation" phase, SFC Lucchesi's desire for receiving real-time feedback from the force grew immensely. So, she did what any good NCO would do and started digging through TRADOC and DOTD training and doctrine regulations to find answers to questions like: What standardization process do the ETB and DOTD use to capture invaluable feedback once the ICTs are being utilized by the force? What does this evaluation process consist of; how is it being carried out; and even more importantly, how is this information being captured, analyzed, and implemented?

Enter the authors from two different sections and two different jobs within

DOTD, Fort Rucker, Alabama. They shared one vision to find a more efficient way to streamline the Department of the Army (DA) Form 2028, "Recommended Changes to Publications and Blank Forms," process to keep training material current (DA, 2018).

Together, they developed a new method to receive feedback on training products more quickly and easily for review, concurrence, and implementation into all training products managed by the DOTD.

This method is the new Digital 2028 process, which allows for rapid feedback—not only from the organization—but also from the operational forces. Developed in the application builder tool, Microsoft Power Apps, the Digital 2028 provides a quick-access link² to immediately provide feedback on all types of training materials.

The old method process required the individual to download the form, fill it out, and submit it. This can prove problematic because many Soldiers, and

even young NCOs, do not know who the proponent is for these training products, specifically the ICTs. So, they take time out of their busy schedules to fill out the DA Form 2028 but then do not know to whom or where to send it. Regarding lesson plans and POI, the DA Form 2028s are sent to a distribution email, which is poorly monitored and managed. This leaves the end user wondering whether or not their efforts and feedback are even being received or actioned, because they do not receive a response or even see their change request take effect.

After building and testing the new application, we have finally published and shared it with members of the Army, Reserves, and National Guard.

The Digital 2028 is a one-stop application that Soldiers, instructors, and developers within U.S. Army Aviation can utilize to send immediate feedback on products by simply clicking a link. The link opens the application, and the individual fills out a brief form, provides their feedback, and adds attachments for reference or recom-

² The new Digital 2028 Product Change Request form is common access card (CAC) enabled, and can be found at: <https://play.apps.appsplatform.us/play/e/default-fae6d70f-954b-4811-92b6-0530d6f84c3/a/465f69a9-f73e-4930-8717-30dafcb2de97?tenantId=fae6d70f-954b-4811-92b6-0530d6f84c3&sourceTime=1736300199395he>



Tigersharks maintain expeditionary deployment readiness. U.S. Army photo by CPT Kyle Abraham.



Aviation maintainers inspect and repair parts of a CH-47, ensuring the unit's aircraft are operational, safe, and ready to fly. U.S. Army photo by CPT Roxana Thompson.

mendations as needed. To send the form, the individual clicks the “submit” button, and their change request immediately uploads to a Microsoft Teams content page. Here, it is then assigned to the branch responsible for the product, as well as the team members who will review and concur/non-concur with the provided feedback.

Because of this application, training products from AVCOE can be tracked more closely for changes and updated rapidly, saving hours of work for developers and their teams. We predict that once in full use, the application will save a minimum of 8 hours per product in

the revision cycle. Ultimately, the Digital 2028 will save an estimated 16,000 man-hours per fiscal year.

We plan to provide a link to the Digital 2028 within all the training products and the CAC-enabled [DOTD Share-Point page](#). Additionally, we coordinated efforts to publish the link on Aviation Training and Maintenance websites, such as the Joint Technical Data Integration (JTDI), and Aviation Maintainer Analytics Platform (A-MAP) sites, for ease of access to the operational force. As of the latter part of January 2025, the JTDI and A-MAP sites have integrated the Digital 2028 link.



Wiesbaden Aviation Regiment performs helicopter maintenance. U.S. Army photo by Connie Dickey.

SFC Lucchesi describes the rapidly changing field of UAS over the past 5 years and anticipates projected intensity as the U.S. Army continues to apply modernization initiatives to become a more lethal, agile, adaptive, and fighting force ready to win on the battlefields of the future, stating that “training development is much like surfing off the coast of Hawaii. Respectively, as a training developer, you must be proactive and ride on top of the waves of change or get pummeled by them.”

The new Digital 2028 establishes that “feedback loop” and is designed to allow DOTD to keep up with the rapid changes of training and ultimately provide more accurate and effective training products. This will help AVCOE ride the waves of change into the future of training development, supporting U.S. Army Aviation strategic alignment and future initiatives.

Biographies:

SFC Deanna Lucchesi currently serves as the 15M and 15E MOS Training Developer for the ETB at DOTD. She has close to 15 years of Active Duty service, with 6 years in the 15E MOS and 9 years in the 15M MOS. She has deployed to Iraq twice with both the Shadow and Gray Eagle UAS. SFC Lucchesi has served as a Maintenance Team Lead, a Technical Inspector and unit trainer, a Production Control NCO, and an Instructor at Fort Rucker NCOA for the Aviation Maintenance SLC. SFC Lucchesi has 3 years of UAS training development experience and is responsible for the development of Initial Military Training and NCO professional military education and leadership training material for more than 2,500 Soldiers worldwide. This includes development and maintenance of UAS TSPs and UAS POIs. SFC Lucchesi is responsible for conducting the analysis and design phases of the Army's Instructional Systems Design process utilizing ADDIE and supports the development of all UAS training. She earned her associate's degree in Aviation Maintenance from Embry-Riddle Aeronautics University.

Ms. Heather Meyerhoff is a Training Specialist for the Training Documentation Branch of the DOTD. She graduated from the University of Tennessee at Martin and taught high school science in the Memphis, Tennessee area. Heather moved to Fort Rucker when her husband PCS'd to serve as a Drill Instructor. She joined the DOTD team in September 2022.

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ENHANCING ARMY AVIATION SAFETY THROUGH MILITARY FLIGHT OPERATIONS QUALITY ASSURANCE (MFOQA)

By Mr. Charles T. Brown and CW3 Matthew D. Marshall

The Imperative for MFOQA in Army Aviation

As Army Aviation operates in increasingly complex airspace and challenging terrain, the risk to flight crews and equipment continues to grow. Despite an overall reduction in flight hours, we have seen an upward trend in aviation accidents over the past few years. This alarming pattern underscores the urgent need for a more data-driven, proactive approach to aviation safety and risk management. Military Flight Operations Quality Assurance (MFOQA) is a critical tool for addressing these challenges, enhancing aviation safety, optimizing mission effectiveness, and improving risk management within Army Aviation. By leveraging flight data analysis, MFOQA provides actionable insights that enable commanders to assess risk, evaluate crew performance, and make informed decisions that directly enhance operational safety. The Army must adopt MFOQA to modernize its aviation operations and align with best practices already implemented in commercial and other military aviation

sectors (Air Force Safety Center, n.d.).

Lessons from the Commercial Sector: The Success of FOQA

Flight Operations Quality Assurance emerged in the commercial aviation sector during the 1960s, revolutionizing safety by utilizing flight data recorders to monitor and analyze aircraft performance (General Accounting Office, 1997, p. 20). The success of FOQA in reducing accidents and incidents through data-driven risk identification and mitigation demonstrates its effectiveness. Airlines have saved millions annually by preventing costly incidents, optimizing maintenance, and improving operational efficiency. This proven methodology is readily adaptable to Army Aviation, which faces similar, if not more complex, operational risks.

Why Army Aviation Needs MFOQA

Unlike commercial aviation, Army Aviation has historically lagged in adopting integrated flight operations management tools. Many units still rely on fragment-

ed, manual processes for flight scheduling and risk assessment, leading to inefficiencies and increased operational risk. The Army must modernize its approach to aviation safety and risk management by implementing MFOQA as a core component of its safety program. This proactive approach would allow for:

- Identification of emerging risks before they result in incidents or accidents.
- Objective evaluation of crew performance, leading to targeted training and corrective actions.
- Enhanced mission planning with insights into trends affecting operations.
- Improved real-time decision-making through enhanced situational awareness.

Department of Defense (DoD) Instruction 6055.19, "Aviation Hazard Identification and Risk Assessment Programs (AHIRAPs)," mandates military aviation organizations to implement robust flight data analysis programs (Office of the Under Secretary of Defense, 2019).



Paratroopers assigned to the 3-82 General Support Aviation Battalion, 82D Combat Aviation Brigade, 82D Airborne Division, conduct pre-flight checks prior to departure. U.S. Army photo by SGT Vincent Levellev.

However, Army Aviation has yet to fully leverage this directive to its advantage. Programs such as the Aviation Safety Action Program¹ and Line Operations Safety Audit² reinforce the need for MFOQA as a fundamental component of Army Aviation's safety and operational excellence strategy.

Evidence from Aviation Data Exploitation Capability: The Army's Missed Opportunity

The Aviation Data Exploitation Capability (ADEC) system, as a sole source Army program, serves as a prime example of the potential benefits of MFOQA in Army Aviation. Developed to integrate flight data analysis, risk assessment, and operational decision-making into a unified system, ADEC demonstrated its effectiveness in real-world testing by Program Executive Of-

fice, Aviation and select Army Aviation units. User feedback from maintainers, instructor pilots, and commanders highlighted its transformative impact on:

- Maintenance diagnostics and fault identification.
- Crew training enhancement through data-driven debriefing.
- Risk assessment improvement via detailed event reconstruction.
- Operational decision-making optimization through comprehensive trend analysis.

The ADEC system's ability to provide granular insights into flight events was exemplified in an incident where two helicopters sustained minor damage. Investigators used ADEC's data visual-

ization tools to reconstruct the event, allowing for precise identification of contributing factors. This level of analysis enabled maintainers to address faults more efficiently, enhanced instructor pilots' training debriefs, and provided commanders with essential information for crew assignments and risk mitigation.

Despite its success and endorsement by leaders up to the three-star level, ADEC was never fully funded for fielding, leaving Army Aviation without a proven, data-driven tool that could revolutionize risk management and operational efficiency. This lack of investment underscores the Army's failure to capitalize on a system that had the potential to align Army Aviation with modern safety and operational practices. Furthermore, no similar real-world systems have been tested by the Army since ADEC.

¹ "The goal of the Aviation Safety Action Program (ASAP) is to enhance aviation safety through the prevention of accidents and incidents. Its focus is to encourage voluntary reporting of safety issues and events that come to the attention of employees of certain certificate holders" (Federal Aviation Administration [FAA], 2024).

² "LOSA is a formal process that requires expert and highly trained observers to ride the jumpseat during regularly scheduled flights to collect safety-related data on environmental conditions, operational complexity, and flightcrew performance" (FAA, 2006).

The Path Forward: Implementing MFOQA as a Standard Practice

Army Aviation's continued reliance on outdated systems and manual processes represents a critical gap in its approach to safety and operational management. The commercial aviation sector has long since demonstrated the tangible benefits of FOQA-based programs. By fully implementing MFOQA through a system comparable to ADEC, Army Aviation can:

- Enhance risk mitigation and safety measures.
- Optimize mission execution through data-driven insights.
- Improve resource allocation and cost-effectiveness.

How, you ask? We created the following vignette: *A Day in the Life with MFOQA—CW2 Davis and the Integrated Safety Advantage*, to answer that question.

0600—Morning Briefing & Situational Awareness

CW2 Davis opens the unit's aviation operations app on her phone while brewing coffee. The **Leader Situational Awareness** module immediately displays current and upcoming missions (Air Tasking Orders, Reading File, Airspace Coordination Order, and flight schedule) for her battalion. On the map, she sees alerts for current Notices to Air Missions, temporary flight restrictions, weather forecasts, recent safety incident reports, and threat reports—all consolidated in one interface. She appreciates having this critical information at her fingertips without digging through email threads or making early-morning calls to collect the data she needs to develop her mission plan and risk assessment worksheet (RAW).

0700—Flight Scheduling and Risk Assessment

Switching to her laptop in the office, Davis opens the **Flight Scheduler** to find her external load (sling load) mission plan preloaded, prefilled RAW, along with a completed Department



U.S. Army pilots conduct pre-flight checks prior to a training flight at Fort Bliss, Texas. U.S. Army photo by SPC David Poleski.

of the Army [DA] Form 5484, "Mission Schedule/Brief," (DA, 2006). The system walks her and her copilot through a **customizable RAW** directly within the interface—available on both her computer and phone. The assessment flags elevated risk due to high-risk flight maneuvers, e.g., brownout reports in the area of operations. She inputs their mitigation plan, confident the system will automatically notify her briefing officer.

0715—Mission Approval

While en route to a pre-mission brief, her commander reviews and digitally signs off on the mission and RAW approval, using the mobile version of the **Mission Approval Process** module. No binders, no delays—everything from assessment to sign-off is seamless, secure, and available across devices.

1130—Mission Execution

The mission proceeds as planned. Davis and her crew execute the external sling load flawlessly. Throughout the flight, the **Digital Source Collector** passively records flight performance data—rotor revolutions per minute, torque data, health and usage monitoring system data, airspeed, weather conditions, strenuous flight maneuvers, gross weight, fuel quantity, fuel consumption rate, gravitational forces—without adding tasks to the crew's workload.

1500—Post-Mission Analysis & Visualization

Back at the hangar, Davis checks the post-mission visualization from her tablet. The system renders a 3-dimensional reconstruction of the flight path, overlays areas of concern, and highlights an event during takeoff. The engine torque limit was reached (not planned) but did not exceed the engine torque limit at the landing zone. During debrief, the instructor pilot flags it as a training opportunity—there's no reprimand, just data-informed discussion.

1600—Aviation Reporting

The takeoff event was auto-logged in the **Aviation Reports** module as a minor incident. If similar trends emerge across other flights, the system will trigger broader analysis and suggest standard operating procedure updates or retraining. Davis's single mission now contributes to Enterprise-wide safety improvements.

1700—Digital Certification & Pilot's Logbook

Using her phone, Davis pulls up her **Pilot's Logbook** while waiting in line at the dining facility. Her mission, approvals, and logged flight time are already consolidated and certified. No lost records, no spreadsheet tracking—just a clean digital record, ready for when she needs it.



A Black Hawk helicopter undergoing pre-flight checks before departing from an undisclosed location. U.S. Army photo by SGT Vincent Levellev.

Why It Matters

Before MFOQA, this same mission would have lacked the proactive safety measures and data-driven insights that CW2 Davis can rely on. Risk assessments were less comprehensive, scheduling more cumbersome, and post-mission analysis often reactive—relying on memory and anecdotal evidence. Now, with MFOQA integrated into every phase of the mission life cycle, from planning to record keeping, Army Aviation operates smarter and safer. This integrated system, accessible from

anywhere via phone or computer, empowers aviators like CW2 Davis to make informed decisions, learn from every flight, and contribute to a safer, smarter Army Aviation force.

The time to act is now. Army Aviation must transition from fragmented, outdated methodologies to a comprehensive, integrated FOQA program. The adoption of MFOQA is not merely an upgrade—it is a necessity to ensure the safety, efficiency, and effectiveness of Army Aviation operations in the modern battlefield environment.

Biographies:

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Mr. Charles Brown is a retired CW3 151A Aviation Maintenance Technician. He is currently an aviation logistics capabilities developer at U.S. Army Futures Command, supporting the U.S. Army Aviation Center of Excellence at Fort Rucker, Alabama. Mr. Brown has deployed three times in support of Operation Iraqi Freedom and Operation Enduring Freedom. He has more than 30 years of Army Aviation maintenance experience.

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Soldiers fire an AGM-114 *Hellfire* missile from their AH-64E Apache helicopter at Yakima Training Center, Washington. U.S. Army photo by CPT Kyle Abraham.

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