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Sustainment

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THE PROFESSIONAL BULLETIN
OF THE ARMY AVIATION BRANCH

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Volume 12/Issue 1

Commanding General, USAACE
MG MICHAEL C. MCCURRY

DOTD
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https://armyeitaas.sharepoint-mil.us/sites/TR-ACOE-DOTD

Doctrine and Tactics Division
Division Chief: LTC JULIE A. MACKNYGHT
https://armyeitaas.sharepoint-mil.us/sites/TR-ACOE-DOTD/SitePages/DTAC.aspx

The Doctrine and Tactics Division, Directorate of Training and Doctrine (DOTD), U.S. Army Aviation Center of Excellence (USAACE), Fort Novosel, 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.

Aviation Digest is approved for public release. Distribution is unlimited. This publication is available through electronic media by accessing the DOTD SharePoint site or the *Aviation Digest* web page at https://home.army.mil/novosel/index.php/aviationdigest and is intended for the use of command levels C, D, and E for the Active Army, the Army National Guard, and the U.S. Army Reserve.

This and all previous issues of *Aviation Digest* are available on the DOTD SharePoint site at https://armyeitaas.sharepoint-mil.us/sites/TR-ACOE-DOTD

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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2331700

The Command Corner

Sustainment

The sustainment of Army Aviation forces will be challenging as we assess the capabilities of peer and near-peer threats in Large-Scale Combat (LSCO). Unlike Desert Shield and Operation Iraqi Freedom, the enemy will neither allow us to build up our supply stockpiles, establish forward operating bases, nor freely use forward arming and refueling points (FARPs). The enemy will seek to disrupt Aviation operations through the denial or disruption of landing and pick-up zones, FARPs, assembly areas, and tactical areas of operation. Large sustainment operations we routinely conducted in the past without fear of interdiction will be at significant risk on the future LSCO battlefield.

As we leverage the advantages that Future Vertical Lift will afford in speed, range, endurance, and lethality, we must also consider how we sustain the Aviation force when operating across a widely dispersed area. Aviation maintenance operations from simple field maintenance to complex battle damage assessment, planned scheduled maintenance to downed aircraft recovery team operations, and even just the simple resupply of aircraft parts and components will be complex. Similarly, gone are the days of entire brigades operating out of fixed bases. We must understand and apply our own sustainment principles as outlined in Army Techniques Publication 3-04.7, "Army Aviation Maintenance," and Field Manual 4-0, "Sustainment Operations" to overcome the hyper-lethal future battlefield.

Army Aviation must incorporate those sustainment principles outlined in doctrine, while also developing innovative tactics, techniques, and procedures that provide for the flexibility to adapt. This means Aviation units must train utilizing the wider division, corps, and joint assets in addition to their organic sustainment assets across largely dispersed geographic training areas without relying on home station support (e.g., civilian refueling, contract maintainers, routine access to lower tactical internet maintenance servers, etc.).

Aviation sustainment on the LSCO battlefield will entail dispersing our operations, functioning in austere environments, operating in small, well-led maintenance teams, and developing specialized parts/tool packages that can quickly and accurately deploy to meet aircraft maintenance needs. We will have to develop innovative sustainment methods for LSCO. This could include aircraft capable of transmitting faults to ground maintenance stations, which allow maintenance planning to begin before an aircraft even lands at their tactical assembly areas.

Army Aviation still delivers its seven core competencies encapsulated in See/Sense, Move, Strike, and Extend in support of the combined arms team. The Army is committed to developing innovative sustainment solutions to position Army Aviation to meet the needs of our ground commanders while overcoming the challenges of the future fight. Recognizing that sustainment is an operation that must receive the same focused planning, preparation, and training each tactical mission receives will ensure that Army Aviation will always be Above the Best–the ground Soldier.

Fly Army!

Above the Best!

Michael C. McCurry
Major General, USA
Commanding

About the Cover:

1. "Fat Cow" fueling operation during forward arming and refueling point training at Schofield Barracks, Hawaii. U.S. Army photo by MSG Lekendrick Stallworth.
2. A CH-47F Chinook prepares to land as Oregon Army National Guard pilots from the 1/168th General Support Aviation Battalion perform dust landing certification flights at the National Training Center, Fort Irwin, California. U.S. Army photo by CPL Alisha Grezlik.
3. Soldiers train on the use of Fat Cow refueling equipment. U.S. Army photo by SPC Jennifer Raley.
4. Soldiers offload gear from an Alaska Army National Guard CH-47 Chinook during aerial sustainment training at Joint Base Elmendorf-Richardson, Alaska. U.S. Air Force photo by Alejandro Peña.

Soldiers with Company B, 6th General Support Aviation Battalion, 101st Combat Aviation Brigade, 101st Airborne Division (Air Assault), and the 3D Brigade Combat Team participate in a large-scale air assault training exercise at Fort Campbell, Kentucky. U.S. Army photo by SFC Andrew McClure, 101st Combat Aviation Brigade.

Aviation DIGEST

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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 2024 (published on or around August 15, 2024). Accepting articles now through May 15, 2024.

October-December 2024 (published on or around November 15, 2024). Accepting articles now through August 15, 2024.

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)

U.S. ARMY

What you need to know about the Directorate of Training and Doctrine's (DOTD's) efforts

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

The Directorate of Training and Doctrine continues to lead significant transformation efforts within the U.S. Army Aviation Branch. Our key priorities involve updating the Aviation Training Strategy and Flying Hour Model, reworking Aviation Mission Survivability maneuvers, addressing spatial disorientation challenges, establishing crew readiness standards for training, overhauling Warrant Officer professional military education, and continuously refining our doctrine.

Recent developments include the release of Army Techniques Publication 3-04.16, "Airfield Operations" on 21 September 2023. Additionally, the Center for Army Lessons Learned published the new Military Decision Making Process Handbook in November 2023. Finally, Field Manual 3-04, "Army Aviation," is undergoing final review chapter-by-chapter under the supervision of the U.S. Army Aviation Center of Excellence Commanding General. We value feedback on our doctrinal publications and encourage you to provide insights, suggestions, and preferences for consideration in future editions. Contact information can be found in the address section of the NOTAMs. Share your thoughts on any recommendations for improvements in upcoming editions.

Training Division Chief (Mr. Bo Thurman):

If you have questions for the Directorate of Training and Doctrine's Training Division, please feel free to contact us at usarmy.novosel.avncoe.mbx.dotd-training-division@army.mil

If you need access to the Aircrew Training Manuals, they are located at the following common access card-enabled link: https://armyeitaas.sharepoint-mil.us/sites/TR-ACOE-DOTD/SitePages/Flight-Training-Branch.aspx

The Aircraft Powerplant Repairer MOS 15B survey will close 22 April 2024.

Participants can access the survey using the link or QR code below:
https://survey.tradoc.army.mil/EFM/se/0AFDD71A7707CF89

The Avionic Mechanic MOS 15N survey will close 30 June 2024.

Participants can access the survey using the link or QR code below:
https://survey.tradoc.army.mil/EFM/se/0AFDD71A275E9210

Officer Training Branch (Branch Chief: Mr. Andrew Mars):

There have been a few changes for the Aviation Captain's Career Course–Reserve update since the last issue. We have started conducting the resident phases back-to-back. However, you will not see the Phase name changes in the Army Training Requirements and Resources System, or ATRRS, until October 2024 (FY25). For now, students will see the order as DL Phase 2, Resident Phase 1, and Resident Phase 3. Please reach out using the information in the address book below if you have any questions.

No updates on Warrant Officer Professional Military Education Modernization.

From the Doctrine and Tactics (DTAC) Division Chief (LTC Julie MacKnyght):

Happy 2024! This is the year of Aviation Doctrinal Updates, as we expect Field Manual (FM) 3-04 (Army Aviation) to go to print by fall, with Army Techniques Publication 3-04.1 (Aviation Tactical Employment) moving into worldwide staffing by late spring. Here are some "big rocks" changes you can expect to see:

Air Ground Integration (AGO) as a formal term will be rescinded. This was a matter of much debate, and we originally sought to update/streamline it to further emphasize aviation as a maneuver element, existing to support the ground maneuver commander. However, in the interest of streamlining doctrine in general, it's more concise to use the existing Army term, combined arms: The synchronized and simultaneous application of arms to achieve an effect greater than if each element was used separately or sequentially (ADP 3-0).

Manned Unmanned Teaming (MUM-T) definition updated to: **"The integrated employment of manned and unmanned systems to accomplish a task *[or mission]*."** This is to expand the definition, as a bridge to the Combined Arms Center eventually assuming proponency, to account for new and emerging technologies. Additionally, MUM-T as a concept is already in use by other branches/warfighting functions due to the rapid proliferation of robotics and commercially available small unmanned aircraft systems platforms. The old definition was much too narrow even for Army Aviation, let alone the Army as a whole!

Attacks: Let's be honest, no one could remember the correct verbiage in the correct order anyway! These descriptions were never meant to be the be-all and end-all categories but that's how they were received. Though "deep attack" has, in the past, had some negative connotations due to specific operations several decades ago, the emphasis here is on nesting with FM 3-0 (Operations) and its focus on deep/close/rear operations, vs geographic areas. Attacks whose purpose aligns with the deep fight will be deep attacks; those that align with the close fight are close attacks.

- ✓ Against enemy forces in close friendly contact ⇨ **Close Attack**
- ✓ Against enemy forces out of friendly contact ⇨ **Deep Attack**

The 7 Aviation Core Competencies **(Current ⇨ Revised / ~~Deletions~~ / Additions /** ***Notes*****):**

1) Provide Accurate and Timely Information Collection ⇨ No Change

2) Provide Reaction Time and Maneuver Space ⇨ Provide **Early Warning,** Reaction Time, and Maneuver Space

3) Destroy, Defeat, Disrupt, Divert, or Delay Enemy Forces ⇨ Destroy, ~~Defeat, Disrupt, Divert~~ **Dislocate, Disintegrate**, or ~~Delay~~ Isolate Enemy Forces *[nests with FM 3-0 defeat mechanisms, removes doctrinally outdated tasks]*

4) Air Assault Ground Maneuver Forces ⇨ Air Assault ~~Ground Maneuver Forces~~ *[redundant to joint definition]*

5) Air Movement of Personnel, Equipment, and Supplies ⇨ Air Movement ~~of Personnel, Equipment, and Supplies~~ *[redundant to joint definition]*

6) Evacuate Wounded or Recover Isolated Personnel ⇨ **Aerial** Evacuation ~~Wounded or Recover Isolated Personnel~~ *[encompasses aero-medical evacuation and casualty evacuation; personnel recovery is a task across all Army branches, not just Aviation, and is thus removed from specific core competency status]*

7) Enable Command and Control over Extended Ranges and Complex Terrain ⇨Enable Command and Control ~~over Extended Ranges and Complex Terrain~~ *[streamlines and widens the aperture; short ranges and "simple" terrain could still become a challenge for ground forces in Large-Scale Combat that Aviation can help solve]*

Tactics Branch (Branch Chief: CPT John [Logan] Meehan):

Our Lessons Learned Team would like to recognize and commend the support of the 25th Combat Aviation Brigade (CAB) for hosting members of the Directorate of Training and Doctrine (DOTD) at their Joint Pacific Multinational Center rotation, along with the Joint Readiness Training Center (JRTC) Team. Valuable insights and lessons were garnered from these experiences and will be used to shape and inform future doctrine, collective training, and deployment preparations. We are always looking for new opportunities to observe and learn from the force.

The Tactics Branch at DOTD strives to gather, integrate, and disseminate current best practices; tactics, techniques, and procedures; challenges; and perspectives from across the Aviation Branch. The "Lessons Learned" section of our SharePoint serves as a resource to units as they prepare for missions, exercises, and deployments, with recent additions including outputs from Warfighter Exercise 23-4, Task Force NO MERCY's U.S. Central Command deployment, 82D CAB's JRTC rotation 23-07, and more. Please send us your unit's products to be published on SharePoint, Center for Army Lessons Learned, and the Joint Lessons Learned Information System to enable and enhance success across the force.

The Collective Team works within Tactics Branch and is continuously reviewing, refining, and updating unit task lists, mission-essential tasks, and combined arms training strategies. Feedback from the operating force is vital to ensure that tasks remain relevant and correct. Provide any feedback to usarmy.novosel.avncoe.mbx.dotd-collective@army.mil, and we will get back to you as soon as possible to make appropriate additions and revisions.

The DOTD Tactics Branch lessons learned SharePoint link is: https://armyeitaas.sharepoint-mil.us/sites/TR-ACOE-DOTD/SitePages/Tactics-&-Lessons-Learned.aspx

Survivability Branch (Branch Chief: CW4 Christopher "Chappy" Crawford):

Survivability branch develops combat capability through the standardization, development, and management of Aviation Mission Survivability (AMS) training, doctrine, tactics, techniques, and procedure validation, acquisition support, and the professional development of the AMS track. Aviation Mission Survivability provides preservation of combat power and enhancement to aviation maneuver.

Current key initiatives include the U.S. Army Aviation Center of Excellence's Quick Reaction Test #3, Mission Planning Modernization efforts, creation of the Fundamentals of Aircraft Combat Survivability manual and associated academics, Aviation Mission Survivability Officer Course updates, embedded aircraft survivability equipment training capabilities, and an overhaul of our AMS ATM tasks, among many other daily activities.

We welcome CW3(P) Will Johnson, our new Mission Planning lead, and SSG Chloe Koehler, our new unmanned aircraft systems and Space subject matter expert, to the team. Please feel free to reach out to us at usarmy.novosel.avncoe.mbx.ams@army.mil or on Microsoft Teams by searching for TR-AVNCoE DOTD Survivability Branch.

Doctrine Branch (Branch Chief: CPT(P) Ashley Howard):

The Doctrine Branch continues to shape the channels of change with revision across all aviation publications with widespread impacts stemming from updates to Field Manual (FM) 3-04, "Army Aviation," and Army Techniques Publication (ATP) 3-04.1, "Aviation Tactical Employment,"as the foundational documents for understanding aviation's role in the latest concept of operations. Keep an eye out for digital "knee-board cards" for these publications available for reference in the Fall.

Recent releases: ATP 3-04.16, "Airfield Operations."

Additional pending releases include Training Circular (TC) 3-04.5, "Instrument Flight for Army Aviators," TC 3-04.71, "Commander's Aviation Maintenance Training Program," and aviation maintenance and aviation safety standard operating procedures (SOPs).

Have an idea on how Army Aviation can do business better? Now is the time to submit documented, well thought-out changes! Submit a Department of the Army Form 2028 today to usarmy.novosel.avncoe.mbx.doctrinebranch@army.mil. Particular areas of interest are: Forward arming and refueling points, aviation sustainment in maritime operations, and command and control as far forward as the division deep area.

Risk common operating picture (R-COP) version 1.3.1 has been released with enhanced compounding risk considerations this fall. Updates include changes to the RCOP, instructions, and annual mission briefing officer/final mission approval authority training to increase visibility of compounding risk elements. Additionally, Risk Academics will be included in all U.S. Army Aviation Center of Excellence (USAACE)-hosted professional military education beginning in the New Year. All R-COP documents, academics, and change brief slides can be found on the Doctrine Branch SharePoint page as Annex C to the Aviation Branch Operations SOP (ABOS).

Be sure to visit the Army Publishing Directorate, or APD, to acquire current aviation doctrine. Additionally, the ABOS with Annexes A: *Aviation Handbook*, B: *BAO and LNO Handbook [Brigade Aviation Officer and Liaison Officer Handbook], C: R-COP*, and supporting instructions as of 01 November 2022 can all be found on the USAACE Directorate of Training and Doctrine (DOTD) SharePoint page. See the address book below for more details.

Looking for a fulfilling career move with an unlimited potential to make a difference? The DOTD is always seeking innovative, diligent minds to shape the future of aviation doctrine. Contact us today for a unique job opportunity here at Fort Novosel!

Gunnery Branch (Branch Chief: CW4 Steve Dickson):

On behalf of everyone from the Gunnery Branch, we would like to say, "Thank You!" The Gunnery Branch has conducted multiple site assistance visits to units across the globe, and we have fielded numerous questions from units of all airframes and all COMPO levels. The insights we have gained are proving to be invaluable as we look forward to shaping the future of Aviation Gunnery. Please continue to reach out to us for assistance and to share your experiences with Aviation Gunnery.

A common topic that we hope to clarify in the near future is differentiating between Army Regulation (AR) 95-1, "Flight Regulations," and AR 350-1, "Army Training and Leaders Development," requirements and how Training Circular (TC) 3-04.3, "Aviation Gunnery," drives those requirements. Understanding what requirements TC 3-04.3 is meant to satisfy will help in managing unit gunnery programs effectively. Army Regulation 350-1 Appendix F-7 requires units to qualify on their assigned weapons in accordance with Department of the Army Pamphlet (DA PAM) 350-38, "Standards in Weapons Training." Department of the Army PAM 350-38, Chapter 7, states that TC 3-04.3 defines the standards for qualification. Lastly, the TC 3-04.3 introduction states, "This TC is the DA PAM 350-38 prescribed TC containing methodology for aviation units to accomplish AR 350-1 required weapons training and qualification with assigned aircraft weapon systems" (2023). Simply put, TC 3-04.3 provides the metrics to which aircrews will be evaluated on aviation gunnery skills for meeting AR 350-1 requirements. Any AR 95-1 requirements or Aircrew Training Program (ATP) gunnery requirements are defined by TC 3-04.11, "Commander's Aviation Training and Standardization Program," and are not meant to be driven by TC 3-04.3. Still not clear about the differences between gunnery requirements and ATP requirements? Please email the team (see address book below) here at the Gunnery Branch, and we'd be happy to have further discussion to help clarify the differences.

The Harding Project aims to renew lively and professional discourse to help guide the Army through this interwar period. Professional writing helps senior leaders communicate down, serves as an outlet for communication up, breaks down silos through lateral communication, inspires us to find solutions to contemporary challenges from the past, and makes us better communicators.

Four point platform. Renewal requires special attention to modernization, improving archives, updating education, and creative staffing models.

1. **Policy and modernization.** Update the Army's professional bulletins to web-first, mobile-friendly outlets supported by social media.
2. **Improve the archives.** Unlock insights from our past with more accessible archives.
3. **Creative staffing.** Consider how uniformed personnel can augment the Army's expert civilian editors.
4. **Educate the force.** Ensure the Army understands the role of professional bulletins and feels able to contribute.

Want to learn more? Follow the Harding Project at https://www.hardingproject.com/

Address Book:

Fort Novosel 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 Education and Technology Branch *(questions regarding the development and/or the development, implementation, and administration of interactive multimedia instruction)*

- Branch Chief: Mr. Chuck Sampson at 334-255-0198 or charles.l.sampson10.civ@army.mil
- TRADOC SharePoint: armyeitaas.sharepoint-mil.us/sites/TR-ACoE-DOTD/SitePages/Educational%20Technologies%20Branch.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: 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-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: 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: Mr. Andrew Mars at 334-255-0433 or andrew.s.mars.civ@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

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

- Branch Chief: Ms. Suzanne Vaughan at 334-255-2124 or suzanne.a.vaughan2.civ@army.mil

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

- Branch Chief: CPT Ashley Howard at 334-255-1796 or ashley.h.howard.mil@army.mil
- Group Mailbox: usarmy.novosel.avncoe.mbx.doctrine-branch@army.mil
- SharePoint: https://armyeitaas.sharepoint-mil.us/sites/TR-ACoE-DOTD/SitePages/Doctrine-Branch.aspx
- 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/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: CPT John (Logan) Meehan at 334-255-1252 or john.l.meehan@army.mil
- Group Mailbox: usarmy.novosel.avncoe.list.dotd-tactics-division@army.mil
- SharePoint: https://armyeitaas.sharepoint-mil.us/sites/TR-ACOE-DOTD/SitePages/Tactics-&-Lessons-Learned.aspx
- *Aviation Digest* public site: https://home.army.mil/novosel/index.php/aviationdigest
- *AD Archives:* https://armyeitaas.sharepoint-mil.us/sites/TR-ACOE-DOTD/Aviation%20Digest%20Documents/Forms/AllItems.aspx

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)*

- Branch Chief: CW4 Chris Crawford at 334-255-1853 or christopher.p.crawford8.mil@army.mil
- Group Non-Secure Internet Protocol Router (NIPR) Mailbox: usarmy.novosel.avncoe.mbx.ams@army.mil
- Group Secure Internet Protocol Router (SIPR) Mailbox: usarmy.novosel.avncoe.mbx.ams@mail.smil.mil
- Intelinks NIPR/SIPR: https://intelshare.intelink.gov/sites/army-ams/ / https://intelshare.intelink.sgov.gov/sites/army-ams/

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

- Branch Chief: CW4 Steven Dickson at 334-255-2691 or steven.d.dickson.mil@army.mil
- Group Mailbox: usarmy.novosel.avncoe.mbx.atzq-tdd-g@army.mil
- Intelinks: NIPR/SIPR: https://intelshare.intelink.gov/sites/usaace/gb / https://intelshare.intelink.sgov.gov/sites/GunneryBranch

A 10th Combat Aviation Brigade CH-47 Chinook helicopter departs the forward arming and refueling point at Forward Operating Base Fenty, Afghanistan. U.S. Army photo by CPT Peter Smedberg/Released.

Conducting Tactical Refueling Missions as a Heavy-Lift Helicopter Company Mission Essential Task

By CPT Andrew R. Schell

Currently, the Heavy Expanded Mobility Tactical Truck (HEMTT) is the primary method of conducting refueling operations for Army Aviation. However, in Large-Scale Combat (LSCO), the Army will need to conduct extended-range aviation operations against an enemy with parity in intelligence and fires, which requires more creative solutions for refueling near the forward line of own troops (FLOT). My recommendation is to create a new mission essential task (MET) utilizing CH-47 Chinook heavy-lift helicopters to transport the Advanced Aviation Forward Area Refueling System (AAFARS)[1] and 500-gallon fuel blivets (fuel storage bladders) to enable rapid tactical refueling in remote locations inaccessible by ground tactical vehicles. The current Headquarters, Department of the Army (HQDA)-approved mission essential task list (METL) for a heavy-lift helicopter company includes three METs: "Perform Air Movement," "Perform Air Assault," and "Conduct Expeditionary Deployment Operations."[2] While one could argue this proposed task, "Conduct Tactical Refueling Missions," technically falls under the task "Perform Air Movement," there are key differences due to the coordination with other aviation elements and the forward support company (FSC). By creating a new MET, it would ensure commanders are training specifically to conduct these missions and better prepare Army Aviation for the future LSCO fight.

> "A mission-essential task is a collective task on which an organization trains to be proficient in its designed capabilities or assigned mission. A mission-essential task list is a tailored group of mission essential tasks" (Department of the Army, 2021, p. 2-1).

Army Aviation forces provide an asymmetric maneuver advantage through amplified reach, protection, lethality, and situational understanding (Department of the Army [DA], 2020, p. 1-2). In order to achieve this advantage, Army Aviation has seven core competencies that all rely on one thing to execute: fuel (DA, 2020, p. 3-1). The HEMTT, as you'll recall, is the primary means of conducting Army Aviation refueling operations. Although it is a highly capable vehicle when a forward arming and refueling point (FARP) can be stationary for multiple hours at a time, the HEMTT lacks rapid maneuverability and the ability to stage in untraversable terrain. However, when fighting in a LSCO, our adversary will have equality with our intelligence and fires, thus requiring more creative solutions to conduct rapid refueling near the FLOT. I believe this problem can be solved by utilizing CH-47 Chinooks to externally load 500-gallon fuel blivets and internally load the AAFARS to pro-

[1] The AAFARS is, "a modular, lightweight, portable four-point refueling system designed for rapid refuelling [sic] of forward-area military helicopters in support of deep strikes" https://www.defenseindustrydaily.com/8m-for-aafars-in-iraq-afghanistan-0462/

[2] Access the common access card-enabled Army Training Network website at https://atn.army.mil for more information on standard METLs.

vide a small-footprint FARP in remote areas that are difficult to identify and impossible to reach by ground tactical vehicles. Then, aircraft conducting operations near the FLOT could land, rapidly refuel their aircraft, and continue the mission while only being exposed on the ground for about 15 minutes. My proposal is to develop this tactic into a new MET for heavy-lift helicopter companies called "Conduct Tactical Refueling Missions."

To assess the feasibility of utilizing a CH-47 Chinook with an AAFARS instead of a traditional HEMTT FARP, we must first verify the systems can provide a marked advantage. One CH-47F with an operating weight of approximately 30,000 pounds (lb) (including aircrew and a four-man team of petroleum supply specialists for FARP setup) and filled with 6,000 lb of fuel has a maximum available load of 14,000 lb (U.S. Army Acquisition Support Center, 2022; DA, 2020, p. 5-5). The AAFARS and all its associated basic issue items weighs approximately 2,500 lb, and 3x500 gallon fuel blivets weigh around 11,000 lb full of jet fuel (JP-8), which puts the CH-47F just under its maximum gross weight of 50,000 lb (DA, 2016, p. 20-45; DA, 2011, pp. 0002-18 to 0002-31; DA, 2020, p. 5-5). Additionally, depending on the number and type of aircraft to be refueled at the FARP, this load could be dropped in a landing zone (LZ) as small as 100 meters across in diameter (Department of the Army, 2006, p. 4-3). With a fully trained team, the FARP could be operational within 30 minutes, reducing the risk of enemy reconnaissance being able to accurately determine its location. The result is that one CH-47 carrying this load is capable of completely refueling 3x AH-64 Apaches and still having fuel to spare on only one turn. This tactic could be expanded to a platoon of four Chinooks landing at different LZs to create multiple options for aircraft to refuel and potentially acting as a deception operation.

In order to train CH-47 crews to conduct this type of operation, it must be added to the heavy-lift helicopter company METL. Currently, the HQDA-approved METL for a CH-47 heavy-lift helicopter company includes three METs: "Conduct Air Movement," "Conduct Air Assault," and "Conduct Expeditionary Deployment Operations." Today, flight companies have become inundated with taskings, annual training, and air mission requests that take them away from training anything other than their METL. While one could argue the mission of transporting fuel blivets and an AAFARS to an LZ technically falls under "Conduct Air Movement," it is unrealistic to expect heavy-lift helicopter companies to conduct this mission without proper training, given significant deviations from an air movement.

There are key elements of utilizing CH-47 Chinooks to transport fuel blivets and AAFARS that merit the creation of a new MET to encapsulate this type of operation. Firstly, the supported unit is no longer a ground maneuver force but rather, another aviation unit. Therefore, the air mission coordination meeting needs to ask different questions, such as aircraft routes, when refueling will be required, and number and type of aircraft to be refueled. Secondly, this task will require greater involvement of the aviation unit's operations section to determine a suitable FARP location based on mission, enemy, terrain, timeline, troops available, and civil considerations, or METT-TC(I). Finally, the heavy-lift helicopter companies are not equipped with the AAFARS or 500-gallon fuel blivets, and these all belong to the aviation FSCs; this will require a great deal of coordination between the flight company and the distribution platoon. Thus, I propose creating a new MET, "Conduct Tactical Refueling Missions," which would more closely resemble the Training and Evaluation Outline Report Task 01-CO-1333, "Conduct Fat Cow Missions."[3] The performance steps and measures of the proposed task would focus on selecting

Petroleum supply specialists practice refueling during training at Schofield Barracks, Hawaii. U.S. Army photo by SGT Sarah D. Sangster.

[3]You can learn more about this task using the CAC-enabled Army Training Network site at https://atn.army.mil/

U.S. Soldiers refuel a CH-47 Chinook helicopter at at FARP in the Middle East. U.S. Army photo by SPC Rob Donovic.

a suitable FARP location, coordinating Class III (petroleum, oils, and lubricant) resupply, developing security measures, and ensuring the aviation crews to be refueled are trained to safely refuel with only their organic crew.

Rapidly establishing FARPs in strategic locations that are difficult to target and destroy by enemy forces will be critical to conducting long-range aviation operations during LSCO. The best way to achieve these mobile FARPs is by utilizing CH-47s to transport AAFARS and fuel blivets to remote areas untraversable by ground tactical vehicles. Creating a new MET is the only way to effectively ensure that the heavy-lift helicopter company commander's time is protected to train this new mission set. Therefore, if the Army expects aviation to rapidly emplace FARPs in austere locations during a LSCO fight, it is critical to create this new task, "Conduct Tactical Refueling Missions" as a MET now—while there is still time to train it.

Biography**:**

CPT Andrew Schell has served 5 years as an Aviation Officer and CH-47F rated crewmember and recently graduated from the Aviation Captain's Career Course (AVC3). Prior to AVC3, he was assigned to the 1/52**D** General Support Aviation Battalion in Fort Wainwright, Alaska, as a heavy-lift helicopter platoon leader and assistant operations officer. During that time, he oversaw and executed multiple Fat Cow operations, both in Alaska and in Guam in support of Operation Pacific Forager.

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SGT Justin Hancock, a Yuma, Arizona, resident, and air traffic control operator with Company F, 1st Battalion, 168th Air Traffic Services, 40th Combat Aviation Brigade, making a visual contact with the aircraft before relaying information over the radio, at Camp Buehring, Kuwait. Operators in the tower control all movement of aircraft on an airfield. U.S. Army photo by 1LT Aaron DeCapua.

"SAY AGAIN?"

ASSUMING COMMAND: NAVIGATING THE CHALLENGES OF DEPLOYING AN AIR TRAFFIC SERVICES UNIT IN THE NATO ENVIRONMENT

By CPT Lance W. Randles

On 6 May 2022, I assumed command of an Air Traffic Services (ATS) unit that would shortly deploy to the European theater in support of Operation European Assure, Deter, and Reinforce. Immediately after taking command, I knew there were two major challenges ahead of us. The first was to deploy my team of controllers, systems maintainers, and valuable pacing items to the European Command (EUCOM) area of responsibility. The second was to deploy the Air Traffic Navigation, Integration, and Coordination System (ATNAVICS) (Note 1) and immediately employ a fully mission-capable system without it being on the equipment status report for the next 6 months. As my team soon discovered, the true hurdle in front of us emerged as we encountered the complexity of providing ATS in the North Atlantic Treaty Organization (NATO) environment.

1. "A highly mobile, self-contained, tactical Airport Surveillance Radar (ASR) and Precision Approach Radar (PAR) system that provides Air Traffic Service (ATS) at designated airfields and landing sites"(PEO Aviation, 2020a).

ATS in a Non-Article 5 NATO Environment (Note 2)

With the recent shift of Regionally Aligned Forces (RAFs) to the East, multifunctional aviation task forces (MFATFs) were established at forward operating sites within new airfields and basing areas. Typically, ATS units are deployed alongside MFATFS to control special use airspace or to augment existing host nation staffed facilities. However, the deployment of standalone ATS facilities that are capable of providing positive control services immediately raised concerns for host nations, including the recognition of credentials, regulatory constraints, and some cultural and political differences.

2. To understand what a Non-Article 5 NATO environment is, we can look to the Article 5 definition, "the principle that an attack on one member of NATO is an attack on all members" (LeBlanc, 2022).

While U.S. Army air traffic controllers (15Qs) are certified by the Federal Aviation Administration through ATS Command, these certifications are not automatically recognized by the International Civil Aviation Organization (ICAO) (Note 3) for peacetime operations at foreign airports. This requires the United States Army Aeronautical Services Detachment Europe, or equivalent, to work with the host nation to recognize U.S. air traffic control credentials. Moreover, each controller must undergo a locally developed

facility training program (FTP) before receiving a rating to allow them to control at that tower. Unfortunately, some host nations have not yet worked with U.S. controllers and do not have internal training programs—that can take 6 to 8 months to create. By that point, the ATS company and RAF combat aviation brigade are at the end of their deployment.

3. The ICAO is "a United Nations organization that recommends and helps establish air traffic standards for 193 countries (although they can only act with the permission of the host country, regulation is performed by the local authorities)" (Cummins, 2020).

Soldiers set up the U.S. Army latest rapid-deployment AN/MSQ-135 Mobile Tower System (MOTS) that will quickly establish ATC operations worldwide in all-weather conditions night or day, for military and civilian aircraft. U.S. Army photo by SGT Sarah D. Sangster.

Without certifying an air traffic control operator through an FTP, ATS units are only able to provide limited services, such as ground control or guiding aircraft to and from a forward arming and refueling point (FARP). This quickly stunts progression, as controllers have limited exposure to the complex air movements necessary to gain proficiency. In addition, host nations are responsible for adhering to ICAO regulations and requirements, which creates hesitation when allowing the RAF ATS units to begin training. Although English is the primary language of aviation communication by the ICAO, host nation airports often see civilian and local military traffic. This creates an unfortunate challenge for U.S. controllers who are on shift to require the quick assistance of a local controller for communication in that foreign language.

Maintaining Readiness and Improving Conditions

Given those challenges, how can ATS units build combat power and develop proficiency in this unique operating environment? The solution lies in maximizing fixed-base training programs at established Army airfields, seeking tactical opportunities with home station units, and filling host nation liaison positions. Each tactical facility requires an air traffic controller to accumulate a minimum of 80 hours on position between Readiness Level (RL) 2 and RL1 position qualification. According to Army Regulation 95-2, "Air Traffic Control, Airfield/Heliport, and Airspace Operations," "Army fixed-base air traffic control facilities (includes Army contract facilities) will be utilized to train Army air traffic controllers assigned to tactical units … Fixed-base ATC [air traffic control] facility managers should make every effort to ensure military controllers are provided the opportunity to obtain a qualification on each ATC position in that facility" (Department of the Army, 2016, p. 19). To achieve this, ATS commanders should then incorporate controllers into fixed-based training programs, like at Ansbach Army Heliport or Grafenwöehr Training Area, as they provide the best resources to achieve controller qualification and proficiency.

Outside of fixed-based training, the RAF ATS offer the only tactical ATS systems in EUCOM, providing an excellent opportunity to assist tenant units. Deploying a Mobile Tower System (Note 4) to an airfield undergoing tower construction or establishing the ATNAVICS to provide precision approach radar ser-

UH-60 Black Hawk Helicopters from 8-229th Assault Helicopter Battalion (AHB) at Godman Army Airfield on Fort Knox, Kentucky. The 8-229th AHB is a direct reporting unit to the 11th Theater Aviation Command (TAC). The TAC is the only aviation command in the Army Reserve. Courtesy photo by CPT Matthew Roman.

vices during inclement weather are a few ways to improve conditions and enhance readiness. Most units operating at the Joint Multinational Readiness Center or the Joint Multinational Simulation Center rarely have the opportunity to interact and leverage ATS. With multiple exercises per year, these joint operations can serve as culminating events for the controllers to provide positive and procedural control to mitigate risk and enable aviation operations.

In addition to training and development, ATS units can also provide a liaison to a host nation or multinational air traffic control facility. These opportunities strengthen relationships, establish facility training programs, and set the stage for future air traffic control operators to earn local ratings and start training. While this may temporarily impact an individual's progression timeline, it is crucial in building a foundation for future success and interoperability with our NATO partners.

Large-Scale Combat (LSCO) and the Way Ahead

The current training model is effective in controlled environments but falls short in preparing air traffic controllers for the demands of LSCO. The deconfliction of airspace, especially with the integration of unmanned aircraft systems (UAS), along with the rapid deployment of tactical systems, will be critical for success in this environment. Current NATO exercises, while valuable, segregate UAS and rotary-wing assets and do not accurately replicate the dynamic and complex airspace of the current operational environment. Enemy UAS will pose a significant threat in future conflicts, and ATS controllers must be trained to manage this risk. Furthermore, the rapid deployment of ATS systems to provide positive control of aircraft inbound to a hasty FARP must be a focus of any training program. This may require temporary changes to airspace, giving the RAF ATS delegation of control. Unfortunately, the current regulatory environment of many host nations presents limitations on the types of training opportunities available, and these challenges will continue to require theater-level involvement to fully prepare controllers for LSCO. Waiting for a non-restrictive Article 5 environment may be too late and could hinder our ability to achieve overmatch in this domain.

> 4. "The AN/MSQ-135 Mobile Tower System (MOTS) is a rapidly-deployable, air traffic control (ATC) tower and Airfield Lighting System (ALS) that quickly establishes Air Traffic Services (ATS) for arrival and departure of military and civilian aircraft and, when assisted by appropriate navigational aids, supports ground operations in all-weather conditions, night and day" (PEO Aviation, 2020b).

As we prepare for redeployment, the team has achieved a number of significant milestones. These include advancements in RLs, multiple control tower ratings, and the successful avoidance of any equipment remaining on the equipment status report. The NATO environment presents substantial challenges for tactical ATS units, necessitating innovative approaches to maintain readiness. While the current training methodology is effective in controlled settings, it does not adequately prepare controllers for the dynamic and complex airspace of LSCO. In order for any MFATF to effectively deploy to remote locations, it is imperative that the ATS community have the capability to adapt, train, and respond. This will play a critical role in ensuring the success of aviation operations in future operational environments.

An air traffic controller monitors air traffic at Camp Ripley, Minnesota. Minnesota National Guard photo by SGT Sebastian Nemec.

Biography:

CPT Lance Randles, a Tennessee native, serves as an Aeromedical Evacuation Officer. He earned his bachelor of arts degree in Exercise & Sports Science from the University of North Carolina at Chapel Hill after commissioning from Valley Forge Military College. Throughout his career, he has taken on roles such as Platoon Leader, Operations Officer, Research Pilot, and most recently, Commander of Company F (Air Traffic Services). Currently, he leads as Commander of the U.S. Army Air Ambulance Detachment at Soto Cano Airbase, Honduras.

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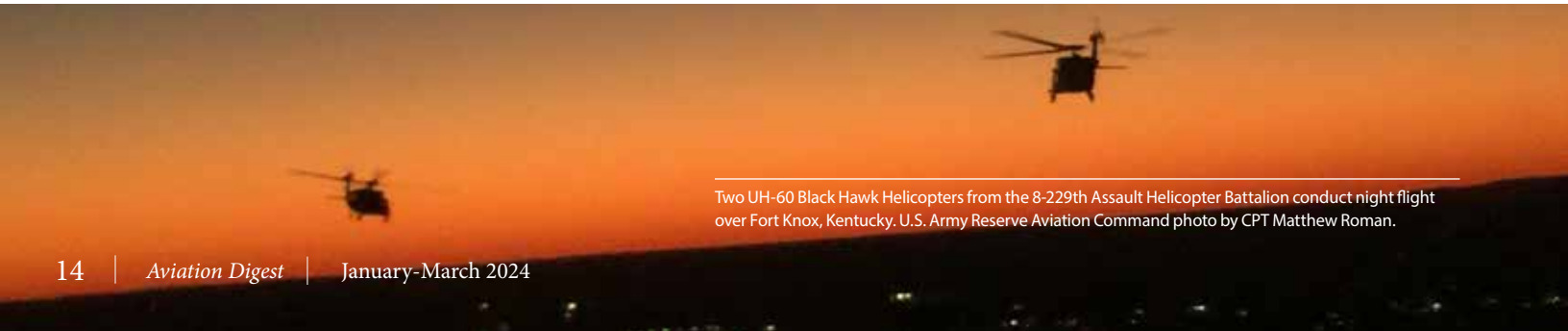

Two UH-60 Black Hawk Helicopters from the 8-229th Assault Helicopter Battalion conduct night flight over Fort Knox, Kentucky. U.S. Army Reserve Aviation Command photo by CPT Matthew Roman.

Aviation Sustainment in LARGE-SCALE COMBAT

By CPT Larry K. Glover, III

In future Large-Scale Combat (LSCO), logistics will be the key component for success in aviation operations. Ensuring Soldiers are getting the appropriate equipment to the company level will be challenged by our adversaries at all levels. We must work flexibility into every sustainment plan to allow logistical hubs to move and avoid being fixed targets. It will be imperative for our company-level leaders to be extremely diligent in understanding their units' supply needs. What has worked for the past 20 years in a counterinsurgency environment will not be survivable with the parity in fires our adversaries possess.

LOGISTICAL CHALLENGES

Since the invasion of Iraq in 2003, there has been little to no contest for the American military in supplying units. The lack of enemy air defense in both Iraq and Afghanistan has allowed equipment and parts to be delivered unencumbered. With peer adversaries having their own air defense and imitation in their aviation operations, the success rate in our unit supply delivery will be significantly lower. With the rise of social media and ability to locate units through their electromagnetic signatures, it will be nearly impossible to conceal logistic centers in the brigade support areas (Pomerleau, 2020). The logistic centers in the division and brigade support area will become prime targets for hypersonic weapons, artillery fire, and close air support with the purpose to disintegrate our operations.

The U.S. Army Aviation Center Logistics Command facility at Fort Novosel, Alabama. Training, doctrine, and testing are all critical parts of the center's mission to develop Army Aviation's capabilities. U.S. Army photo by Jerry Duenes.

It will be imperative for our logistical hubs to remain agile and expeditious to stay ahead of our enemy's information collection. The logistical network cannot be singular lines that run to the front but instead, a robust network that allows newly emplaced locations to pick up the workload as older locations displace to stay ahead of the enemy's information collection.

FIELD-LEVEL FOOTPRINTS

With the rise of our adversaries' unmanned aerial systems, it will be necessary to improve our battalions' abilities to displace rapidly. Learning how to survive in austere environments while conducting operations will be critical. Gone are the days where every piece of equipment deploys. Survival will depend highly on our ability to move at a moment's notice. During a Joint Forcible Entry,[1] sleep and rest will be minimal with the greater risk being posed by our enemies' fires assets. Tactical Operations Centers will be reduced to briefing off maps on our vehicle's hood or stabilator. Sleeping and rest conditions will be reduced from tents to sleeping on the hood of Humvees (High Mobility Multipurpose Wheeled Vehicles) or inside aircraft. The time and space these tents require are now limited. The vehicles that each company has will be maxed by Soldiers' gear, common bench stock, and tools. The time it takes to set up and tear down tents will create another step in getting operations started. As operations continue, it is likely that vehicles will break down and limit space, exacerbating the problem further.

To increase survivability, units will need to consider disintegrating down to the company or platoon level. This will require a further increase in proficiency and simplicity in our mission command and communication systems to maintain situational awareness of our units. Platoon leaders will have to quickly become more proficient in understanding not only operations but the logistics that enable them to conduct the operations. Empowering these junior leaders to lead in austere environments now will be an investment that will grow their understanding of the logistical needs of LSCO. By further decentralizing, field-grade leaders will have more availability to plan operations with synchronized sustainment.

Aviation maintenance will no longer have the luxury of being extremely reactive to problems as they occur. Maintenance leaders must have an indepth understanding to appropriately forecast maintenance operation. Not only that, but they must stay in lockstep with future operations to appropriately synchronize maintenance and provide maximal aircraft availability. As maintenance issues arise, comprehensive push packages will need to be sent to the unit with the appropriate petroleum, oils, lubricants, and parts. With limited vehicle space, it will be impossible to expect units to move large or uncommon components. To save space at the tactical level, we need thought in place to conduct P4T3 (P4–Problem, People, Parts, and Plan; and T3–Time, Tools, and Training) prior to shipment with the appropriate maintenance work packages.

COMMAND DISCIPLINE PROGRAM

The moment a unit leaves its home station, that is when it is likely the most well equipped. From that moment on, parts will break and items will be consumed, destroyed, or potentially lost. Taking equipment that is not fully mission capable will be the equivalent to starting with a handicap. It is up to commanders to have an intensive understanding of their Command Supply, Maintenance, and Deployment Discipline Programs. These programs protect our readiness by allowing units to deploy to theater, move in theater, and operate in theater.

At a moment's notice, the orders to deploy can be cut. In the moments to follow, success will depend on unit movement officers, container control officer, hazardous material officers, and air/rail load teams to be ready (Russell, 2018). That will not be the moment to update inspections or worry about certifications. It is up to leaders to appropriately forecast outbounds, inbounds, and expirations on certificates and inspections.

Command maintenance discipline programs will be our lifeblood in the next fight. The days of driving a beat-up host nation vehicle around the forward operating base are over. It will be necessary for our ground crews to be

Parachutes lay ready for British, Italian, and U.S. Soldiers as they will execute a Joint Forcible Entry into Poland in support of a multinational airborne forces exercise. U.S. Army photo by SGT Kenneth Reed.

[1] "Joint Forcible Entry (JFE) is joint decisive action to seize operational initiative in a crisis, and it is one of the most challenging and complex missions assigned to the U.S. Army." https://www.army.mil/standto/archive/2015/07/29/

Soldiers assigned to III Corps stand at parade rest during an award ceremony for their outstanding support in the command supply discipline program at Fort Cavazos, Texas. U.S. Army photo by SSG Angela Holtby.

as familiar with the intricacies of the ground vehicles just as aircrews are of the aircraft. In the middle of LSCO is not the time to discover the tendencies and personalities that each vehicle has. Creating proactive ground vehicle maintenance programs that interlink seamlessly with drivers' programs will help increase both driving proficiency and ground vehicle maintenance proficiency. Increased proficiency in both these areas will lighten the demand on our support companies and in the logistical supply networks by reducing misdiagnosis in the troubleshooting process.

It will be vital for the commander to create a supply discipline program where people are unafraid to report shortages. An end item with missing basic issue items or components of the end item will have reduced versatility, capability, or endurability. In preparation for LSCO, we must remove the stigma that comes with Army supply—that you will be charged for everything you do not have or that breaks. Items will inevitably break, and equipment will be consumed. It is more important to replace and backfill shortages as soon as possible (with appropriate adjustment documents) rather than create an environment where Soldiers are fearful of not having equipment and losing their pay.

CONCLUSION

In LSCO, our supply lines will be a key target for our adversaries. It is prudent that we begin to train for deep, expeditious, and redundant supply networks. Lack of space will require junior leaders to problem-solve, lead their units, and forecast supply consistently. Commanders must understand how critical it is not to just maintain but rather, systematically improve their command discipline programs to ensure they are ready to deploy at moment's notice. In short, in LSCO, our ability to optimize our sustainment systems will maximize our survivability and increase our lethality.

Biography:

CPT Glover commissioned from University of North Georgia on a Green to Gold scholarship after 3 years as a UH-60 crew chief. Following flight school, CPT Glover deployed to Afghanistan as an AH-64 Platoon Leader. CPT Glover also served as a maintenance Platoon Leader and Battalion S4.

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PREPARING THE APACHE HELICOPTER FOR 2030

An AH-64E Apache Guardian helicopter unmasks during a capabilities demonstration at Fort Novosel, Alabama. U.S. Army photo by LTC Andy Thaggard.

By Public Affairs, Program Executive Office, Aviation

Even as the U.S. Army is pursuing future vertical capabilities for the battlefield of 2030 and beyond, efforts continue to modernize and update the enduring fleet. The AH-64 Apache helicopter is one of the subjects of this targeted modernization.

The Apache has been the Army's attack helicopter since the 1980s and will continue in that role for the foreseeable future. Program Executive Office (PEO), Aviation has progressively upgraded the Apache from its original configuration. Little of the original design remains, and the upgrades have produced the world's leading attack helicopter. The Apache "is used by the U.S. Army and more than 16 allies around the globe" (Bazinet, 2023).

The Apache Project Office (Apache PO) has developed the latest version of the Apache. The AH-64E Version 6.5 (V6.5) will include an improved software program to increase its survivability on today's battlefield. Version 6.5 will follow the Apache PO common configuration strategy to build a common operational flight program software baseline spanning the whole Apache E model fleet.

"We're very excited about the ongoing development of the V6.5 software as it paves the way for Apache modernization including the integration of the [improved turbine engine program] ITEP engine," said COL Jay Maher, Apache project manager. "V6.5 aligns the entire E model fleet under the same software, streamlining training and maintenance while providing a pathway for sensor/capability parity" (Bazinet, 2023).

AH-64E version 6 (V6) Apache helicopters take off from the Boeing facilities at Mesa, Arizona, bound for Joint Base Lewis-McChord (JBLM), Washington. PEO Aviation's PM Apache New Equipment Training Team conducts computer-based and hands-on training as part of the certification process to fly and maintain the Apache AH-64E V6 Apache helicopter. Photo courtesy of the Boeing Company. Photo credit, U.S. Army.

The latest Apache version includes an open systems interface, a beginning step toward a more open systems architecture. The new architecture will allow quick insertion of new technologies and enhanced capability in subsequent updates.

Beginning with the Army Aviation and Army capabilities manager attack/recon priorities and the 2019 V6 follow-on operational test and evaluation findings, V6.5 "includes upgrades in aircraft lethality, survivability, situational awareness, navigation, and communication" (Bazinet, 2023).

Having successfully completed its systems readiness review and the preliminary design review, Boeing successfully conducted the V6.5's first flight in Mesa, Arizona, on October 11, 2023.

Once approved, V6.5 will be used to upgrade and standardize existing aircraft. Because it is software-heavy and includes several hardware insertions, a modification work order will be used to retrofit the AH-64E V4 series and V6 series aircraft to V6.5.

The V6.5 development program is scheduled to end in 2025, and V6.5 fielding via aircraft retrofit is currently projected to begin in fiscal year 2026.

The Apache PO is already anticipating further upgrades to the aircraft. Additional software and hardware updates are required to integrate the T901 ITE for developmental testing (DT). Once DT is completed, the Apache PO will support the T901 operational test & evaluation program.

"We look forward to integrating this more capable engine onto the AH-64E and performing the necessary testing so one day we can get this into the hands of our warfighters," ITE Integration assistant product manager, Katie White, stated. "The Apache ITE Integration team has done a tremendous job collaborating with the V6.5 team, Aviation Turbine Engines Project Office, Boeing, GE [General Electric], and other stakeholders to enable successful integration and qualification activities" (Bazinet, 2023).

U.S. Apache AH64E attack helicopters provide close air support for Romanian Piranha III C armored personnel carriers in Galati, Romania during Exercise Dacian Strike 2023. U.S. Army photo by Troy Darr, U.S. Army NATO Brigade.

The AH-64E V6.5 upgrades in survivability, modernization, alignment of the E model fleet, and improved open systems architecture—paving the way for the eventual integration of the ITE—continue the AH-64 helicopter's 39-year legacy of excellence.[1] These upgrades will improve upon the Apache's current capabilities, while standardizing them across the Apache fleet and reinforcing its "reputation as the world's most advanced and proven attack helicopter" (Boeing, 2023).

Biography:

The Program Executive Office, Aviation, located at Redstone Arsenal, Alabama, serves Soldiers and our nation by designing, developing, delivering, and supporting advanced aviation capabilities for operational commanders and our allies.

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[1]The Apache helicopter's entry into Army service was in 1984. https://www.army-technology.com/projects/apache/

Aviation Sustainment:

The Changes to Survivability, Integration, and Innovation in Training Needed for Combat

82D Combat Aviation Brigade (CAB) sustaining the fight, even at night. U.S. Army photo by SSG Christopher Freeman/82D CAB Public Affairs Officer.

By CPT William E. Benagh

Army Aviation sustainment faces the same challenge of atrophy and cuts from 20 years of static insurgency fighting as the rest of the aviation force. The challenges of Large-Scale Combat (LSCO) demand that we adapt the force that fuels the fight. In the current fiscal climate, commanders will face these greater challenges with fewer assets and personnel than required. It is incumbent upon aviation leaders to adapt our home station training to address survivability through long-range movements, integration with higher echelons of ground sustainment, and foster a climate of innovation through dedicated and de-coupled training of support companies.

Army Aviation provides unique and dynamic capabilities to both ground force and joint force commanders in LSCO. It serves many roles across the battlefield and poses multiple dilemmas to enemy commanders anytime the skies are clear. Army Aviation continues to be a critical component of maneuver warfare, but it also remains an intensely resource-demanding force. A combat aviation brigade is, by design, structured and manned with far more maintenance and sustainment Soldiers than actual Aviators because of this. The conflict in Ukraine highlighted to the world the critical importance of executing effective sustainment operations. Army Aviation as an organization, however, allowed its own ability to conduct sustainment operations to atrophy drastically over the past 2 decades of predictable and steady conflicts in the Middle East. The zero-sum[1] environment Army Aviation continues to embrace will force its sustainment systems to do more with less. In the current fiscal environment, mid-grade and senior aviation leaders must emphasize sustainment survivability training through long-range movements, enhance aviation sustainment integration with ground logistics units, and foster a culture of innovation and protected training within support units to ensure that maneuver companies can accomplish their missions.

Survivability is one of the core tenets of Army sustainment operations (Department of the Army, 2019, p. 1-3). The ability of an organization to rapidly displace, move, and emplace is key to surviving on the battlefield. For aviation units to survive, they must be mobile and able to project power from well behind the forward line of own troops (FLOTs). The current structure of aviation units is a product of 20 years of counterinsurgency operations from static forward operating bases (Sweeney, 2019). As designed now, forward support companies (FSCs) have limited ability to move and distribute the volume of supplies required across a dispersed battalion operating area while continuing to execute its primary mission of establishing forward arming and refueling points (FARPs) (Cunningham & Lillehaug, 2016). They not only lack the personnel, but they are—more concern-

[1]Zero-sum is defined in the Merriam-Webster dictionary as "of, relating to, or being a situation (such as a game or relationship) in which a gain for one side entails a corresponding loss for the other side." https://www.merriam-webster.com/dictionary/zero-sum

ingly—lacking the vehicles, trailers, and flat racks of the palletized load systems (PLS) that are used by sustainment brigades to rapidly receive, transfer, and distribute classes of supply across the battlefield (Cunningham & Lillehaug, 2016). The forward support troops that do possess PLS have them for the sole purpose of moving Class V (CLV) supplies (ammunition) for Apaches;[2] a fact that is almost always overlooked when mission design series (MDS) are mixed as a task force.[3] I believe the distribution limitations that we possess challenge commanders and force aviation units to operate far from artillery ranges and near larger logistic support areas. We must continue to focus training on long-range force projection—with rear bases that recognize widely dispersed operations are not feasible to sustain under our current structure.

A battalion plus-sized air assault, executed by an aviation task force of 40 mixed MDS aircraft, can consume thousands of gallons of fuel in one period of darkness. Army Aviation relies on its logistics unit's ability to draw, transport, and deliver huge quantities of fuel on a routine basis. This is a task that is impossible for an aviation support battalion to sustain and well outpaces brigade support battalions' capabilities. We rely on resupply from division or combat support sustainment brigades. These organizations have the depth to support our needs, but they lack the training and relationships to operate efficiently with aviation sustainers. Aviation leaders need to foster integration between these organizations now before we rely on them in theater. Forming a relationship with supported aviation FSCs enables cross-training on systems like the M967, 5000-gallon (5k) tanker and knowledge-sharing between leaders. I believe the most critical knowledge gap between combat sustainment support battalions and aviation units is the length FSCs go to ensure that issued fuel is safe (Gill & Day, 2021). The M967 tanker lacks filters (Department of the Army, 1993, p. 1-13), and before it can be transferred to an FSC fueler it must have time to settle to prevent the contaminants in the tank from clogging M978 filters. A transfer from a M978 without a valid filter effectiveness test requires the FSC to recirculate multiple times before issuing. These seemingly benign issues can render thousands of gallons of fuel unusable and jeopardize the best planned air assault or attack mission timelines.

Our FSCs possess the capability to move large quantities of fuel and ammunition hundreds of miles toward the FLOT, rapidly establish a FARP, and return to relative safety. Proper training and leadership enable junior leaders to execute the countless tasks required to complete such a complex mission. However, I believe the dedicated training for FSCs needed to execute these missions is lacking within aviation battalions. Aviation leaders must protect and emphasize support company commanders' ability to train their formations and build the culture of innovation we need. Flight companies are constantly executing missions with battalion and brigade collective events sprinkled throughout the year, culminating in the almost semi-annual pilgrimage to a combat training center. The second-order effect to all this maneuver training is a complete inability for a support company commander to plan and execute their own training. The FSC's Soldiers are constantly training on some tasks to support the mission at hand, but the commander is unable to focus their organization to a collective level. The solution is simple but painful—support companies must be given the resources to train in a dedicated and deliberate way separate from the operations of the supported units. The FSC's primary mission is to support the flight companies, but it cannot succeed without dedicated time to perfect the

A U.S. Army UH-60L Black Hawk helicopter crew chief with the New Jersey National Guard conducts hoist training at Joint Base McGuire-Dix-Lakehurst, New Jersey. U.S. Army National Guard photo by SPC Michael Schwenk.

[2]Forward support troops in the attack battalion/air cavalry squadron are allocated in the modified table of organization and equipment in the CLV distribution section.

[3]The Department of Defense Joint publication, "Operations Support," defines MDS as, "The official designation for aerospace vehicles used to represent a specific category of aerospace vehicles for operations, support, and documentation purposes." https://static.e-publishing.af.mil/production/1/af_a8/publication/afi16-401/afi16-401.pdf

Sustainment Soldiers practice hooking up a sling load to a Black Hawk during training at Powidz, Poland. U.S. Army photo by SPC Elsi Delgado.

individual and collective tasks that are its foundation.

The demands of Army Aviation on sustainment will continue to grow as the force restructures in the next decade. Joint forcible entry, "an operation meant to seize and hold a lodgment against armed opposition" (LaBrecque et al., 2018) and light combat aviation brigades are set to stress even the larger division sustainment assets. The sustainment force structure we currently possess should be updated to maximize our potential as a force. In the meantime, we must continue to address training operations in garrison that increase the FSC's survivability through long-range movements, integration with division sustainment elements, and build a culture of innovation through deliberate and dedicated company training.

Biography:

CPT Bill Benagh was raised in Port St. Lucie, Florida. He graduated the United States Military Academy in 2018 with a Bachelor of Science degree in Mathematics. He is currently stationed with his wife Alexis at Fort Novosel, Alabama, for the Aviation Captains Career Course. He served as an assistant operations officer, platoon leader, and forward support company executive officer while assigned to the 6/101st Aviation Regiment at Fort Campbell, Kentucky.

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Please note that the acronym, FARA, in this article refers to a Forward Arming and Refueling Area, an emerging concept that has previously appeared in the *Digest* as a "FARP Assembly Area" (Vol. 10, Issue 3, 2022, p. 35). It has no connection with the recently cancelled Future Attack Reconnaissance Aircraft program and is not a formal term codified in any doctrine or training publication at this time.

Eagle 08 Sends
Evolving FARP Concepts

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Introduction:

The Forward Arming and Refueling Point (FARP) is quickly becoming the Center of Gravity in aviation operations during Large Scale Combat Operations (LSCO) in the contemporary operational environment. In an attempt to increase survivability, we have observed units test a new concept at the National Training Center (NTC) called Forward Arming and Refueling Area (FARA). Though we see a tremendous potential in this concept worth development, we have also witnessed an increase in risk to force that we want units to remain cognizant of.

Deployment of the FARA concept at NTC

Leaving the Aviation Tactical Assembly Area (TAA) in relative sanctuary hundreds of miles to the rear require aircraft to travel for hours to get to the Forward Line of Troops (FLOT). In this construct, the FARP can quickly be considered the Center of Gravity of a formation based on the critical requirements, capabilities, and vulnerabilities it presents in LSCO. Unfortunately, the enemy knows this and will quickly raise the importance of FARPs on their High Payoff Target List (HPTL) in an attempt to limit our ability to see, strike, move, and extend our operational reach. The FARA concept seeks to (and successfully) increases survivability be decreasing the time it takes to establish and teardown the FARA location.

FARP operations have always presented accidental risk for Army Aviation, and they are notoriously dangerous operations when not properly planned, prepared, or executed. Without Standard Operating Procedures (SOPs), planning, training, PCCs/PCIs, and rehearsals, the risk of FARP operations increases. The introduction of new variables that FARA induces and a perceived decrease in requirement to identify and mitigate risk (because it is not stated in doctrine) has the potential to increase risk beyond that of a traditional FARP. Here is what we have observed at the NTC, and some means to employ the FARA concept safely.

Deployment of the FARA concept at NTC:

By definition, a FARP is "a temporary facility organized, equipped, and deployed as far forward, or widely dispersed, as tactically feasible to provide fuel and ammunition necessary for the sustainment of aviation maneuver units in combat" (ATP 3-04.17, p. 1-1). ATP 3-04.17 further breaks down FARP operations into four categories: active, silent, jump, & rolling. Although the techniques for executing each of these FARPs are different, the objective remains the same – rapidly refueling and rearming aircraft in order to prevent a unit's culmination due to sustainment.

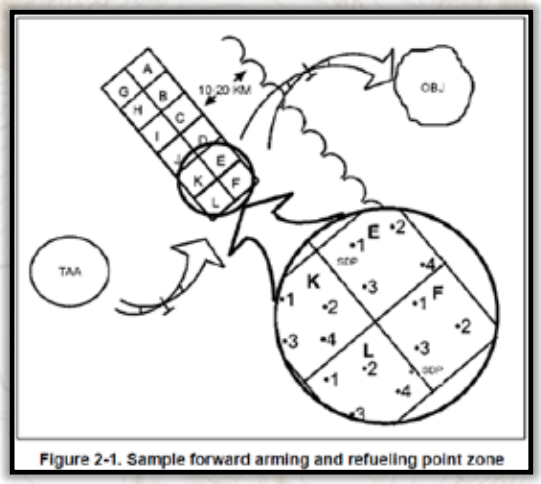

Figure 2-1. Sample forward arming and refueling point zone

As with all operations, FARPs and the doctrine governing them have continuously evolved over time and improved as lessons are learned and experience is gained. Over the last several rotations we have seen the FARA concept tested here at the NTC. The FARA is an interesting hybrid FARP concept developed to increase survivability, and with a degree of development certainly demonstrates the high potential for inclusion into our doctrine. Though this new concept has advantages over conventional FARPs, as we have observed, also increases accidental risk to force that we should address.

The Concept and Protection:

We have seen multiple variations of the concept. Two commonalities are a lack of fixed fuel hoses, and the landing area is much larger than a conventional FARP. The aircraft land within the designated area and the Class III and V drive up to the aircraft. This reduces the requirement to run and stake hundreds of feet of hose across the ground and gives more flexibility to aircrews to pick a suitable landing area. As witnessed during the NTC 23-08 rotation, the FARA rapidly relocated during an indirect fire attack. Despite flat racks of ammunition being left behind, the Class V, vehicles and Soldiers escaped destruction. In comparison, a traditional FARP would likely have been destroyed. More impressive, during one rotation, the enemy was unable to gain custody of the FARA during the 10-day force on force iteration. This is by all accounts a good news story, a concept that increases survivability worth development; but there is a cost.

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An Introduction to the Risk:

Like every effort in testing concepts beyond doctrine, there is risk to address. Four of the last six units that trained at the NTC tested the concept with varying degrees of risk. All six units briefed the concept but lacked the "sets and reps" in home station to have thoroughly identified and mitigated risk through standardization, training, and rehearsals. Of the four units who tested this concept, only one attempted execution at night and none executed the concept under live conditions or while the rotors were turning. Why?

Units have gained institutional knowledge executing traditional and doctrinal FARPs. As a result, most all units have established doctrine and most units have SOPs, battle drills, load plans, packing lists, and check lists to standardize the validation of risk mitigation measures of our FARPs. To date, we have not seen the same degree of organization with the FARA concept. This lack of standardization induces variables that are difficult to anticipate and mitigate.

Two point FARP deployed at NTC

The Variables:

The concept requires the FARA crew to visually identify the location of where aircraft land and move their vehicles to get to the aircraft location. On the surface, this seems benign, but it is easy to visualize how driving these heavy vehicles, during periods of limited visibility, in complex terrain, and at times without positive two-way communication becomes more challenging. We have observed aircraft landing next to an adjacent unit thinking the vehicles were their FARA, delaying link up for an hour. In more extreme cases we have observed aircraft conduct precautionary landings kilometers from the FARA because they were unable to affect link up.

The concept allows for aircraft to land at any location they deem suitable. What is not taken into consideration is Foreign Object Debris. We have observed numerous "near misses" at the NTC when aircraft unknowingly landed within feet of engineer stakes, concertina wire, loose plywood, and even vehicles. Without a defined landing direction, we have also seen AH-64s attempt rearming operations facing one another.

The Mental Variable:

We have all witnessed the decrease in rigor applied to planning and rehearsing a mission when the task shifts from an Air Assault to an Air Movement despite no change to the actual mission or variables. At the NTC, we observe the same decrease in rigor in planning, preparation, execution, and oversight while employing a FARA in place of a FARP. Leaders tend to create a false narrative that the safety and inspection criteria listed in ATP 3-04.17 for a FARP no longer applies to FARAs because it lacks a predetermined point on the ground. "It's not a FARP, it's a FARA, therefore it does not need to be certified."

How Do We Mitigate the Risk?

Inspections: ATP 3-04.17 states that a Safety Officer, or a properly trained individual appointed by the commander, will certify a FARP according to the checklist established in the unit's SOP (p. 1-3). The purpose of FARP inspections is to identify hazards and associated risks before the first aircraft lands. Because fuel hoses are not run and the operation is being called a FARA, should not indicate that risks have ceased to exist. Of the 48 suggested inspection requirements listed in ATP 3-04.17 (p. 2-18), only three are specific to a fixed-hose layout.

Planning: The FARA should be a deliberate effort that is directed at the Squadron or Battalion level through the operations process to ensure the unit does not culminate due to sustainment. The mission, location, duration, consumption rates, resupply, conditions, triggers, branches, and sequels should all be taken into account. The deployment of a FARA, just like a FARP should be operationalized to increase the likelihood of success.

PCCs/PCI: A vast majority of the inspection criteria listed in the ATP check for the presence of all necessary safety and operating equipment. Drip pans, spill kits, nozzles, grounding rods, etc., are all items that would be inspected with a traditional 4-point FARP. Through PCCs/PCIs, the FARA crew and leaders should check and inspect the necessary equipment prior to the crew leaving the TAA.

Layout & Diagram: Though METT-TC will dictate the exact location of each vehicle and ammo rack, the layout should be standardized to reduce variables. Additionally, the diagram and marking of the FARA along with subsequent planned locations by name/designation (i.e., FARP 1a, 1b, etc.) should be briefed in the OPORD.

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Emergency Procedures: All FARA personnel should be briefed on all emergency procedures and contingencies using a developed SOP prior to execution. Consider posting these actions in a separate binder with key leaders to enable the efficient execution of emergency procedures. More importantly, these contingencies should be rehearsed prior to execution.

Rehearse, Rehearse, Rehearse: For air and ground crew's rehearsals using the SOP/TACSOP should be executed multiple times at home station and on a recurring basis. Prior to execution, live rehearsals serve both air and ground crews an opportunity to visualize, synchronize, and practice their actions.

Conclusion:

Our ability to see, strike, move, and extend operational reach is more dependent on our ability to sustain the fight in the contemporary operational environment than ever before. Likely the Center of Gravity in aviation operations, our ability to prevent early culmination is tied to our ability to increase survivability of our FARPs / FARAs and safe execution of our sustainment operations. The FARA is a promising concept that does just that, but much like any creative concept that goes beyond our doctrine, we are incurring some risk.

The purpose of this article is not to discredit the FARA concept. The purpose is to highlight the additional variables that generate risk to force, means by which to mitigate them, and offer commanders the opportunity to accept to risk to force, or not. Most importantly, what units should not do is negate the years of experience mitigating risk to FARP operations simply because these requirements are not explicitly stated in the ATP 3-04.17 or ATP 4-43 for a FARA.

-CW3 Ed Smith, Eagle 08/3M/S, Senior Warrant Officer, Master Gunner, Safety Trainer

Two point FARP deployed at NTC

The Eagle Eye is the National Training Center Eagle Team's monthly newsletter, hosted on their sharepoint page at *https://armyeitaas.sharepoint-mil.us/teams/EagleEyeNewsletter*

Pilot-in-Command:
Phase V Designation Board

10th Combat Aviation Brigade in action at Forward Operating Base Shank, Afghanistan. U.S. Army photo by CPT Peter Smedberg.

By COL Ryan J. Scott

The Army Aviation Standard Operating Procedure (SOP) contains a detailed outline for structuring a pilot-in-command (PC) program. Based on my time as a battalion commander in the 10th Combat Aviation Brigade (CAB), I found the Phase V designation board critical. It helped me assess the candidate, mitigate risk, and reinforce commander's intent. Conducting the Phase V is based on technique, and I'd like to share what I've learned.

The Army Aviation's branch-wide SOP outlines the preferred program for designating PCs. Using a five-phase program, the CAB can grow lethal warfighters.

PC Program

Listing the phases in detail, Phase I addresses integration into the aircrew training program (ATP). Here, the PC candidate is responsible for advancing to Readiness Level 1 (RL1).

Academic and flight training occurs in Phase II. Often using a unit specific checklist, PC candidates master a series of ATP tasks. Despite being RL1, candidates continue to progress, learning to lead and manage missions under the mentorship of company PCs. Simultaneously, the candidate is building a reputation throughout the company regarding their judgement, maturity, and safety–reputation matters, and word travels fast within a company.

Phase III is the nomination board. Company and troop commanders establish a board of company-level experts who formally review the candidate's records, PC checklists, and grade slips. Candidates who achieve a board nomination advance to a flight evaluation.

During Phase IV, candidates demonstrate technical and tactical proficiency in flight. Comparable to an annual proficiency and readiness test (APART), the candidate participates in an oral evaluation and mission scenario in all modes of flight with an instructor pilot (IP).

Phase V is the designation board and the candidate's final hurdle. This phase is the battalion or squadron commander's final opportunity to mitigate risk and reinforce commander's intent before assigning the candidate as a PC. Phase V is based on technique. I offer the following as a glimpse into how I achieved success during the final phase of designating a PC.

Designing the Board

The designation board's composition is at the commander's discretion. In a formal setting, I formed a diverse board of battalion-level experts–usually the standardization officer, maintenance officer test pilot, safety officer, and aviation mission survivability officer. Additionally, I highly encouraged the company commander and company standardization pilot to participate.

Having these leaders sit on the board served two purposes. First, their presence showed candidates the designation board was important. Second, it was a way to routinely reinforce commander's

"To find yourself, think for yourself."-Socrates (Socrates statue illustration courtesy of Pixabay.com)

intent to my key leaders. Additionally, despite not having a formal vote, I expected the board to provide an alternative perspective.

The designation board was also a venue to personally interact with the PC candidate. Most importantly, I was able to assess if they understood the organization's mission, vision, and my intent. It would be simple for the candidate to use rote memory and simply recite commander's intent or the priorities of the organization. However, I was on the hunt to determine if the candidate understood the "why."

Following a model from the school of advanced military studies, I used open-ended questions (also known as Socratic questioning) to seek clarity, self-discovery, and deepen the knowledge of the candidate. Prior to meeting, I encouraged each candidate to become familiar with Army Doctrine Publication 6-0, "Mission Command," (Department of the Army [DA], 2019), the Army Aviation SOP,[1] and Army Techniques Publication 3-04.1, "Aviation Tactical Employment," (DA, 2020). My goal was to explore the depth of the candidate's knowledge.

The aim was not to trap the candidate. Rather, I wanted to take them on a guided journey through our doctrine. Together, we would understand its significance and how doctrine would enable their success as a PC.

With the right leaders in the room and a solid structure for conducting the board, I was ready for my first candidate.

The First Candidate

The first candidate to experience a designation board arrived in my office. They were confident and ready to be designated a PC following what they assumed would be a stern warning about reckless behavior. The candidate sat next to their company commander on a round table equipped with a pen, paper, and a digital tablet. Behind them, ready to observe the interaction, were the battalion's senior WOs. I stood in front of the candidate next to a whiteboard with a dry erase marker in hand.

I began by asking the candidate if they were familiar with the Aviation SOP's description of the Phase V designation board. The candidate paused. Rather than force them to guess, I encouraged the candidate to use their digital tablet to reference the SOP verbatim. With a slight hesitation, the candidate said the designation board ensures the candidate has thorough understanding of their commander's intent. "Yes," I exclaimed. Startled and uncomfortable, the candidate waited for the second round of questioning.

I explained to the candidate that it was my responsibility to assess their understanding of my intent. How you answer the questions during our dialogue would inform the outcome of your PC designation, I said. The candidate acknowledged, and we proceeded with the discussion.

I then prompted the candidate to list the doctrinal materials they used to prepare. As expected, the candidate listed the recommended references. I captured their response on the whiteboard. I then asked for the doctrinal meaning of "commander's intent." What is meant by purpose, key tasks, and end state? Where is this definition in our doctrine? Why does this matter to a PC? Again, rather than have the candidate blindly guess, I told them to find it in the doctrine and we discussed the meaning together.

Doctrinal Crosswalk with the Candidate

Every mission you execute has a commander's intent, I explained. The PC writes a doctrinally correct mission statement on the first line of the unit's risk common operational picture (RCOP). I began sketching a graphic to link concepts. I showed the candidate how the purpose for their mission, key tasks that enable mission success, and the desired end state are all embedded within the RCOP. I then described the RCOP as a binding contract, like an operations order. Therefore, it's the PC's responsibility to execute the mission within the left and right limits of the RCOP. The candidate's wheels were visibly turning. We moved on to mission command.

I asked the candidate to list the principles of mission command–again, encouraging them to search the doctrine rather than guess. I told the candidate that as a PC they will inevitably see that no plan will survive contact with the enemy. Sometimes the enemy is maintenance, bad weather, or enemies we encounter in combat. I impressed upon the candidate if they understood and applied the principles of mission command, the likelihood of mission success would be higher. Applying the principles, I added, was both the responsibility of the commander and their subordinate.

The first principle, he said proudly, was competence. I captured his answer on the board and clarified that if he was competent as a PC, and I was competent as a commander assigning the mission, the likelihood of success when things inevitably go wrong would be higher. Next, he said, was mutual trust. I followed in-turn. If I trust you as a PC to execute the mission, you trust I will support your decision

Army AH-64 Apaches use Wright-Patterson Air Force Base, Ohio, as a stopover on their way to Fort Drum, New York. U.S. Air Force photo by Tyler Greenlees, 88th Air Base Wing Public Affairs.

[1] Please contact the author for more information on the Aviation SOP referenced in this document.

making, and then the likelihood of success will be higher if things go wrong. Shared understanding followed. Then commander's intent, mission orders, disciplined initiative, and finally risk acceptance.

By the 45 minute mark, the whiteboard reached capacity. More importantly, the candidate acquired a thorough understanding of my intent for them as a PC to be a doctrinally sound aviator who executes their assigned mission through the principles of mission command.

The final step remained—the candidate's designation as a PC. Going around the room, I solicited feedback from all the board members. Considering their feedback, the final decision was mine. As the candidate sat nervously waiting for my determination, I looked them in the eye and congratulated them on achieving PC.

A Better Way

Over the next 2 years, I repeated this process with every newly designated PC candidate. Each time, the candidates shared their experience with peers. Candidates dug deeper into the doctrine. They were getting better. The process also evolved. Depending on the candidate's role in the organization, I tailored the discussion to suit officers, WOs, and future air mission commanders.

When I first made PC as a CPT, my commander brought me in his office, told me a scary story, and handed me the keys. I appreciated the story, but he missed an opportunity.

Alternatively, by the end of my tenure in command, my intent had percolated throughout the battalion. The Phase V designation board became my most effective risk mitigator for newly assigned PCs.

Biography:

COL Ryan J. Scott serves on the Joint Staff, J-3 Operations Directorate. He is the former commander of 2-10 Assault Helicopter Battalion, 10th Combat Aviation Brigade, 10th Mountain Division. He has a Doctorate in Public Administration from North Carolina State University, a Master of Arts in Strategic Studies from the School of Advanced Military Studies, and a Master of Public Administration from the University of Oklahoma.

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Alaska Army Aviation conducts training near Colony Glacier. Alaska National Guard photo by Robert DeBerry, Public Affairs.

IMPROVING AVIATOR TRAINING IN PREPARATION FOR LARGE-SCALE COMBAT

By CPT Katie J. Rummery

It is my opinion that Army Aviators are severely undertrained. They need to conduct more realistic, tough, battle-focused training in order to appropriately prepare for Large-Scale Combat (LSCO). This can be accomplished with the following two changes to Army Aviation operations: **Army Aviators need more flight hours and tactical training in flight school, and risk approval should be delegated to lower echelons**. These two changes will significantly increase the training ability of units across Army Aviation, resulting in higher tactical proficiency as the Army prepares for operations in a LSCO environment.

First, I believe a major shortfall of pilot training starts in flight school during initial entry rotary-wing training (IERW). I graduated flight school in 2019 with 127 aircraft hours and approximately 50 simulator hours, as did all of my IERW peers.[1] After speaking with flight student graduates from other U.S. Military Services, it appears that the Army provides significantly less ***flight training*** to its new aviators than any other branch of U.S. military service. The Navy, Marine Corps, and Coast Guard require each student pilot to complete 160 hours in their first airframe (along with an additional 90 hours in a simulator) (Training Air Wing One, n.d.). The Marine Corps helicopter flight students complete an additional approximate 115 hours in their advanced airframe, totaling 275 total actual flight hours (U.S. Marines, n.d.). The Navy provides over 100 hours in their advanced airframe, totaling over 260 hours of flight time (Bahadur, 2019). The Air Force provides flight students with 90 hours of flight training in their basic aircraft (Columbus Air Force Base, 2019) and 100 hours in their advanced aircraft, totaling 190 hours (Moreno, 2018). These flight hours produce pilots that are more proficient and safer in their aircraft.

Due to these flight hour constraints and from personal experience, I believe that Army Aviation flight school places very little emphasis on tactical flight and mostly focuses on basic tasks. It essentially produces readiness level 2-capable aviators,[2] which puts the burden of mission task training on individual units. Most units are not equipped to handle it, as the pool of senior pilots with experience is declining and being replaced with new aviators straight out of flight school. This puts undue burden on the units to train too many aviators with too

[1] "The Army's traditional initial rotary wing flight training model is 32 weeks and consists of four phases. Upon graduation, students will have accumulated 179 hours of flight instruction that includes 149 in an aircraft and 30 in a simulator" (Belcher & U.S. Army Aviation and Missile Command, 2022).

The author notes that the UH-72 and UH-60M courses are both part of IERW. The UH-72 course is the basic airframe course, and the UH-60, CH-47, AH-64, and C-12 courses are the advanced airframe courses.

[2] "RLP training is given to new, uncertified pilots and annually to certified pilots to test their aircraft proficiencies. There are three levels of the training. RL3, uncertified, involves pilots, accompanied by a senior instructor pilot, doing basic maneuvers and learning to fly in formations with other helicopters. Level two involves mission-oriented training and RL1, certified, is where pilots can fly without instructor pilots and are considered ready for missions." https://www.army.mil/article/97107/Aviators_prepare_to_fly/

U.S. Army Warrant Officer 1 Amy Berner, assigned to Company Bravo, 1st Battalion, 145th Aviation Regiment, walks off of the flight line after flying a UH-72 Lakota Helicopter on Toth Stagefield Army Heliport, Fort Novosel, Alabama. She and other Army Aviation students are completing their first phase of flight training to become U.S. Army helicopter pilots. U.S. Army Reserve photo by SSG Austin Berner.

few instructors, and it often becomes the priority over other essential individual and collective tasks necessary for flight in a LSCO environment. This results in many aviators, not just new students, possessing a severe lack of proficiency in mission tasks, which significantly increases the risk associated with conducting the tasks.

If the Army provided at least 200 hours of total actual flight time to flight school students, there would be time to train new aviators on mission tasks. This would significantly decrease the burden on units to train their new aviators to the necessary proficiency level to begin training with their platoon and company. This would allow units to focus on their individual and collective mission essential task list responsibilities and unit training objectives, instead of spending most of their time attempting to get new pilots up to standard. It is better to have fewer proficient aviators than to have more aviators of mediocre proficiency. The latter significantly increases risk as units attempt to conduct rough, realistic training.

Secondly, ***risk mitigation*** is often mishandled at every echelon, and senior leaders have become so risk-averse that it inhibits lower echelon aviators from appropriately conducting training. By withholding risk approval for all but low-risk missions, senior leaders cripple their companies from conducting the appropriate number of iterations of mission tasks necessary for proficiency. By utilizing the "crawl-walk-run" method, in order to be prepared for aviation operations in LSCO, crews need to incrementally build training plans to achieve complex, dynamic training as both individual aircraft and multiship operations. By restricting crews to only the "crawl" or "walk" phases of training by withholding risk approval, they will not achieve proficiency. Only conducting the "run" phase at a combat training center and not any other time is not enough repetitions for crews to be proficient enough to successfully conduct the tasks in a LSCO environment. Crew must routinely conduct these moderate-risk

MAJ Sara C. Adams, UH-60 Black Hawk helicopter instructor pilot, talks with students beside a Black Hawk at Fort Novosel, Alabama, June 12, 2023. U.S. Army photo by Kelly Morris.

U.S. Army Chief Warrant Officers conduct CH-47 Flight Simulator training at the Illesheim Flight Simulator Complex, Germany. U.S. Army photo by Georgios Moumoulidis, TSC Ansbach/Released.

training events, which will increase proficiency and ultimately decrease the risk associated with the tasks.

In a LSCO environment, this delegation of risk approval will be forced upon Army Aviation at large. Whether by the death toll of leaders at every level or the lack of ability to communicate across the battle space, young leaders will be forced into positions where they approve missions beyond their current knowledge or experience. Senior leaders must start training their young leaders to manage risk and allow them the opportunity to approve missions. Army Regulation 95-1, "Flight Regulations" (2018, p. 10) currently states "At a minimum, company level commanders and below are the final mission approval authority for low-risk missions, battalion level commanders and above for moderate-risk missions, brigade level commanders and above for high-risk missions, and the first general officer in the chain of command for extremely high-risk missions." For Army Aviation to successfully manage risk in a LSCO environment, experienced leaders must begin training young leaders at an earlier age. With proper final mission approval authority training, platoon leaders who are pilots-in-command should be the approval authority for low-risk missions, company commanders should be the approval authority for moderate-risk missions, and battalion commanders and above should be the approval authority for high-risk missions. This delegation of approval authority will allow units to train to a higher level of proficiency and conduct decentralized operations in a LSCO environment.

In conclusion, I believe that Army Aviation can significantly increase aviators' level of proficiency as units prepare to conduct operations in a LSCO environment by increasing the number of flight hours new pilots receive in flight school. Increased hours would enable them to become more proficient in tactical tasks and by delegating risk approval to lower echelons to prepare units for the approval levels they will conduct in a LSCO environment. This will better prepare and train units to conduct LSCO operations in the future.

Biography:

CPT Katie Rummery commissioned from the Reserve Officers' Training Corps at Olivet Nazarene University in 2018 and graduated from the Army Flight School in 2019. Since then, CPT Rummery has flown in both medical evacuation and air assault units as a pilot-in-command. She thanks her mentors, especially LTC Ralph Salazar, who made her the pilot and officer she is today.

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The Permanent Change of Station System is Detrimental to Large-Scale Combat Readiness

By CPT Alexandra G. Weisser

As part of the Army's focal shift to Large-Scale Combat (LSCO), the Permanent Change of Station (PCS) process for the active Army must be revised. Higher echelon leadership within the Army is already aware of this; in 2018, then Secretary of the Army, Mark Esper, alluded to a revision of the PCS process. No changes have been implemented since then, and the PCS system remains (Vergun, 2018). I believe the Army should make three changes to the PCS cycle:

—Stabilize Soldiers and officers at duty stations for 4 years outside the continental United States (OCONUS) and 6 years in the continental United States (CONUS),

—Create and enforce a deliberate PCS handover at gaining and losing units, and

—Modify the officer professional military education (PME) program to minimize unnecessary moves.

These three changes will enable more complex training and greater readiness, which is a necessary quality in organizations to withstand the challenging operational environment. As an all-volunteer force in the smallest active Army since before World War II (South, 2023), the Army should perceive these modifications to the PCS program as part of a larger effort to incentivize recruitment and re-enlistment in order to meet the personnel needs for LSCO.

Currently, an average unit's training requires 6–12 months of individual and collective tasks for pre-deployment training. This timeline compounded with a PCS cycle means that 1 in 3 Soldiers are replaced by deployment. This means that in the 12 months it takes to complete requisite training for a deployment, 1

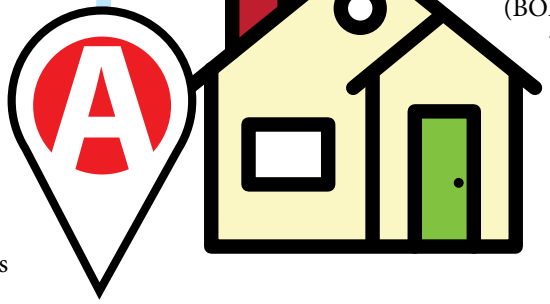
Workers from River City Movers conduct a direct delivery for SSG Cornel Varnado Jr., 194th Military Police Company, 716th Military Police Battalion, at Fort Campbell, Kentucky, whose belongings were transported overseas from his previous duty station in Germany during a government move. U.S. Army photo by Ethan Steinquest, Fort Campbell Public Affairs Office.

in 3 people would be different. This becomes an issue when many Training & Evaluation Outlines require more than 80 percent (%) of total unit personnel to be present for an external evaluation. As the Army transitions to a division-driven LSCO fight, units will need to be proficient at a higher echelon of collective tasks in order to be deployment ready. With these issues, units are completing high-risk training without the right people present.

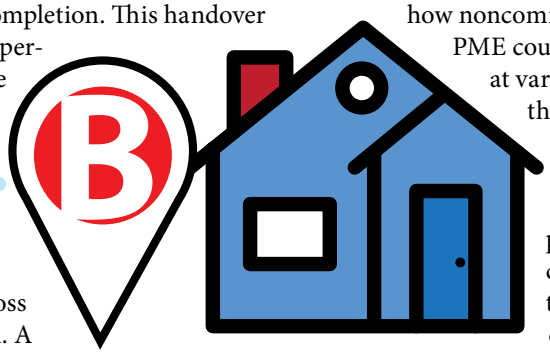
Some personnel depart before the deployment and others arrive without the required training to fully contribute to a higher level of collective tasks.

Two potential solutions to this issue are to force units to complete more training in less time or to re-evaluate the standard PCS cycle. The first is not ideal, because units are straining under the current training and administrative requirements; condensing the timeline will jeopardize the quality of the training. Instead, the Army should ***stabilize personnel for 4 years at an OCONUS duty station and 6 years at a CONUS duty station***. This would allow personnel to complete multiple iterations of training, resulting in greater expertise at a specific mission set. Exceptions to these tour extensions can be adjudicated on a case-by-case basis, much as they are now. Similarly, commands will need to ensure personnel rotate positions within the garrison to maintain career growth potential and to avoid too much familiarization within the rating chain.

If personnel stabilized at a duty station, the Army could then implement a transition window to train Soldiers on unit or position nuances before integrating incoming personnel. In the last 3 months, personnel can fully train and transition their duties to their replacement, similar to staff duty handovers or left seat/right seat practices. In under 5 months, they dedicate 1 month to training a replacement; 2 weeks for out-processing; 1 month for leave, travel, and house hunting; 1 month for in-processing; and 1 month for training at a new position. Having a deliberate handover is imperative, especially for positions that include property layouts or leadership positions.



While this is an occasional practice for staff duty or deployed units, the Army does not provide a standardized method of tracking completion. This handover between unit personnel has the potential to be the most significant preventive measure to maintain readiness across the formation. A month-long period for leave, house hunting, and travel ensures that Soldiers have adequate time to recuperate before relocating and starting a new job. Also, a longer in-processing period ensures that incoming Soldiers have taken care of personal needs such as living quarters, a vehicle, childcare, etc., prior to fully integrating into a new unit. To reinforce this deliberate handover, evaluation reports should add a statement of handover completion and reference a codified procedure for left seat/right seat practices to act as a checklist for personnel.



Some may argue that while active-duty Soldiers may be able to ***minimize PCS moves, it would not be possible for officers due to required PME***. In the first 10 years of a career, officers have three PME courses—Basic Officer Leaders Course (BOLC), Captain's Career Course (CCC), and Intermediate Level Education (ILE). All three of these courses are 10 months or less. Although BOLC is undeniably best suited as branch-specific courses, ILE is conducted with mixed branches and CCC should be as well. The disparities between career courses across different branches is massive and does not equally prepare all officers for the rigors of command or staff work. Additionally, the four largest CONUS installations—Fort Liberty, North Carolina; Fort Campbell; Kentucky, Fort Cavazos, Texas; and Fort Lewis-McChord, Washington—should offer "satellite" courses for ILE and CCCs. This would be similar to how noncommissioned officer PME courses are conducted at various locations in the Army. Both CCC and ILE students should complete a distance-learning portion at the current duty station as a full-time online student for all academic classes, including common-core, area of concentration, and leadership lessons. After an appropriate amount of time, both CCC and ILE students attend an in-person course at one of the four installations. This change in CCC means that the military decision-making process section would be a simulated, fully functioning staff with officers of varying backgrounds. By offering these courses at the four largest CONUS installations, officers could attend prior to leaving or upon arrival at a new permanent duty station. This model would allow opportunities for junior CPTs to learn from peers of differing backgrounds. In LSCO operations, re-evaluating officer PME structure would create staff officers intimately familiar with their specific role in the larger scheme of operations. Officers would have a better understanding of complementary mission sets and create relationships for complex training in a unified fight. Also, the Army would save money adopting this model by maximizing distance-learning modules, minimizing unnecessary officer moves, reducing temporary duty funds, and potentially reducing family separation pay. This money could be far better allocated to expensive modernization efforts.

Each of the previous points explain the impact of PCS moves on the Army's readiness for the next LSCO fight; however, the individual supporting the family unit are massive factors in this success. In today's Army, approximately

57% of active duty military members are either married, have children, or both (National Academies of Sciences, Engineering, and Medicine, 2019). In an annual survey, Soldiers leaving the Army named the top five reasons as relating to impacts on the family and stability (Winkie, 2021). As stated by LTG Kevin Vereen, the current Deputy Chief of Staff for Installations, "The Army may recruit Soldiers, but we retain families" (Riebeling, 2023). By elongating time spent at a permanent duty station, spouses would have more job prospects in the local area; families would be able to deepen roots within local communities to assist during deployments; and mental health issues for children, spouses, and Soldiers could decline.

Additionally, with a dedicated PCS window, spouses would be able to look for work, apply, interview, and attain needed licenses. This would significantly minimize the employment gap that almost all working spouses experience with moves. These changes could alleviate many issues forcing personnel out of the Army but also may have a positive impact on recruiting. Roughly 80% of people in the military knew a veteran or current Soldier before joining (Kenney, 2022). In 2021, the Military Family Support Programming Survey reported a decline from approximately 75% in 2019 to approximately 63% in 2021 that military and veteran families would recommend military life (Military Family Advisory Network, 2021). This means that by addressing concerns driving people out of the Army, veterans and current active-duty members may be more inclined to recommend the Army. This may enable the next LSCO fight to maintain the all-volunteer force structure with personnel dedicated to serving.

The Army needs to radically re-evaluate the PCS cycle for personnel of all ranks. The constant moves are detrimental to the unit for the complex, high-risk missions a large-scale operation demands. Stability at a duty station for 6 years would enable depth of knowledge unheard of in the force. The additional time on station would also allow for a more comprehensive transition between personnel. By reinforcing a deliberate handover between personnel, operations will become more seamless when gaining and losing Soldiers. Also, active Army officers traditionally move more frequently than enlisted members, but a few modifications to the PME system would eradicate unnecessary and costly moves. Lastly, this elongated time on station would open a world of possibilities for recruiting and retaining the numbers needed in an all-volunteer LSCO fight. As stated by a strategic studies senior fellow, "the risk is if the US military is too small to conduct the kinds of missions that it needs to conduct in future wars, that that will go badly for the United States" (Kurilla, 2023, takeaway 2).

A Fort Liberty, North Carolina, family prepares for their PCS move. PCS season is in full swing and families across the installation are preparing to move to their new duty stations. U.S. Army photo by Jacqueline Hill, Fort Liberty Garrison Public Affairs Office.

Biography:

CPT Alexandra Weisser is an Aviation Officer and UH-60 Black Hawk pilot. She has previously served with Bavarian Dustoff assigned to the 12th Combat Aviation Brigade and holds a bachelor of science degree in Operations Research. She is joined in service with her husband, CPT Alexander Weisser, and son, Vincent.

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Restructuring Airspace to Enable Rapid Deployment of Small Unmanned Aircraft Systems in a Large-Scale Combat Environment

By CPT Benjamin L. Larson, CW4 Nicholas H. Cyin, and CW2 Daniel A. Tirol

During Joint Pacific Multinational Readiness Center 23-01,[1] the air defense and airspace management (ADAM)/brigade aviation element (BAE) repeatedly encountered issues with airspace management, specifically the constraints the current airspace coordinating measure request (ACMREQ)[2] process imposed on small, unmanned aircraft system (sUAS) usage.

> "For good or for ill, air mastery is today the supreme expression of military power and fleets and armies, however vital and important, must accept a subordinate rank." –Winston Churchill, 1949

Why Airspace Matters, and What is the Desired end State?

Airpower is "the ability to project military power through control and exploitation in, from and through the air" (U.S. Air Force, 2021, p. 6).

Proper airspace management should enable all forces operating any equipment in the air to rapidly execute their mission and exercise airpower with minimal restrictions. If any military element attempting to regularly utilize the airspace encounters systemic constraints, the controlling organization must ameliorate their airspace management methods.

Churchill's deduction regarding aviation still holds true in modern warfare; however, the battlefield has continued to change due to advancements in technology. Large airfields and robust logistics are no longer mandatory to exercise airpower. Small ground elements equipped with the correct tools can deny the enemy from operating within the airspace via man-portable air defense systems, rapidly deploy aerial intelligence, surveillance, and reconnaissance (ISR) platforms, and accurately deliver munitions into enemy rear areas.

The Army is working to equip our Soldiers with the best of these systems. Fielding of the Skydio RQ-28A quadcopter for its short range reconnaissance (SRR) program (Tranche 1) is underway, and the Army is already well in the selection process for the next generation SRR Tranche 2 system (Program Executive Office, Aviation, 2023). To accommodate new capabilities, traditional airspace delineation needs to change and allow for new capabilities to be leveraged against the enemy within adaptive, unplanned timelines.

The sUAS Project Office conducted the first prototype testing of the Tranche 2 SRR sUAS prototypes at Fort Moore, Georgia, to improve upon RQ-28A performance. The RQ-28A (shown) is the Army's first program of record quadcopter, and it is a small, vertical takeoff and landing aircraft that Soldiers at the tactical level can use to conduct real-time reconnaissance, surveillance, and target acquisition operations past the next terrain feature. Courtesy photo, PEO, Aviation.

[1]You can read more about JPMRC rotation 23-01 here: https://www.army.mil/article/261685/joint_pacific_multinational_readiness_center_rotation_begins_in_hawaii

[2]"An ACMREQ is a request to reserve airspace for a specific use. An originator requests airspace for an operation within their assigned AO [area of operations]. An ACMREQ can consist of single or multiple ACMs" (Department of the Army, 2016, p. 3-3).

Summary of Current Airspace Planning

"Army forces operate as part of a larger national effort characterized as unified action. Army commanders understand that they do not operate independently but as part of a larger force. They integrate and synchronize their actions and operations within this larger framework, collaborating with entities outside their direct control. Just as commanders manage terrain throughout their area of operations, they continuously collaborate with unified action partners to integrate the use of airspace" (Department of the Army, 2016, p. iv).

The Army is assigned blocks of airspace to manage from surface to the coordinating altitude (CA), ideally set high enough for permissive fires. A brigade (BDE) will be assigned control of airspace by the controlling division's airspace coordinator. This airspace will be within the lateral boundaries of that BDE's area of operations (AO) up to the CA and will utilize two methods of airspace control—positive and procedural—with the BDE ADAM/BAE working to maximize the use of procedural means of control (Department of the Army, 2016, p. 1-3).

Currently, airspace is divided by the coordination level (CL) and the CA. The CL is used as a procedural control to separate fixed- and rotary-wing aircraft by determining an altitude below, which fixed-wing aircraft normally will not fly. The CA acts as a procedural control for which the use of the airspace below the CA and within the BDE's AO is controlled by that BDE's ADAM/BAE.

Problems with the Current Method of Airspace Delineation

This current method of airspace procedural controls assigns no-default operating zones for sUASs. Therefore, all sUASs must request an airspace coordinating measure (ACM) prior to utilization. The ACMREQ needs to be submitted 24 hours in advance in order to ensure the ACM is included in the airspace control order (ACO). Otherwise, an immediate ACMREQ must be submitted by any element looking to utilize an sUAS, a process that will take between 1–3 hours to establish a restricted operations zone (ROZ) for the safe operation of the sUAS. This requires the ground force to take one of the following four paths of usage that tactical necessity dictates its use is required.

1. Identify all potential utilization of the sUAS at a specific location 24 hours in advance.

2. Wait hours for an immediate ACMREQ to be approved and a ROZ established for sUAS use while the battlefield continues to change.

3. Ignore airspace restrictions and launch the sUAS, creating a danger to aircraft operating in the area.

4. Abandon sUAS operation due to usage constraints and lose its benefits and capabilities.

Anecdotally, maneuver leaders most often report selecting option 4, prioritizing familiar tactics, techniques, and procedures (TTPs). Option 1 is not feasible or self-limiting, as BAEs are instructed to "Limit (in number, size, and duration) ACMs to the minimum required for mission accomplishment to maximize flexibility for airspace users" (Department of the Army, 2016, p. 3-5).

While the Army shifted focus from counterinsurgency to Large-Scale Combat (LSCO), there has been little consideration for modernizing the airspace to provide one that works for all users within their mission time constraints. Leaders have had had ample time to plan and organize the battle-space, placing ROZs over key terrain to provide ISR operational support well in advance of ACO publication.

What we are Proposing

Simple changes to the current airspace structure, while utilizing existing airspace management computer systems, will provide a simple-to-understand airspace that is functional for all users and supports the ground force commander.

Spatial Deconfliction

When designating airspace, units can determine an altitude for the ground force for utilization of sUASs based on mission requirements. For example, we suggest airspace from surface to 500' above ground level is allocated for this purpose. The altitude delineation between the sUAS and rotary wing will be referred to as the coordinating floor (CF). Coordination level and CA will be retained for their same purpose (Figure). Any rotary aircraft operation within the BDE's airspace below the CF, outside of a standard use Army aircraft flight route, will be required to submit an ACMREQ or immediate ACMREQ for inclusion to the ACO. Due to aviators' better knowledge of airspace management compared to that of other maneuver branches and the typical aviation planning timeline, the burden of requesting an ACM below the CF will have no impact to aviation mission execution.

Time Deconfliction

If lateral control measures for airspace deconfliction below the CF are constraining aircraft from operating as necessary for a particular mission, either due to a short timeline of execution or air mission complexity, time deconfliction may be used. Time deconfliction would involve temporarily bringing the CF to the surface and grounding all sUAS within the airspace to allow permissive movement of rotary-wing aircraft. Since sUASs can be both rapidly deployed and recovered, rapid air missions will not be constrained when a notice is placed to recover all systems.

Examples of time deconfliction in effect:

1. Complex rotary-wing mission—During the military decision-making process, the airspace plan becomes too complex due to an excess of ACMs needed for a complex air assault supported by attack aircraft moving between battle positions. This situation could make deconfliction for sUASs unfeasible. Instead, after air-ground integration discussion, ground forces are instructed that during the 2-hour block of time, no

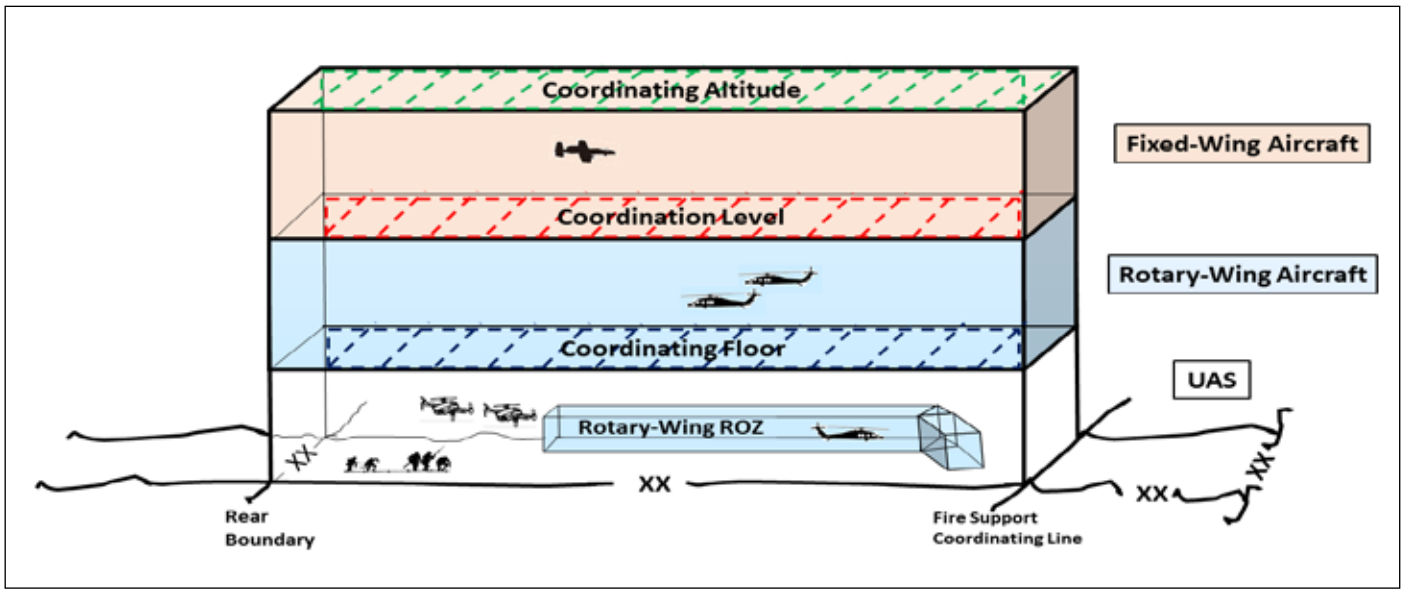

Figure. Depiction of the BAE's proposal for an improved airspace plan (Larson, et al., 2023).

sUAS will be operated without a ROZ below the CF, effectively returning the airspace to the current aircraft permissive structure. Then, when executing the ground tactical plan after the sUAS restrictive block of time has expired, aircraft will be relegated to their ACMs if below 500', and the sUAS capabilities will be fully utilized.

2. Medical evacuation (MEDEVAC) mission—After MEDEVAC is approved, the aircrew begins the MEDEVAC aircraft run up while the BDE tactical operations center (TOC) determines where the airspace needs to be coordinated by considering point of takeoff, ambulance exchange points, and the medical support facility. Utilizing positive control, the BDE ADAM/BAE contacts appropriate units and instructs them to recover all sUASs. Within minutes, the aircraft is en route to the casualty, and all sUASs are down. Once the aircraft has recovered the casualty and exited the airspace, the BDE contacts those units to allow resumption of sUAS operations.

This airspace design will allow the ground force to operate UASs anywhere on the battlefield below 500', excluding ACMs that have been submitted for aircraft. Ground operators will be able to validate if any aircraft ROZs or corridors are in their vicinity by reviewing the published ACO. If they are unsure that there is a restriction on their use of the airspace or do not have access to the ACO, they can reach up to their controlling battalion or BDE for confirmation on the ACO that the airspace is clear for launch. This is an extremely quick process and will still allow for rapid deployment of sUASs.

Aircraft Hardening Against Enemy sUASs

The advent of sUAS technology has populated the airspace with airborne objects that pose a significant threat to Army aircraft. As discussed, the best risk mitigation for friendly UASs is airspace deconfliction. However, it does not account for enemy drone implementation. Air mission survivability planners have their hands full deciding on the future techniques and tactics to counter these threats. Technology has evolved faster than the current TTPs and development and implementation of new TTPs take time, leaving a gap in survivability coverage every time UAS technology evolves.

To cover this gap in survivability, hardening the aircraft's vulnerable spots is the best solution. The Federal Aviation Administration (FAA) commissioned a study on drone mid-air collision with manned aircraft in 2015 (FAA, 2017). The FAA and the Alliance for System Safety of UAS through Research Excellence (ASSURE) study determined that the most vulnerable spots on fixed-wing aircraft were the leading edges of the wings, while the windshield sustained minimal damages (ASSURE, 2017; FAA, 2017). Converting this to Army rotary-wing aircraft, the most vulnerable areas on a helicopter are the rotor blades and the engines. Military helicopters have been known to safely land with serious damage to the rotor blades. Therefore, the current rotor systems may already meet survivability goals for drone strikes.

Protecting the engines with a guard or filter over the engine intake would be a low-cost and time-expedient solution. Like the Inlet Barrier Filter fitted on aircraft exposed to higher levels of salt and sand, this barrier would protect from the engines from foreign objects such as a drone. The 2015 FAA/ASSURE study determined a mechanical drone with rigid metal components would cause significantly more damage to an engine than a soft body bird of the same weight; thus, there is a risk of devastating consequences to an unprotected turbine engine (ASSURE, 2017; FAA, 2017).

Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, and Facilities (DOTMLPF) Changes

Doctrine–The changes we have outlined in this article detail how **doctrine for airspace management at the tactical level should change to enable UAS employment**. The tactics for use of robotics

in LSCO for the conventional Army is still in its infancy and requires further development to ensure an understanding of what Soldiers and commanders can expect from the added capabilities of sUASs.

Organization–**The integration of robotics into maneuvers would benefit from a dedicated robotics or unmanned branch**. Regulatory guidance for UASs under the Aviation Branch results in requirements and restrictions that deter maneuver forces from employing UASs or employ UASs without meeting those requirements. This is partly due to UAS regulatory guidance being implemented as an afterthought and evidenced in requiring subordinate echelons without proper staffing to meet the same standards required of larger aviation battalions and BDEs (e.g., U.S. Army Forces Command Arms).

Training–With the advent of unmanned systems and their undeniable effectiveness, **a new robotics specialty is warranted**. Training for this new military occupational specialty or additional skill identifiers standardized and institutionalized at the Maneuver Center of Excellence ensures proper program implementation and expertise to be distributed throughout the Army.

Materiel–Procurement of new unmanned systems by Army acquisitions is largely focused on tactical capabilities. Procurement of command and control (C2) and airspace management capabilities for robotics to report position location information on existing integrated tactical network (ITN) systems is lacking. **The Army needs requirements to integrate future systems into the airspace management architecture to ensure UAS can be fielded with airspace management in mind**. The current hodgepodge of ITN and C2 systems to enable airspace management of UAS is limiting effectiveness or requiring more time and personnel to properly manage.

Leadership–There is **no standardized training for leadership in the tactics of utilizing robotics**. As TTPs are developed, leadership must be trained in the employment of sUASs in their formations.

Personnel–**Specialized personnel must be organized to best enable skill maintenance and redundancy**. Existing maneuver personnel can be reorganized to establish robotics teams in maneuver elements. Situational awareness of the airspace in LSCO becomes paramount in the utilization of fires and UAS assets in a distributed and noncontiguous battle space. Current ADAM sections are only capable of airspace management operations solely from the TOC. **Additional tactical airspace integration systems and airspace systems operators are required in ADAM sections to man TOCs, as well as tactical command posts for 24-hour operations**.

Facilities–The force can benefit from **dedicated sUAS training facilities focused on advanced LSCO TTP development and implementation**. Purpose-built facilities can mitigate any security or safety risks posed due to training. Facilities with obstacles or realistic LSCO environments (to include electronic warfare threats) allow for effective sUAS TTP development.

Policy–**Develop policies with the FAA and installation management to allow for permissive and regular training of UASs**. Currently, the UAS operations officer at each installation and unit is required to establish an agreement between air traffic controllers, installation management, and the FAA through a Department of the Army Regional Representative. Provisions from the FAA and installation to allow for training of sUASs can be implemented to enable rapid and continuous sUAS training.

Conclusion

Modern sUASs are a force multiplier, providing ground forces with on-demand, useful, real-time situational awareness of enemy disposition, as well as use as a weapon system to engage enemies directly from the sUAS platform. Every effort should be made to facilitate our ground force commander's utilization of these assets, beginning with the cessation of requiring burdensome and slow administrative barriers prior to sUAS employment.

Biographies:

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DOCTRINE UPDATE:
Training Circular 3-04.5

By CW4 Dustin H. Schnaible

The Doctrine Branch at Fort Novosel's Directorate of Training and Doctrine released final edits for Training Circular (TC) 3-04.5 to the Army Training Support Center as of 29 September 2023.

The Branch focused TC 3-04.5, "Instrument Flight for Army Aviators," revisions to align the TC with Federal Aviation Administration regulations and guidance regarding instrument flight.

Global positioning system navigation is being integrated into all airframes, so Doctrine Branch TC revisions focused on increased understanding of the system and the rules that apply to all phases of instrument flight to help aviators better use this capability.

The Doctrine Branch updated figures with graphics displaying the newer glass cockpits and its references to instrumentation for instrument flight rules flight. Additionally, they updated figure graphics and symbols to show relevance to current map data. Finally, they removed old weather advisory and planning information that is no longer in service.

HH-60 Black Hawk helicopter aviators stay current on their flight status and proficient in their warrior tasks and drills at Newnan Coweta County Airport in Newnan, Georgia. U.S. Army photo by SSG Austin Berner.

Production Control:

Ground Units can Improve Their Maintenance Programs by Observing Aviation Maintenance Management Systems and Processes

By CPT Jacob D. McConnell and 1LT Maritza L. Futch

Introduction

Units across the Army struggle with maintaining their operational readiness (OR) rate and keeping a clean and accurate Equipment Status Report, regardless of how often or in-depth their weekly or biweekly maintenance meetings are. The truth is, going 1 or 2 weeks without talking maintenance across the formation is way too long, but having daily, hour-long maintenance meetings is too arduous.

Aviation units do not have the same struggles with keeping aircraft fully mission capable (FMC), nor is there much ambiguity about the status of parts or services. Aviation units conduct daily 20-to 30-minute production control (PC) meetings to discuss daily maintenance status on every single helicopter, troop to task, prioritization, and where parts are in the system. In this article, we will detail how we integrated lessons learned from our aviation brothers and sisters to increase our OR rate, build predictability, and conduct maintenance more efficiently.

Background

Currently, my forward support troop (FST) is forward deployed in Europe, supporting a multifunctional aviation task force (TF) that has a Headquarters & Headquarters troop, AH-64E troops, UH-60 companies, Gray Eagle company, aviation maintenance troop, and supply support activity platoon. Needless to say, we have a massive fleet to take care of, several hundred pieces of rolling stock and ground support equipment (GSE) with a reduced maintenance platoon, and no permanent, forward-deployed infrastructure that would aid our limited personnel capabilities. We knew how difficult this was going to be prior to deploying, so we sat down with the Maintenance Control Officer (MCO) and Maintenance Control Technician to figure out how we could discipline our systems and troops to task in order to maintain our TF's fleet. The answer was to mimic our aviation brothers and sisters and implement our own version of their PC meeting.

How we Prepared

To start, we had to gain an understanding of what occurs at aviation PC meetings. We were impressed by how the meeting was run (strictly) and how short it was, averaging 20 minutes in duration. Each troop has a maintenance representative who briefs their troop's aircraft status by tail number—every single day. If an aircraft is partially mission capable (PMC) or non-mission capable (NMC), that maintenance representative then briefs what the fault is, if parts are on hand to fix the fault, who is currently working on that aircraft, and when that aircraft will be FMC. Once every troop representative briefs their statuses and priorities for the day, the back shops, GSE, test measurement diagnostics equipment (TMDE), and petroleum, oils, and lubricants representatives brief their tasks to sync support with the line troops/companies. Finally, the PC officer in charge or noncommissioned officer in charge ties the meeting together to finalize priorities, the end state for maintenance, and to read-back due outs requiring resource requests from the support battalion or brigade. At the end of the meeting, there is a clear understanding across the squadron of what maintenance operations are happening over the next 24 hours. There is no ambiguity on who is doing what following the meeting.

After attending several PC meetings and taking notes with both aviation maintainers and ground maintainers, we started codifying tiers of priorities for our TF. The clear maintenance priority for any aviation unit is usually the M978 heavy expanded mobile tactical truck fueler. These vehicles are the lifeline that keep helicopters flying, with the capability to store and distribute 2,500 gallons of fuel (Oshkosh Defense, 2023). They are also prone to breaking due to the age of most of the fleet, as well as the constant use that aviation units put them through. In a garrison environment and on an average week, our squadron's distribution platoon distributes more than 15,000 gallons of fuel through these M978s.

1LT Futch leading our ground PC meeting. Photo provided by CPT Jacob McConnell.

What Happened in Theater?

After focused planning and refinement of priorities, we implemented our ground maintenance PC meetings shortly after arriving in theater. Each troop and company knew that every morning at 0930, they needed to have one representative present to brief on their ground fleet. Though troop executive officers (XOs) are the preferred representative, a CPL empowered with the right information can be just as effective. The designated purpose is for the representatives to provide their needs to the maintenance team of what they could not accomplish on their own.

This was one avenue that we needed to adjust from aviation, knowing our ground fleet is increasingly larger than the aircraft fleet. Reciting every vehicle status would be arduous and very time-consuming, but having representatives brief their ground priorities and accountability of scheduled services, TMDE, and recoverable item turn-ins allows everyone involved to be held accountable. Doing this not only provided needed data to the MCO but it better prepared the maintenance team to forecast requirements for upcoming missions. This process allows our team to plan and adjust internal priorities accordingly and most importantly, empower troop and company representatives to take ownership of their equipment.

The ground PC meeting agenda starts with the MCO conducting accountability of each troop, company, and platoon. After accountability, each representative briefs their section's priority for maintenance that they need assistance with (this could range from them requesting dispatch support to informing the maintenance team that a priority vehicle they need for an upcoming training event was deadlined the night prior), their status on TMDE, weapons, and finally, if there are any other requests for information or requests for support not already covered in their brief. After all units have briefed their respective statuses and needs, the MCO will tie the meeting together to finalize priorities, the end state for maintenance, and to read-back due outs requiring resource requests from the support battalion or brigade, just like in the aviation PC meeting.

The additional piece we added to the ground PC meeting is once all units are dismissed from the meeting, the unscheduled services senior mechanic briefs the MCO, the squadron commander or XO, and the FST commander the by-bumper number status of every M978 fueler and the way ahead for each truck. These meetings have opened doors for relationships within the squadron and have improved accountability for our ground fleet altogether. It's not an uncommon theme for ground maintenance to be a reduced priority within aviation units. However, upholding our teams to this standard has brought a new exposure to the importance of the readiness realities of our ground fleet.

How we Benefited

There have been beneficial second- and third-order effects since launching the ground PC meeting. Primarily, we keep identifying new and shared processes between aviation and ground maintenance teams that generates higher levels of shared understanding. One of the processes aviation maintainers utilize is "P4T3." This process breaks down, by step, the decision-making of maintenance managers before they assign taskings and executions. The "P4" represents the four Ps (Problem, Planning, People, Parts), while "T3" represents the three Ts (Time, Tools, Training). In a nutshell, each of these topics discuss the importance of ensuring the maintenance managers are identifying the problems, planning the adequate time to complete the taskings, verifying they have the correct tools, and most importantly, safety of qualified personnel.

This process brought to light numerous areas where our team had fallen short. A few examples of P4T3 integration into our systems include verifying tool calibrations, ensuring all parts are on hand to install before pulling bad parts, and creating more opportunities to cross-train junior officers. The P4T3 process is also helpful for communicating maintenance tasks in plain terms. For example, leaders outside the maintenance platoon do not inherently understand how time- and manpower-consuming certain jobs can be to complete. We communicate when a part is expected to ship, how many days that part will take to install, how many mechanics needed to perform that job, what specific tools or equipment are needed, and if it requires any additional support from a higher echelon. The P4T3 process seems intuitive, but we were surprised how much more efficient we became when we deliberately planned maintenance operations around using it. The P4T3 process is a prime example of where our ground maintainers opted to adopt aviation techniques, adapt them to the motor pool, and significantly increase efficiency.

By deliberately implementing these techniques, we began to increase consistency and develop new habits. We started with the internal functions like our "Troops to Task" and erased old expectations and ways of thinking regarding how we would attack maintenance. We started by rearranging our personnel and their responsibilities based on our squadron's training priorities. For instance, if our fueler slant started to slip drastically or if several became NMC, Maintence—meaning those deadlined fuelers had all parts on hand—we would shift personnel from the scheduled services section to rapidly make those trucks FMC. Previously, we would not have altered our maintenance service schedule, but now we clearly establish daily priorities that are tied to specific mission and training requirements and flex manpower as necessary based on parts flow.

Conclusion

The coexistence of aviation and ground maintenance within our brigade and their processes have challenged our teams to understand the vitality of integrity, accountability, attention to detail, and development of leaders. Learning the processes of aviation maintenance and developing a PC meeting molded to the ground priorities of our TF improved the user-level equipment accountability and overall OR rate of our wheeled vehicle fleet. After 90 days in theater, we increased the M978 OR rate by 60% and the overall rolling stock OR rate by 13%, despite the losses in manpower. We plan to continue learning from the aviation side and vice versa as we navigate through our missions ahead. Working alongside these teams has not only improved networking within the brigade and supporting units, but it has solidified trust and cohesion within our teams. This has been one of the largest wins, and we look forward to continually refining our processes, developing trust, and accomplishing new standards for our remaining missions ahead here in Europe and back at home station.

SFC Sevilla leads a team of mechanics conducting vital repairs on an M978A4 fueler. Photo provided by CPT Jacob McConnell.

Biographies:

1LT Maritza Futch is the Maintenance Control Officer for Echo Forward Support Troop, 3**D** Squadron, 17th Air Cavalry Squadron, and is currently deployed in Europe as part of Atlantic Resolve. She graduated from the University of Bridgeport in 2019 with a bachelor's degree in industrial design. She commissioned in March 2022 from Officer Candidate School as a Quartermaster Officer. She is a graduate of the Logistics Basic Officer Leaders Course and the Sling Load Inspector Course. 1LT Futch is in her first assignment as an officer and looks forward to gaining more experience across the Sustainment Enterprise as she furthers her military career.

CPT Jacob McConnell is the commander of Echo Forward Support Troop, 3**D** Squadron, 17th Air Cavalry Squadron, and is currently deployed in Europe as part of Atlantic Resolve. He graduated from Louisiana State University with a bachelor's degree in political science and commissioned as a transportation officer from their ROTC (Reserve Officers' Training Corps) program in 2017. CPT McConnell is a graduate of the Transportation Basic Officer Leaders Course, Logistics Captains Career Course, Air Assault School, and also earned his Expert Soldier Badge. His previous assignments include Distribution Platoon Leader, Maintenance Platoon Leader, Plans Officer, and Battalion Operations Officer.

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M978 HEMTT tankers during a maintenance break in Saudi Arabia during a multilateral logistics operation. U.S. Army photo by SFC Mary Katzenberger.

The following article was original published on Linkedin. We are reprinting the article with permission from the NTC Eagle Team, along with author updates.

An AASLT departing the PZ for the Objective at the National Training Center.

Measuring Aviation Training Program Effectiveness

LTC Eric Megerdoomian*

Eagle 07 (Senior Aviation Trainer), NTC
Published May 26, 2023

Are we measuring what has been accomplished or are we measuring the increase in our ability to accomplish our mission? If we focus on Measures of Performance alone; we risk measuring performance as an end onto itself.

When units fail to measure both the Performance and Effectiveness of their aviation training programs before their arrival at the National Training Center, we witness a decrease in lethality and survivability in the contemporary operational environment and in increased risk to force and to mission. Measuring both the performance and effectiveness of aviation training programs arms commanders in recognizing divergent aviation training efforts not tied directly to the training objective set forth in Unit Training Plan. Failure to recognize divergent aviation training efforts results in not only an inefficient use of the Flying Hour Program, but also a decrease in aviator proficiency and the correlated increased risk to force.

Measures of Performance (MOPs) refers to the metrics that are used to evaluate how well a particular process or system is performing. If we have clearly defined common indicators that help us measure the accomplishment of specific tasks or processes, then we are likely measuring performance alone. "What was our Operational Readiness (OR) Rate this month?" "Did we meet our Flying Hour Program (FHP) this month?" MOPs are typically easier to measure as indicators are generally clearly defined and can be quantified more easily.

> "Measure what is measurable and make measurable what is not."
>
> --Galileo Galilei

Measures of Effectiveness (MOEs) on the other hand, evaluate the change in our behavior or ability in achieving the training objectives, and in a broader sense, accomplishing our mission. MOEs risk being more subjective and offer more qualitative measurements unless the appropriate indicators are collected to provide quantitative feedback on the effectiveness of our training programs. "What is our ability to generate combat power?" "How many aviators experienced near misses in their first six months after achieving their Pilot

AH-64s arriving to the Jump FARP in preparation for an attack at the National Training Center.

in Command qualification?" Without MOEs as a part of a holistic feedback mechanism, we rob commanders of the understanding they need to make informed decisions about refining programs and allocating resources towards achieving a desired end-state.

What should give you pause is this… we can measure performance without training strategies, training objectives, and desired end states tied to the unit's mission. We can do work, but are we achieving anything?

As an Army we are starting to focus more effort on measuring the effect of our training programs towards the desired outcome. We no longer simply measure the push-up, sit-up and the 2-mile run. The ACFT now measures functional fitness needed on the modern battlefield with an eye towards holistic health. Despite expending the same number of rounds, the new M4 qualification starts to holistically assesses a Soldier's ability to employ situational awareness, safe weapon handling, and core marksmanship competencies.

How does this correlate to Aviation Training?

"Did you meet your Flying Hour Program (FHP) this month?" I ask this leading question to then ask this one… "But what did you do with those hours, and did we move the bar in terms of our ability to accomplish our mission?"

While the FHP provides a metric for tracking utilization of a resource, it alone cannot measure the effectiveness of our aviation training programs. The FHP is just one aspect of a broader approach to measuring training effectiveness which is why it is essential to consider how the FHP was utilized and what was achieved with those hours to measure the performance of our training programs.

To achieve this, we must apply cognitive effort to the task of measuring both the performance and the effectiveness of our aviation training programs. We must start with the development of the Annual Training Guidance and the Unit Training Plan that clearly defines the desired end-state. Next, we must identify the necessary MOPs and MOEs that will reflect the effectiveness and the alignment our training programs. Finally, we should select the indicators for each measure that inform our assessments.

> What you measure is what you will get."
>
> --Peter Drucker

By considering measures of performance and effectiveness from the Annual Training Guidance down through each training flight we execute, we can gain a more comprehensive understanding on how effective our training programs are we can start to recognize if our efforts are aligned towards a common desired end-state.**

Divergent Training Efforts:

The power of assessing both MOPs and MOEs is that it highlights when "What we are doing?" is not properly aligned with "Where we are trying to go?" If our MOPs and MOEs indicate that "We exceeded our FHP but we are still a T3," then we may have divergent training efforts at echelon that need alignment.

When the desired end-state is clearly defined, the associated MOPs and MOEs are codified, and those indicators are measured; subordinate leaders will take note. Once informed and empowered, they align their actions towards this common desired end-state. Commanders, Mission Briefing Officers, Air Mission Commanders, Flight Leads, and Pilots in Command become vested in ensuring each planned ATM task or flight is nested and aligned with the training objective. Failure to do so risks accruing metrics that indicate divergent training efforts not aligned with the desired end-state. Divergent training programs commonly result in ineffective training programs at best. At worst, divergent training efforts fail to increase aviator proficiencies, increase risk to force, and risk to mission.

In conclusion, focusing solely on Measures of Performance can increase risks to the force and to the mission as we fail to recognize the holistic effect of our training programs. Although measuring effectiveness requires more cognitive effort and analysis, it is necessary to avoid viewing performance as an end onto itself. Well-defined Measures of Effectiveness and their thoughtfully selected

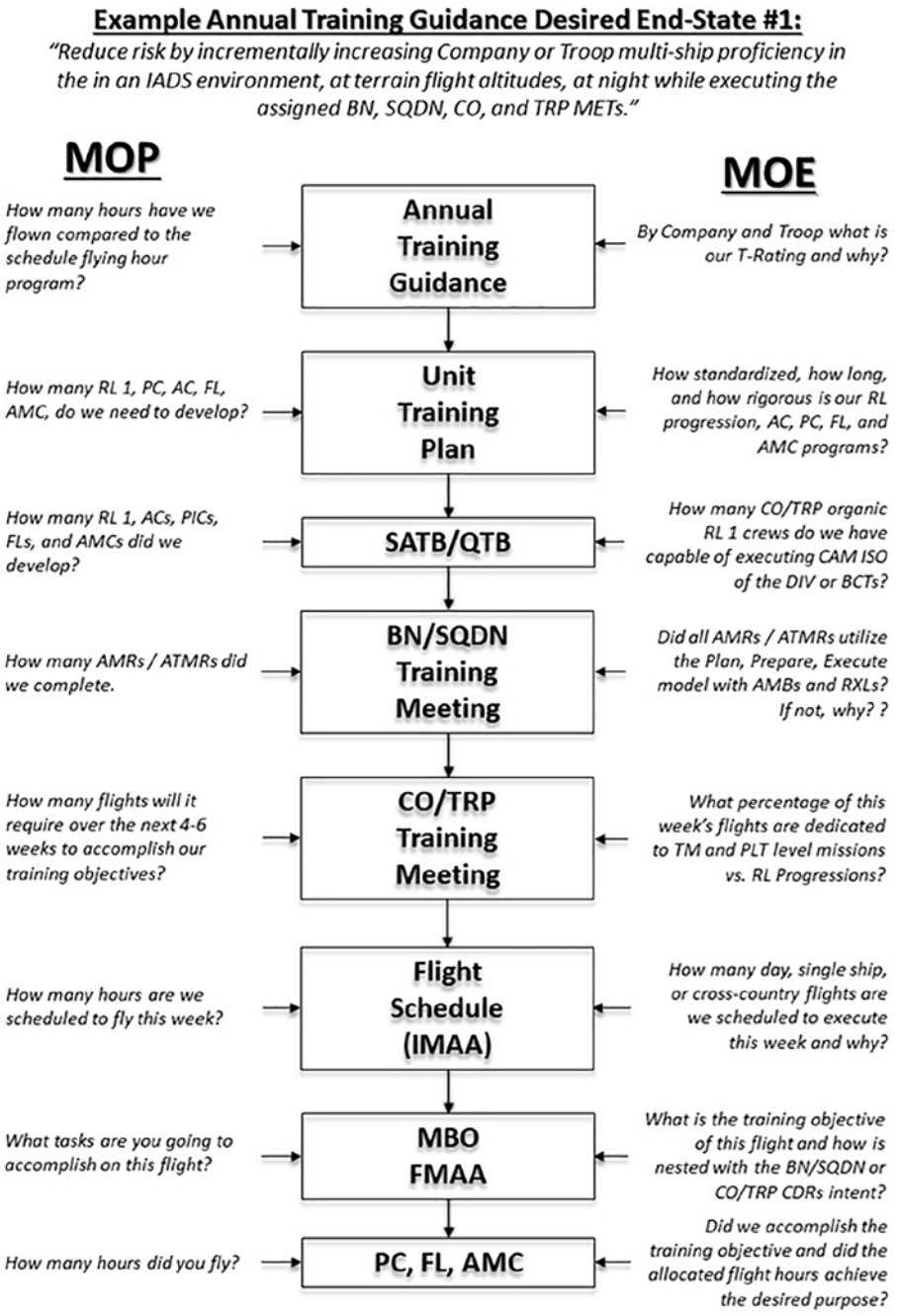
Eagle OC/Ts chasing their counterparts in an LUH-72 during a live fire operation.

UH-60 crews preparing for a mission at the National Training Center.

indicators can provide critical information about the effectiveness and alignment of our aviation training programs. Ultimately, the goal of measuring the effectiveness of our aviation training programs is to empower commanders in developing, assess, and refining training programs that increase the likelihood of mission success and aviator proficiency while decreasing risk to the force and to the mission.

* This article was written by LTC Eric Megerdoomian (Senior Aviation Trainer, Eagle Team, the National Training Center) co-authored by MAJ Andy Bartlett, MAJ Brandon Wess, and MAJ Jake Rykken, aviation trainers at the National Training Center.

** The authors wished to make the following updates to their original article: Using semi-annual training plans/ quarterly training briefings, training meetings, or flight scheduling meetings as avenues for assessing our MOPs and MOEs, we can gain a more holistic understanding of how effective our training programs are. Simply asking both questions in these meetings can highlight effectiveness. "How many AMRs did we accomplish last week?" can produce a vastly different number than "How many AMRs did we accomplish last week enabling companies to plan, prepare, and execute through Air Mission Briefs and Rehearsals?" Beyond measuring effectiveness, when we ask the right questions, we can start to recognize if our efforts are aligned toward a common desired end-state or if they are divergent.



Increasing Fuel Efficiency in Army Aviation Training Flights to Reduce Greenhouse Gas Emissions

MAJ Dave Balthaser and MAJ Kevin Chapla

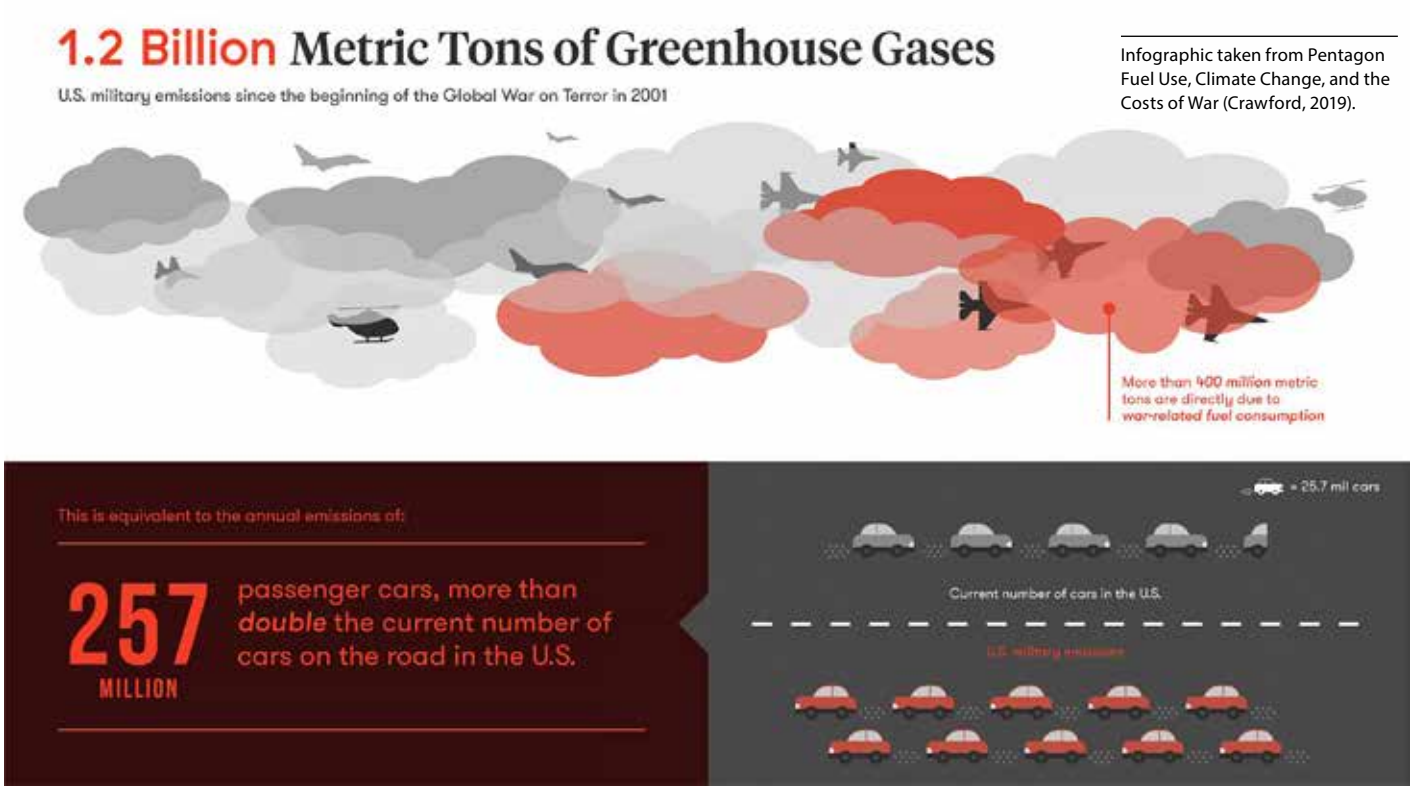
Define the Problem

The U.S. Department of Defense (DoD) has an energy problem. Consuming 4.6 billion gallons of fuel annually, the DoD is the single largest institutional user of fossil fuels and correspondingly, the largest producer of greenhouse gases (GHG) in the world. (Krelsher, 2010, p. 66; Crawford, 2019, p. 2). Were it a nation state, it would rank as the 47th largest emitter of GHG. (Lancaster University, 2019, para. 3).

The 2022 National Security Strategy declares climate change the "greatest" of the shared problems we face, and one that is "potentially existential for all nations" (The White House, 2022, p. 9). Greenhouse gas emissions contribute immensely to the climate change issue, and the DoD must take steps to address what The White House has defined as an existential and grave threat. As the U.S. transitions toward a more sustainable energy mix, if the DoD does not rapidly follow suit, its percentage of U.S. emissions will only increase. Efforts to reduce its usage need to be explored across all facets of the DoD and its Services.

Define the Army's Path to a Solution

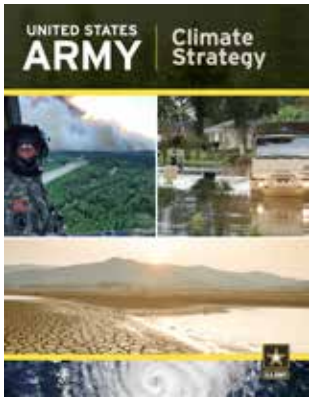
While the Army accounts for only 7 percent (%) of all U.S. government fuel



Infographic taken from Pentagon Fuel Use, Climate Change, and the Costs of War (Crawford, 2019).

consumption, compared to the Air Force's 52%, and the Navy's 33%, (Lengyel, 2007, p. 13) it is the first branch to release a climate strategy. The Army Climate Strategy (ACS), released in February 2022, has developed meaningful ways to reduce emissions through innovation and its installations across the world, yet failed to address concrete measures on how to adapt its training to support the strategy of emissions reduction (Department of the Army, 2022, p. 5). The strategy includes three overarching goals:

1) "**Achieve 50% reduction in Army net GHG pollution by 2030**, compared to 2005 levels
2) **Attain net-zero Army GHG emissions by 2050**
3) **Proactively consider the security implications of climate change in strategy, planning, acquisition, supply chain, and programming documents and processes**" (p. 5)



The United States Army Climate Strategy (2022).

To achieve these goals, the strategy identifies three Lines of Effort (LOEs):
1) "**Installations**
2) **Acquisitions and Logistics**
3) **Training**" (p. 5)

The most significant allocation of resources toward the ACS, about $5.2 billion of the estimated $6.8 billion, will be allocated to the installation's LOE by completing 55 microgrids (Eversden, 2022, para. 5) and fielding fully electric non-tactical vehicles in support of its 585,000 facilities spread over 27 million acres across 160 different countries. (Kehrt, 2022, para. 14). The acquisitions and logistics LOE prioritizes electrification technologies with targets for fully electric tactical vehicles and the charging capability required to power them by 2050 (Department of the Army, 2022, p. 10). Compared to the 11 and 12 intermediate objectives in the first two LOEs, respectively, training (LOE 3) has six:

1) "Beginning in 2024, publish climate change lessons and best practices every two years
2) Update Army programs of instruction for leader development and workforce training to incorporate climate change topics no later than 2028
3) By 2035, increase the number of Soldiers and Army civilians serving in strategic headquarters with advanced credentials on climate change topics
4) Ensure that all Army operational and strategic exercises and simulations consider climate change risks and threats by 2028
5) Consider reduction of GHG emissions as a factor in planning to optimize the Army's mix of distributed learning, virtual learning, and resident courses
6) Develop ways to reduce direct GHG emissions resulting from Army individual and collective training by 2028" (Department of the Army, 2022, p. 14).

I believe that while incorporating the effects of global climate change into training curricula, exercises, and simulations is a step in the right direction, these efforts can and should be implemented quicker than by 2028. Analyzing how we consume energy and identifying ways to reduce (whether implemented or not) is something we can begin today through the Army's biggest energy consumer, aviation.

Our Proposal to Reduce Emissions

As the "workhorse" of Army Aviation, the UH-60 Black Hawk is the Army's most numerous vertical lift aircraft in the fleet, employed around the world across 12 active duty combat aviation brigades (CABs), and totaling over 2,100 airframes, including the National Guard and Reserves (PEO Aviation, 2018). In an effort to meet the intent of the ACS, one way to reduce direct GHG emissions resulting from Army individual and collective training is by examining the burn rate at different airspeeds in varying environmental conditions.

Training flights are usually flown at an airspeed of 120 knots. Before every flight, aircrews input aircraft and environmental data to receive performance factors for the flight. We calculated a data set made up of aircraft operating at varying total weights, pressure altitudes, and temperature to determine the difference in fuel flow


Company A, 3**D** Battalion, 25th Aviation Regiment, 25th Combat Aviation Brigade, 25th Infantry Division, conducts a routine flight of a UH-60 Black Hawk on Oahu, Hawaii. U.S. Army photo by PFC Daniel Proper.

between flying at 120 knots and flying at maximum endurance, or the most efficient airspeed. We calculated the average fuel flow across all conditions at 120 knots at 991 pounds per hour, with the average maximum endurance airspeed at 71 knots and a fuel flow of 806 pounds per hour—an 18.5% increase in fuel efficiency.

Numerous variables can be applied to these data when attempting to broadly extrapolate across an assault helicopter battalion (AHB) in various CABs across the world—variables that can make the 18.5% increase in efficiency assumption a drastic overestimation. Different training objectives will dictate a need for increased speeds or high power demands to simulate training for combat. However, if the 18.5% fuel flow reduction is applied to all Black Hawks across the Army, what does that mean for operational energy reduction? Furthermore, under the assumption that other types of aircraft would see a similar percentage reduction, how much fuel and emissions could be reduced across Army Aviation as a whole?

If the same 18.5% reduction is extrapolated across all 12 AHBs in active duty CABs (636 helicopters), assuming they have similar flying hour programs of 5,873 hours, the Army would save 1.8 million gallons of fuel and 15,853 metric tons of carbon dioxide from entering the environment. Applying a similar framework across all aircraft in active duty CABs, an 18.5% fuel reduction would result in a decrease of 7.3 million gallons of fuel. In total, these reductions prevent 65,151 metric tons of carbon emissions. For its part, this exercise highlights the enormous potential energy consumption the Army could save when operating at the most conservative airspeed. While this may be the ceiling in terms of fuel savings, it highlights the compounding effect that any increase in efficiency can provide across Army Aviation as a whole.

Benefits of our Proposal

The benefits of reducing airspeed for fuel efficiency do not end with monetary savings, preventing emissions, or a more sustainable military but have significant security impacts on the entire force. When aircraft fly more efficiently, there is a secondary effect on the logistical requirements needed to support them. A 20% reduction in aviation fuel requirements would have compounding positive effects across the spectrum of military conflict. This reduction would affect a reduced logistical demand, ease the logistical burden on sustainment forces, and reduce the relentless demand for securing logistical trains and lines of communication. Moving fuel throughout the battlefield requires large convoys of oil tankers. During the height of combat operations in Afghanistan, these targets suffered a casualty for every 24 convoys conducted (Union of Concerned Scientists, 2014, para. 3). Through decreased fuel consumption in Army Aviation, the military can free up logistical and security resources to increase unit effectiveness and provide Soldiers with enhanced protection capacity. Reduced logistical requirements, through efficiency in conjunction with the ACS's plan for future electrification of tactical vehicles, will create a more protected force.

Drawbacks and Criticism of our Proposal

While there are significant reasons to support a training shift in an effort for greater fuel efficiency, there are many reasons why it doesn't fit into the role of a fighting force. One senior aviator who serves as a Standardization Pilot at the Army's flight school at Fort Novosel, Alabama, does not believe a reduced airspeed for fuel efficiency scheme is operationally feasible. He stated that as an instructor, he relies on iterations of maneuvers with new students to train proficiency, i.e., take-offs, landings, emergency procedures in flight, etc. These iterations take place at an airfield, where he plans for 10 traffic patterns an hour with a student. If the pattern is typically flown at 120 knots and speed is reduced for maximum fuel efficiency, the number of patterns able to be flown in that same hour would be cut in half. He argues that reducing airspeed creates dead time in the aircraft during a traffic pattern. Instead of more time being spent on practicing maneuvers, the time flying the pattern will virtually double. Additionally, flying the aircraft at 120 knots is a skill within itself. One of the most critical tasks for an aviator is managing the aircraft, including radio calls and mandatory systems checks while on the controls. If the pilot is used to flying at a much slower speed, they can be quickly overwhelmed in a very dynamic environment or heavily trafficked area at an increased speed. Most importantly, speed is essential for survivability in a combat environment with anti-aircraft threats. He argues that the military is not the airline industry, beholden to profit-driven boards constantly seeking to create greater efficiency, either through fuel or real estate within the aircraft cabin. Airlines are designed to be efficient, whereas helicopters operate more by "constantly beating the air into submission."

Strategic Competition Implications

War and preparation for it are expensive fossil fuel-intensive activities. However,

U.S. Soldiers with the 96th Aviation Support Battalion, 101st Combat Aviation Brigade, fuel a UH-60 Black Hawk helicopter at Bagram Airfield in Parwan province, Afghanistan. U.S. Army photo by SGT Duncan Brennan.

absent any change in the DoD's fuel use policy, the U.S. military's consumption will continue to produce high levels of GHG. The ACS is absolutely a positive step in the right direction by identifying areas to significantly reduce emissions without affecting warfighting capabilities through installations and electrification of non-tactical and tactical vehicles. To truly make an impact, we must identify additional ways to reduce operational energy use. The proposal of exploring options to increase fuel efficiency throughout the DoD's fleet of aircraft by means of changing how to fly the aircraft will not be met favorably. The fact is that aviation is responsible for 70% of energy consumption (Crawford, 2019, pp. 7-8) and will only increase as sustainability is achieved in other areas. The DoD has an opportunity to reduce its impact on climate change, including the security threats associated with it, by reducing its GHG emissions (pp. 3 & 7). The coming years of intensified strategic competition between powerful state actors will correspondingly intensify competition for valuable natural resources—from hydrocarbons to metals and rare minerals. Competing with its rivals does not always require monumental change and reform. A coherent collection of incremental changes—like the one proposed here—united by clear strategic guidance can pay massive dividends in the geopolitical arena.

Conclusion

A key component will be defining what is an acceptable risk to the mission—what loss of airspeed is the DoD willing to accept in order to reduce aviation's share of fuel and emissions? To meet a directive from senior leadership with metrics in reduced fuel consumption can relieve small unit commanders from making those difficult decisions and is easily verified through the military's robust logistical process. Another option is to increase simulator usage, though this will also be met unfavorably. While aircrews have minimums required in the simulator and "sims" are useful for certain training objectives, they do not provide the same level of proficiency that flying the aircraft does. However, a simple change in 10% of hours flown from the aircraft to the simulator provides great monetary and emissions reduction when applied at-scale across the force. When combining these two factors of reduced airspeed and increased simulator usage, the Army and the DoD, as a whole, could reduce emissions by more than 25%. As the National Security Strategy's "greatest" threat, the DoD is obliged to find solutions to this wicked problem immediately. When the Army finds ways to reduce emissions in the relatively small percentage of operational energy it consumes within the DoD, the Air Force and Navy, as the major consumers, might be inspired and driven to change. Once that happens, the DoD will see significant emissions reduction in both efforts to create sustainability of installations across the world and sustainability in how the force trains for war.

Biographies:

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Black Hawk routine flight in Oahu, Hawaii. U.S. Army photo by PFC Daniel Proper.

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Understanding Urban Warfare

Print date, 3 October 2022; Authors, Liam Collins and John Spencer; 392 pages; Howgate Publishing Limited

A book review by 1LT Jacob R. Dotson

The cities of Kyiv, Mariupol, Kharkiv, Kherson, and Bakhmut have dominated headlines since Russia invaded Ukraine last year. Both sides vie for control over the infrastructure and populations of these crucial sites. Cities are increasingly important around the world. The percentage of the world's urban population nearly doubled from 30 percent (%) to 56% between 1950 and 2020. The United States military must be ready to fight and win in urban areas. Unfortunately, Liam Collins and John Spencer believe American military training and education for this combat environment is insufficient.

In *Understanding Urban Warfare*, Collins and Spencer attempt to partially bridge this gap, providing a baseline understanding of military operations in the urban environment. Both authors bring credibility to the topic as warfighters and scholars. Collins is a former Army Special Forces COL who recently retired as the Director of the Modern Warfare Institute at West Point, New York. Spencer recently retired from the infantry and now directs urban warfare training for the California Army National Guard. While both authors obtained incredible amounts of experience in the field of urban warfare on their own, they mostly relied on the knowledge and experiences of others for this book. *Understanding Urban Warfare* is full of interviews from military leaders like GEN James Rainey, Commanding General of United States Army Futures Command, and urban warfare experts like Dr. Charles Knight, who developed the Australian army's urban doctrine. Most interviews are with veterans of the battles they discuss. Collins and Spencer argue that urban environments are the most challenging and destructive combat settings. While armies may try to avoid cities, urban warfare frequently pulls them into tough fights.

This book is similar to *Urban Warfare in the Twenty-First Century* by Anthony King. Both books examine the problems that armies face with the increase of urbanization and stress the importance of understanding the systems of cities before attacking. Where these books differ is in their level of analysis. *Urban Warfare in the Twenty-First Century* focuses on strategic implications of urban conflict and the effects of nuclear warfare. *Understanding Urban Warfare* focuses on a lower level, collecting individual stories in which readers obtain tactical and combat lessons. This ground-level exploration is reminiscent of Louis DiMarco's *Concrete Hell: Urban Warfare from Stalingrad to Iraq*. DiMarco is even one of the veterans interviewed in *Understanding Urban Warfare*. Where Collins and Spencer separate themselves is in their final recommendations section. Pulling from their own expertise and the evidence from the interviews, they suggest realist actions the United States Military could take to better prepare for urban conflict.

The argument is built over two sections. The first explores various concepts of a city, including urbanization trends, globalization, technology, challenges posed by megacities, and the underground aspects of different types of cities. The chapters in this section provide different frameworks for viewing cities and discuss their impact on military operations in an urban environment.

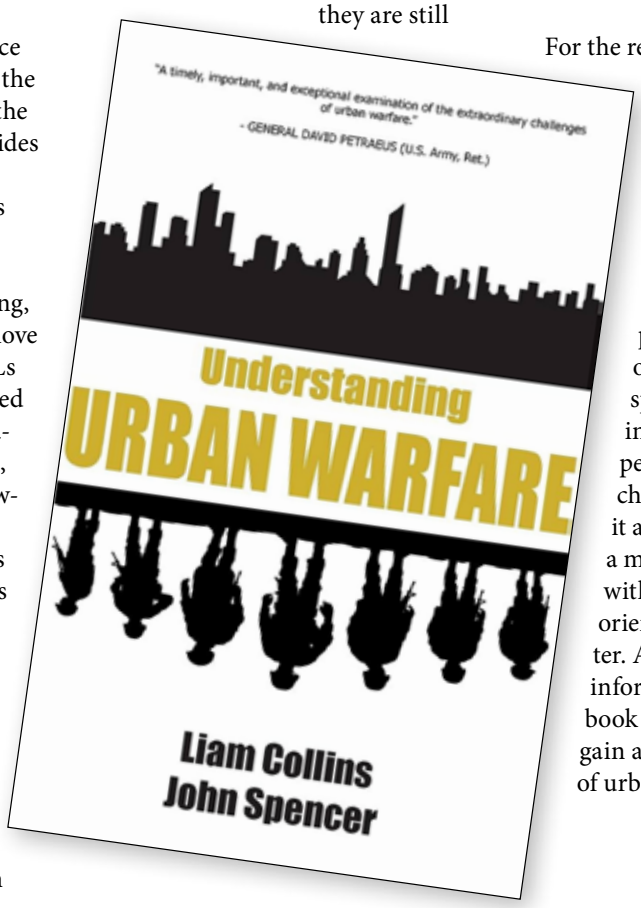
In the second part of the book, the authors provide case studies of urban battles, beginning with the Battle of Ortona, highlighting the importance of combined arms operations and adaptation. Other battles discussed include the Battle of Mogadishu, the Second Battle of Fallujah, the Battle of Ramadi, and the retaking of Shusha. The case studies reveal tactics like "COP in a Box,"[1] and stories like the building of a 5-kilometer concrete barrier while under fire in Sadr City. The book also examines the tactics of non-Western armies, including the Iraqi army's slow push of ISIS out of Mosul. These chapters provide exposure to different tactics and offer detailed experiences on how to train for and fight in an urban setting from actual veterans of the battles. The book's concluding section summarizes the trends and lessons learned from the case studies. The authors provide training and education recommen-

[1] The author explains that "COP in a Box" is a tactic used to methodically take control of a city. It consists of seizing key buildings, establishing Combat Outposts (COPs), and expanding the security perimeter until an entire area is secure.

dations for the military to better prepare for urban warfare.

Overall, this book succeeds in informing readers about urban warfare. In exchange for approximately 8 hours of free time, the reader learns how to plan for and fight in an urban battle. The mental frameworks, exposure to urban tactics, leadership advice, and combat experience discussed in the interviews make the book well worth the read. While the interview style for this book provides a wide variety of experiences and wisdom, many of the contributors veer off in unexpected directions that do not further the argument. These sidetracks are still interesting, however. Aviators especially will love the dialogue between retired COLs Perino and Van Arsdale and retired SGM Lamb on the Battle of Mogadishu. Despite this minor quibble, Collins and Spencer conclude powerfully. The trends and common themes seen in all the case studies are summarized in about 10 pages of lessons learned. Among these are the importance of detailed planning with the city systems in mind, learning about the enemy, and constantly adapting.

Urbanization shows no signs of stopping, so all military leaders should make time to learn about fighting in cities. *Understanding Urban Warfare* provides insights for a wide variety of branches and specialties from those who gather intelligence about the city, to those who plan for any aspect of the battle, and to those who will fight there. While aviators are unlikely to fight on the ground in urban combat, they are still important elements for intelligence, surveillance, reconnaissance, fires, troop and equipment movement, command and control, and medical evacuations. GEN Rainey shared the story of then COL McConville laying down fires from his Apache so an infantry formation could escape being pinned down.



For the researcher, this book might prove interesting with its wealth of knowledge and real-life experiences. With each interview being independent of each other, *Understanding Urban Warfare* has important insights for anyone learning about the specific battles explored in the book. The independent nature of each chapter would also make it a good book to study in a military or history class, with a different lesson plan oriented around each chapter. Altogether, this is an informative and easy-to-read book in which the reader will gain a better understanding of urban warfare.

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How we Fight in Large-Scale Combat

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A CH47 Chinook from Company B "Big Windy," 1-214 General Support Aviation Battalion, conducts a training flight over the island of Cyprus. U.S. Army photo by MAJ Robert Fellingham.

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