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HOW WE FIGHT

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

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An AH-64D Apache "shows its muscles" at an air show. U.S. Army photo by SGT Roberto Di Giovine

The Command Corner

As current events around the globe remind us, Army Aviation must be prepared to fight and win our nation's wars today. The last 20 years of counterinsurgency operations demonstrated that Aviation is a critical component of the Combined Arms Team, providing unmatched speed, lethality, and flexibility. The Aviation Force needed to fight and win in large-scale combat operations (LSCO), for the Army of 2030 will combine our enduring fleet of Black Hawks, Apaches, and Chinooks, with our Future Vertical Lift (FVL) aircraft. This pairing of capabilities is critical to our success in LSCO.

The addition of the Future Attack and Reconnaissance Aircraft (FARA) and Future Long Range Assault Aircraft (FLRAA) will bring unprecedented speed, range, lethality, and survivability to the battlefield. Future Vertical Lift will change the battlefield geometry for our Army 2030 to bring a decisive overmatch to our adversaries. Our aircraft will operate from positions of relative sanctuary, while integrating Air Launched Effects (ALE) to enable the convergence of assets at the time and place of our choosing to provide multiple dilemmas for our enemies. The FARA ecosystem with ALE will detect, identify, spoof, disrupt, and destroy enemy integrated air defense systems and critical command and control networks to create maneuver corridors that we will exploit with our FLRAA and enduring aircraft. Incorporating long-range precision munitions, such as the Spike non line-of-sight missile, will provide significantly increased standoff. Future Vertical Lift is transformational for Army Aviation and will create a significant shift in how Army Aviation fights in LSCO.

To maximize the capabilities of speed and range in our FVL aircraft, we must adapt not just how we fight but also how we maintain. Large-scale combat operations will require our Soldiers to serve as the primary maintainers of our fleets. The robust contractor maintenance packages will not be viable in a LSCO battlefield. Gone are the days of the spoke and hub maintenance programs with the area support battalion operating out of the large forward operating base. Instead, we will be forced to closely look at our maintenance teams to break them into smaller organizations by capability to support the launch-recover-launch of out aircraft. Large signatures on the battlefield are targetable by our adversaries, and our maintenance forces must remain agile and innovative to remain survivable.

This update in the way we fight Aviation operations for the Army 2030 requires deliberate and in depth training reps and sets. Leader development is the most important thing we do. The Enterprise is updating doctrine, standard operating procedures, training support packages, and rewriting Programs of Instruction across Enlisted, NCO, Warrant Officer, and Branch Officer professional military education (PME) to ensure the focus is fighting and winning in LSCO. We need to get back to the basics and master the fundamentals of our training to become more tactically and technically proficient as aviators, maintainers, planners, and leaders. This restructure of Officer, Warrant Officer, and Enlisted PME will create leaders at echelon that are capable of fully exercising mission command to meet emerging threats and requirements in LSCO. Aviation is redesigning the Warrant Officer professional timeline to develop more tactical and technical skill sets in our aviators. Warrant Officers make up 75% of our aviators, and we need them to be masters in the employment of our aircraft.

The steps our Enterprise is taking now, coupled with the transformational technological advancements we are pursuing for the future, will ensure that Aviation remains the most lethal, agile, and responsive asset for the Division. Future Vertical Lift, coupled with our enduring fleet, will provide greater range, speed, lethality, and survivability to the LSCO battlefield to create a convergence of effects that will overmatch our adversaries. This truly is an exciting time in Army Aviation, and it is an honor to serve as your Branch Chief. Thank you for your unwavering sacrifice and service to our nation.

Above the Best!

David J. Francis
Major General, USA
Commanding

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U.S. Soldiers conduct training in an AH-64D Apache Longbow at Grafenwoehr. U.S. Army photo by Markus Rauchenberger

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Sustaining the Combat Aviation Brigade:

Fighting the Aviation Support Battalion in Large-Scale Combat Operations

By LTC Lee Robinson and CPT Antonio Giori

Soldiers with Company B, 6th General Support Aviation Battalion, 101st Combat Aviation Brigade, 101st Airborne Division (Air Assault), and the 3rd Brigade Combat Team participate in a large-scale air assault training exercise January 19, 2018 at Fort Campbell, Kentucky. The training event demonstrated the troop's readiness to deploy and ability to integrate land operations with air support. U.S. Army photo by SFC Andrew McClure, 101st Combat Aviation Brigade

Atlantic Resolve serves as an excellent laboratory to experiment with different methods of employing the capabilities of an aviation support battalion (ASB) in large-scale combat operations (LSCO). Doctrine provides a firm foundation for the training necessary to prepare an ASB for LSCO, but manuals such as Army Techniques Publication 3-04.1, "Aviation Tactical Employment," do not address the full capabilities an ASB provides for a combat aviation brigade (CAB).[1] This article provides a framework for employing the ASB to maximize its contributions in LSCO. Like a Swiss Army knife for an outdoorsman, the ASB is an indispensable asset to a CAB. However, knowing the capabilities of each tool, ensuring each is sharpened and ready, and employing them at the right place and time, enable the user to get the most out of the asset. This article briefly describes the capabilities of each tool in an ASB, drawing upon the experiences of the 603D ASB in Atlantic Resolve to illustrate the ASB's role in supporting a CAB in LSCO.

[1]This publication may be found via the Enterprise Access Management System-Army site with a valid common access card.

Knowing the Tools: Understanding the Capabilities of an ASB

In order to understand the ASB's capabilities for employment in Atlantic Resolve, the command teams and staff developed a Commander's Dashboard as shown in Figure 1.

MAINTENANCE:

Lane Str	w/PH	wo/PH
CH-47 75%	1	12
UH-60 100%	1	12
UH-60 100%	1	12
AH-64 140%	1	12

Ground MEDEVAC:
12

RECOVERY:
Air:
DART TM 12
Contact TM
UH-60 1
AH-64 1
CH-47 1

Ground:
Recovery TM 12
Contact TM 12

TRANSPORTATION:
Water:
HIPPO 123
CL III:
M969 1234
M978 123456
CL V:
Pallet Positions:
176/272
M977 1
M1120 w/CROP 12
4K FORKLIFT 123
5K FORKLIFT 1234
10K FORKLIFT
1234567
ECHU 123

SIGNAL:
JNN 1
CPN 12
HCLOS 123
RETRANS 1234

FARP Teams
CI III:
TM1 1234
TM2 1234

Armament:
123

STORAGE:

Water: 6K/6K
CL III: 20K / 47.5K
CL V ATHP: 1

CERTIFICATION:

PQAS 1
TWPS 1
LWPS 12

Figure 1. ASB commander's dashboard (603D ASB, 2020).

The Dashboard provides a single source that reflects the ASB's capabilities based on equipment, personnel, and training readiness. To turn a capability from red (not capable of employment) to green (capable of employment), the team had to meet all three criteria of equipment, personnel, and training readiness. For example, in Figure 2, to make a vehicle recovery team from the headquarters support company green requires a fully mission capable Heavy Expanded Mobility Tactical Truck wrecker, sufficient personnel to man this equipment, and completion of all licensing and training requirements for the equipment. In Figure 2, the recovery team was one of two due to the not-mission capable status of one of the wreckers.

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The Commander's Dashboard provides a snapshot of the capabilities of each team in the ASB. As indicated in the upper left corner of the Dashboard, the aviation support company (ASC) can provide a contact team for each airframe type simultaneous to an aircraft phase and two contact teams when the ASB does not have a phase. This capability varies based on the assigned strength of each section.

M984A4 (HSC344) - Equipment	
Auth./OH	1 / 1 (FMC)
Crews	
Auth. / On-Hand / Trained	4 / 5 / 5
SM Per Crew	2 x 91BH8
Leaders	1x NCO
Capability / Shortfall	
1. (C) Heavy Equip Wrecker (PLS/LHS) including fueler (if mostly empty)	

M1089 (HSC362) - Equipment	
Auth./OH	1 / 1 (NMC)
Crews	
Auth. / On-Hand / Trained	4 / 5 / 2
SM Per Crew	2x 91BH8
Leaders	1x NCO
Capability / Shortfall	
1. (C) Light Equip Wrecker (LMTV and smaller)	

Legend
1 - Crew Qualified and Current all MOS Tasks
2 – Crew requires MOS Training
3 – Crew not combat capable or position unfilled

Training Status: TRNG / #SM	
H8	6
HAZ 11 (USAREUR HAZ)	6

Bumper #	Name	Crew
HSC 344	Last, First	Primary
	Last, First	
HSC 344	Last, First	Alternate 1
	Last, First	

Bumper #	Name	Crew
HSC 362	Last, First	Primary
	Last, First	
HSC 362	Last, First	Alternate 1
	Last, First	

Figure 2. Recovery and field maintenance crew combat power (603D ASB, 2020).

When replicated at echelon, the Dashboard provides a familiar template from which current operations and CAB decision-makers gain immediate visibility on available assets across the formation. For battalion and company-level leaders, the Dashboard provides a consolidated medium from which commanders and training officers can direct and prioritize crew-level training. During Atlantic Resolve, the Commander's Dashboard provided a decision tool in the battalion command post. Additionally, the command teams reviewed the combat power slides for each capability (Figure 2) once per month to shape priorities on training, maintenance, and personnel.

Through tracking the readiness of each capability in the ASB, the battalion command post had the information readily available to support operations. The ASB is a team of teams with different capabilities that can be combined together in a forward logistics element (FLE) to support particular missions or deployed separately based on mission requirements. Knowing the readiness of each team enabled the ASB S3 and support operations officer (SPO) to recommend force packages to support requirements. The Commander's Dashboard frequently served to simplify logistical support decision making for mission support or when more stringent, and differing, host nation transit restrictions applied to vehicles or licensed crews. Frequently, the ASB conducted vehicle recovery, ammunition transportation and handling, material handling equipment, and bulk fuel support in the concentrated collective training areas at Grafenwoehr, Germany, and Hohenfels, Bavaria. The nature of regionally aligned force positioning of summer and winter sets commonly means that aviation collective training audiences are not always contiguously located with their support elements. This posture also replicates the distributed nature of operations that an aviation brigade would likely encounter during LSCO.

Employing the Tools in LSCO

The 3rd CAB operated from as few as four and as many as six countries simultaneously during Atlantic Resolve, presenting a significant logistical challenge. We approached the positioning of the ASB during Atlantic Resolve through the lens of LSCO. In LSCO, the CAB should not tie the maneuver battalions to terrain so that they can position themselves on the battlefield to best support ground maneuver forces. With this concept in mind, the brigade positioned the ASB with the CAB headquarters at Storck Barracks, Germany. This decision assisted the ASB to employ its full capabilities. First, this positioning enabled the ASB S3 and SPO to coordinate closely with the brigade staff as operations progressed throughout the rotation. Second, positioning the ASB at Storck Barracks provided sufficient facilities for the ASB to conduct all phase maintenance for the CAB during Atlantic Resolve. Third, placing the ASB headquarters at Storck Barracks centrally positioned the ASB and the ASC at the nexus of a complex web of interlocking agencies supporting theater-wide movement of personnel and parts, vehicle and aircraft recovery efforts, and hazardous materials movement to remote aviation headquarters.

This decision enabled the maneuver battalions to focus on unscheduled maintenance and launch-recover-launch, thereby remaining mobile on the battlefield and not tied to terrain. The ASB served as the hub for aviation maintenance, projecting combat power to the spokes, which were the aviation battalion task forces (ABTF) deployed throughout the theater. Similarly, the ASB's other tools projected from the hub at Storck Barracks to provide sustainment at critical junctures during operations, including annual and semiannual aircrew qualifications prior to major joint exercises. Some of the tools in the ASB are employed consistently, regardless of the operational environment: The ASC provides night-vision goggle services for the brigade and scheduled aircraft maintenance support, while the signal company provides mission command for the brigade tactical operations center and tactical command post. In Atlantic Resolve, we employed some of the ASB's tools with great effects for theater deployment and redeployment low-density capabilities, while the brigade operated, distributed, and sustained during transitions.

101st conducts snowy air-assault training. U.S. Army photo by CPT Kristoffer Sibbaluca, 101st Combat Aviation Brigade

Theater Deployment and Redeployment

Three tools that were indispensable during the brigade's deployment operations for Atlantic Resolve were the ground and aviation maintenance teams and the transportation assets. As the brigade prepared to convoy its 1,807 pieces of rolling stock to the Port of Savannah from Hunter Army Airfield (HAAF), the ground maintenance teams conducted equipment assessment for the brigade's wheeled vehicle fleet. Prior to staging for the convoy to the port, the ground maintenance contact teams inspected each vehicle to ensure it met 10-20 maintenance standards and could safely deploy to port. The aviation maintenance teams, formed into aircraft fold and build teams, provided flexibility to maneuver battalions as the ASB led aircraft fold and build operations coming into and out of theater. Last, the ASB's truck squad moved more than 300 containers in the brigade's footprint, supplementing the capabilities provided by the sustainment brigade and commercial line haul as the CAB deployed from and redeployed to HAAF.

Low-Density Capabilities

The aviation signal company, supply support activity (SSA), and low-density aviation military occupational specialties (MOSs) in the ASC filled shortfalls as the brigade employed ABTFs during Atlantic Resolve. Due to the lack of mission command capabilities at some operating bases, the Command Post Node teams from the signal company deployed with ABTFs to enable mission command. The ASB also sent a retransmission team with an ABTF for Combined Resolve, a multinational training event at Hohenfels.

While there are 23 multiclass Defense Logistics Agency SSAs with more than 38,000 lines of authorized stockage lists (ASLs) in theater, most do not carry aviation ASLs. This limitation presented a dilemma to the CAB on how best to support its ABTFs while distributed. The 603D ASB was the first Atlantic Resolve unit to split its SSA into two detachments using two different routing identifying codes (RICs) to sustain the ABTFs. This innovation enabled the brigade to move the SSAs, as missions dictated, to reduce the risk to remote site aviation maintenance with one RIC switching between Greece and Poland and the other from Germany to Latvia during the rotation.

The ASC performed the vast majority of scheduled and unscheduled maintenance at Storck Barracks, but it also deployed low-density MOSs as needed to enable the ABTFs. When shortfalls were identified, such as a lack of avionics experience in one of the ABTFs, the ASC deployed a contact team to address the shortfall. The ASC's Downed Aircraft Recovery Team (DART) also served as a tool for the brigade to employ when the maintenance required exceeded the capability of the ABTF, or if the ASB was better positioned geographically to support the DART, based on the operational environment.

In LSCO the ASC would also support battle damage repair, which draws upon the ASB's unscheduled maintenance capacity. We simulated this support in Atlantic Resolve through unscheduled maintenance support for 14 AH-64D transfers between

the 12th CAB and 3rd CAB, employing teams from the ASB to ensure these aircraft met transfer criteria. Assumption of this mission reduced risk to aviation maintenance at remote sites, as a greater number of maintainers remained forward deployed with the task force, while small groups of subject matter experts returned to Storck Barracks to oversee the transfer of equipment.

Sustainment During Transitions

Large-scale combat operations are characterized in part by continuous and mutual adaptation by participants; thus, the operational environment is ever-changing and uncertain. The CAB is in a continuous process of transition during LSCO with potentially multiple transitions happening simultaneously. The 3rd CAB experienced this environment during the transition from the winter to spring months in Atlantic Resolve as ABTFs prepared to change locations. As the Cavalry Squadron ABTF, Task Force Lighthorse, maneuvered from Greece to Poland, the ASB used several of its tools in an FLE to support this movement. Task Force Lighthorse completed aerial gunnery qualification for 21 crews through Table VI at the Grafenwoehr Training Area in Germany during its transition to Poland. The ASB advantaged its resident aviators to facilitate mission command and logistical support oversight, creating a linkage between aviation qualification training and support. To sustain this exercise, the ASB deployed an FLE with Class (CL) I, III, V,[2] armament, medical support, and unscheduled aviation maintenance support. Again, we leveraged the Commander's Dashboard to understand the ASB's capabilities to best support CAB readiness.

Similarly, as Task Force Brawler prepared to transition from Romania to Latvia, the ASB deployed an FLE consisting of CL III capabilities, a ground maintenance contact team, and an SSA detachment to set the conditions for this movement. These FLEs replicated the capability of the ASB to tailor support packages to sustain operations in a rapidly changing and distributed environment. The benefit to the transitioning aviation task force was a warm base reception with pre-positioned CL III and SSA support from an FLE that conducted detailed exercise support rehearsals.

[2] Class I refers to subsistence (e.g., meals and water); Class III refers to petroleum, oils, and lubricants; Class V refers to ammunition (Johnson, M., & Coryell, B. [2016]). Logistics forecasting and estimates in the brigade combat team. https://www.army.mil/article/176881/logistics_forecasting_and_estimates_in_the_brigade_combat_team

Mastering the Fundamentals

The readiness of the ASB's tools to support the CAB is critical for the brigade to remain agile and adaptable during LSCO. The 603D ASB focused relentlessly on the fundamentals that enabled each of its capabilities, resulting in successful sustainment during distributed operations supporting Atlantic Resolve. By understanding the ASB's tools, ensuring they are ready, and calling upon them at the right time, the ASB enables the CAB to gain and maintain a position of relative advantage in the rapidly changing operational environment of LSCO.

Biographies:

LTC Lee Robinson is an AH-64D Aviator and served as the Commander of the 603rd Aviation Support Battalion from 2019-2021. His previous deployments include Operation Iraqi Freedom and Operation Enduring Freedom.

CPT Antonio Giori is a UH-60M Aviator that has twice rotated to USEUCOM as part of the Aviation Regionally Aligned Force. He served as the 603rd Aviation Support Battalion Operations Officer from 2019-2020.

References:

603D Aviation Support Battalion (2020). *ASB commander's dashboard*.

603D Aviation Support Battalion (2020). *Recovery and field maintenance crew combat power.*

Soldiers engage in large-scale air assault training event at Fort Campbell, Kentucky.
U.S. Army photo by SFC Andrew McClure, 101st Combat Aviation Brigade

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U.S. Army 1SG Willie Green and PFC Ayala Ortiz of Charlie Company, 6th Battalion, 101st Combat Aviation Brigade, monitor the "Dustoff TAC" to ensure critical aeromedical response during the unit's jump to a new location within Hohenfels Training Area, Sept. 21, 2020, during Combined Resolve XIV. Combined Resolve XIV is a Headquarters Department of the Army-directed multinational exercise designed to build 2nd ABCT, 3rd Inf. Div's readiness and enhance interoperability with allied forces to fight and win against any adversary. U.S. Army photo by SFC Garrick W. Morgenweck

Ground Movement: Assuring Symmetry Within an Aviation Battalion

By CSM Albert A. Rodriguez

A typical sight at any gym will have gym-goers working on their bench press or dumbbell curls. These are usually the people maximizing their time in front of the mirror, but who can blame them? A toned upper body is a sign that a person takes physical fitness seriously. However, those same gym-goers share one thing in common, they had to walk into the gym to get that tough workout on their chest and arms. Juxtaposing the human body with an aviation battalion as an analogy, the flight companies would be the chest, shoulders, and arms while the Headquarters and Headquarters Company (HHC); the Aviation Maintenance Company, or AMC; and the Forward Support Company, or FSC, form the legs and core (Figure).

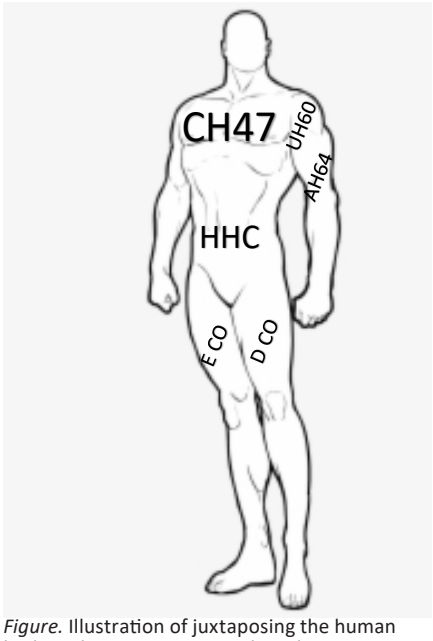

Figure. Illustration of juxtaposing the human body with an Army aviation battalion. Figure created by CSM Albert Rodriguez

This article will share some lessons learned on how aviation battalions moved their ground elements in recent conflicts, success stories at the Joint Multinational Readiness Center (JMRC), and some ideas for improving readiness in driver's training. Continuing with the gym analogy, if fitness enthusiasts only work the upper body, the entire body will eventually fail; therefore, if aviation battalions only work the upper body and neglect the legs, they will fail at large-scale combat operations (LSCO).

The average aviation battalion has almost three times as many wheeled vehicles as helicopters; however, the average aviation battalion does not train three times as much on maintaining currency in wheeled vehicle operations. This has been evident during the past 2 years as an observer, coach, trainer (OC/T) at the JMRC. In some cases, the rotational training unit chooses to line-haul their wheeled vehicles from Grafenwoehr Training Area to Hohenfels Training Area (approximately 55 miles away), instead of putting their drivers behind the wheel and allowing them to drive on the German roadways. The reasons are many and varied: icy road conditions, inexperience with European traffic laws, or a lack of qualified drivers are a few of the reasons for not moving by ground.

Learning from Past Experience

Most aviation leaders are familiar with the story of what platform fired the opening rounds of Operation Desert Storm. Apache attack helicopters fired Hellfire missiles to destroy Iraqi radar and communication sites in January, 1991 (Fratus,

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2021). Then Lieutenant Colonel Cody commanded the 1st Battalion 101st Aviation Regiment on the mission. He made the decision to sacrifice rockets for fuel so he would not have to set up a jump forward arming and refueling point (FARP) and to ensure the safety of the FARP personnel. Although the unit did not use a FARP for this mission, the fuel and munitions still had to move by ground from the port to the unit tactical assembly area.

During the preparation for deployment to Operation Iraqi Freedom 1 (OIF), Major General Sanchez ordered the entire 1st Armored Division to combat load all vehicles preparing to deploy to Iraq. Every echelon packed equipment needed for immediate operations in a vehicle, then that vehicle was put on a Military Sealift Command vessel. Shipping containers were only used for equipment that was not needed within the first 3 months of deployment. Also in OIF 1, Colonel Lamb, former JMRC Senior Aviation Trainer, was a distribution platoon leader with the 3rd Infantry Division. He led a distribution platoon from Kuwait to Baghdad, driving the 400-mile trip without incident, while setting up a FARP every 3 to 4 days. Furthermore, Master Sergeant Khim, the Headquarters Company OC/T for the Falcon team at JMRC, deployed with the 2-3 General Support Aviation Battalion during OIF 1, and he recalls his unit transporting every piece of ground support equipment (GSE) organically. Khim said, "If you didn't take it with you, it didn't make the trip to Baghdad" (personal communication, 2021).

Host-nation rail- and line-haul for vehicles was not an option during OIF 1. Although integrating host-nation support is very much part of the planning process, a host nation cannot be option 1 in an immature theater. Even in a theater that is well-established, such as Europe, there will be issues with ground movement.

An article from Christopher Woody (2018) highlighted the delayed movement of a six-vehicle contracted line-haul at the German border. The Polish contractors transporting the M109 Paladin self-propelled Howitzers did not have the proper paperwork for transport, and the loads did not conform to transportation standards within the European Union. Although Army aviation does not own Paladins, there is always a possibility of transporting fuel or munitions across international borders, which if delayed, could severely impact missions if a transit-nation confiscates the cargo or delays the convoy for incorrect hazardous materials documentation. History shows the lower body needs just as much work to be successful, and there are ways for commanders to ensure symmetry with the upper and lower body for their battalion.

1-3rd AB entering Hungary during their convoy to Saber Guardian in support of Defender 21. U.S. Army photo by SGT Preston Malizia

Success Stories at the JMRC

There are plenty of opportunities for aviation battalions to work the legs while at the JMRC and within the European theater. Division-shaping operations are a unique feature of the JMRC that focuses on echelons-above-brigade, while incorporating Army aviation using complex decision-making scenarios. During Combined Resolve XV, in support of division-shaping operations, the 96th Aviation Support Battalion (ASB) executed a Jump FARP during an attack-out-of-contact. Integrating an ASB at echelon is not a typical sight at the JMRC, and it provided significant realism for the Apaches needing fuel. The post-mission after-action review provided many lessons learned. The importance of pre-combat checks and pre-combat inventories (PCC/PCI), as well as driver comfort level with night-vision goggles, were key takeaways to improve readiness.

During Defender 2021 (U.S. Army Europe and Africa, n.d.), a large-scale exercise designed to build readiness between the U.S. and the North Atlantic Treaty Organization, or NATO, the 1-3 Attack Battalion drove its fleet of 68 vehicles and 43 trailers more than 600 miles from home station in Germany into central Hungary. First Lieutenant Nobles, battalion S-4, noted that the ground movement was not without its challenges. Movement for the GSE was primarily transported using commercial line-haul; Nobles identified that his unit lacked the assets internally to transport the 10K forklift and SCAMP [self-propelled crane aircraft maintenance and positioning] (personal communication, 2021).

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How Do We Get Better?

In order for the aviation community to get leg day in the rotation, aviation battalions should utilize every aspect of the combat training centers to meet their battalion training objectives, focus on licensing and qualification, and create a fundamental shift in the training paradigm. Since each regionally aligned force (RAF) deploys at varied levels of training and readiness, the Falcon team makes every effort to meet the rotational training unit where they are in their training glide path, while still trying to design scenarios that are challenging. During a unit's arrival days, prior to the start of division-shaping operations, and also known as Battle Period 0, the Falcon team will assist commanders and command sergeants major in meeting their training objectives so they can safely and confidently drive their vehicles anywhere in the training area. Falcon Team can assist the battalion master driver with finding a suitable route challenging enough for their unit's abilities and spot checks on executing PCC/PCI, which may be the most critical step. If a unit does not know how to operate the equipment in its vehicle, it will fail during a convoy. Drivers need to ensure their frequency modulation, or FM, radios are operational, know how to use their Joint Battle Command-Platform, are qualified and licensed for the vehicle they operate, and know how to drive at night using night-vision devices. Rehearsing the movement with all vehicle drivers will ensure understanding of the route, actions on enemy contact, and what to do in case of breakdown on the European road network. In addition to post-training feedback, the Falcon team can coordinate for an opposing-forces attack during training so Soldiers can feel confident about their actions during contact.

Licensing and qualification are a large part of getting the legs ready for that tough workout. An obstacle common to all permanent party units in Europe is the possibility of Soldiers arriving to their new duty station without a civilian driver license. Soldiers arriving to Europe without a license must return stateside if they wish to obtain one; new arrivals without a civilian license can pay out of pocket on the local economy, but costs for this option could exceed 2,000 Euro. Very few locations in the Continental United States can replicate the harsh winter driving conditions of Eastern Europe, but all units can ensure its drivers are trained, qualified, and comfortable with the vehicle they are assigned to drive. At a minimum, before units deploy on a RAF mission to Europe, all Soldiers should take and pass the U.S. Forces Driver's Training Program for Europe.[1] This course gives all drivers familiarity with common vehicular laws and road signs found within Europe. The Army aviation community utilizes numerous checks and balances to ensure safety and qualification of rated and nonrated crewmembers for aviation operations; commanders justifiably apply appropriate emphasis to any function of flight operations. Could the same be said about ground movement operations? Do commanders and their noncommissioned officer counterparts ensure that driver training is conducted in accordance with Army Regulation 600-55, "The Army Driver and Operation Standardization Program (Selection, Training, Test, and Licensing)," (Department of the Army, 2019)? Commanders should not be lulled into the belief that because they have a toned upper body, the core and legs are thoroughly worked. Sergeant First Class Dunn, the maintenance company OC/T for the JMRC Falcon team remembers wheeled vehicle training programs with previous units; Dunn recollects, "It was a fight to get driver's training on the calendar…training was always out-prioritized by other requirements" (personal communication, 2021).

One suggestion would be for commanders to tilt the training paradigm on its side and make the support companies the primary training audience during a few months out of the year to ensure driver training does not get out-prioritized. Commanders should incorporate "the legs" by pushing a Jump FARP to a remote location—sending the Battalion Tactical Command Post with the FARP to exercise command and control, while having the maintenance company exercise its Downed Aircraft Recovery Team—all while using the flight companies as enablers to make sure the legs are thoroughly worked.

Soldiers supporting Defender 21 greeted in Hungary. U.S. Army photo by SGT Preston Malizia

[1]You can find more information on this subject via Joint Knowledge Online with a valid common access card.

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In conclusion, writing this article prompted several questions and areas for further discussion:

- Does an aviation battalion need to have the means to move all of its personnel and equipment using organic assets, without making multiple turns?
- Should the aviation battalion be able to defend itself organically?
- Are there specific vehicles or equipment an aviation battalion needs to match the capability of Future Vertical Lift (FVL)? It is hard to imagine FVL aircraft commanded and controlled from frame tents designed in the 1960s.

Former Sergeant Major of the Army, Dan Dailey, messaged that the U.S. Army should want all of its fights to be away games, and that we should never fight on home soil; all Soldiers should always be ready to be on the away team (Hale, 2016). Working the legs does not just involve driving, it is every mission Echo Company, Delta Company, and the Soldiers in HHC are asked to do. I personally never flew to the field during my career, and it is not likely that non-flight company Soldiers will fly to training—they will drive to the field, and they will drive to their next tactical assembly area during LSCO. It is 400 miles from Kuwait City to Baghdad, and it is over 600 miles from the port at Bremerhaven, Germany to Warsaw, Poland; these distances require Soldiers who are prepared, Soldiers who are trained to convoy wherever the mission requires, and require commanders who will never fail to work the legs.

Biography:

Command Sergeant Major Albert Rodriguez is the Senior Enlisted Aviation Trainer at the Joint Multinational Readiness Center, Hohenfels, Germany. CSM Rodriguez deployed twice to Iraq and was part of the 2010 surge to Afghanistan. He is a graduate of the U.S. Army Sergeants Major Academy class 64 and holds a master's degree in Defense and Strategic Studies from the University of Texas at El Paso.

The 1-3rd Attack Battalion is greeted by the Hungarian Military as they enter Hungary on their second day of the three day convoy to destination Saber Guardian in support of Defender 21. Upon entering the country, the Soldiers had their temperatures taken, vehicles refueled, and were given a place to rest up for the next day's convoy. U.S. Army photo by SGT Preston Malizia

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Hawaii Army National Guard (HIARNG) Soldiers with 3rd Battalion, 126th and 1st Battalion, 189th Aviation Regiments, prepare to land the UH-60M Black Hawk aircraft after returning from a medical evacuation (MEDEVAC) during helicopter hoist training, Wahiawa, Hawaii, June 17, 2021. Operational training like this assist Soldiers with certifying their special skills while performing multiple MEDEVAC procedures during an air rescue emergency situation. U.S. Army National Guard photo by SFC Theresa Gualdarama

The Combat Aviation Brigade and Medical Evacuation/Casualty Evacuation

By LTC Steve Sevigny

By better integrating the combat aviation brigade's (CAB) casualty evacuation (CASEVAC) capability into the division concept of health service support and patient evacuation plan, divisions will significantly reduce evacuation times, which can prevent culmination and reduce died of wounds rates in large-scale combat operations (LSCO).

PART I: EVACUATING CASUALTIES IN LSCO

Among many other sources, Field Manual (FM) 3-0, "Operations," paints a bleak picture about estimated casualties in LSCO (Department of the Army [DA], 2017):

"During the 1943 battles of Sidi Bou Zid and Kasserine Pass in World War II, 5,000 American Soldiers were killed over the course of just 10 days; during the first three days of fighting, **the Army lost Soldiers at the rate of 1,333 per day** [emphasis added]. Even later in the war, when units were better-seasoned, trained, and equipped, casualty rates remained high due to the inherent lethality of large-scale combat operations. In the Hürtgen Forest the Army sustained +32,976 total casualties over 144 days, a loss of 229 Soldiers per day. Similarly, the Battle of the Bulge cost the Army 470 Soldiers per day, for a total loss of 19,270 killed and 62,489 wounded over 41 days of sustained combat" (DA, 2017, p. 1-2).

These casualty figures mark a dramatic change in how the United States Army fights and evacuates casualties from counterinsurgency operations to LSCO. Aside from historical comparisons, FM 4-0, "Sustainment Operations," warns, "during large-scale combat operations the Army's theater medical planners may anticipate a sustained rate of 3,600 casualties per day" (DA, 2019, p. 4-4). Considering the limited patient holding capacity at brigade combat teams (BCT) and below, evacuation will be paramount.

A group of Army Reserve Soldiers from the 76th Operational Response Command work together to carry a casualty to a helicopter landing zone for a medical evacuation during an urban assault mission on Camp Williams, Utah, April 16. The warriors are part of a group of 15 Army Reserve Soldiers from around the country who recently came to Camp Williams to compete in a Joint Command Best Warrior Competition that challenged the Soldiers with 5 days of rigorous physical and mental events ranging from the Army Combat Fitness Test to marksmanship, medical knowledge, and warrior skills. U.S. Army Reserve photo by SFC Brent C. Powell

A battalion aid station (Role 1) has zero patient holding capacity; the brigade support medical company (Role 2) can only hold up to 20 patients for up to 72 hours (DA, 2014, p. 2-22). Finally, a combat support hospital (Role 3) in support of a division, provides hospitalization for up to 248 patients (DA, 2020b, p. 10-3).

Considering the casualty estimates, it is clear that the Army's air and ground medical evacuation (MEDEVAC) capability will struggle to provide timely patient evacuation in LSCO. Only through the deliberate use of MEDEVAC and CASEVAC can the Army keep up with the anticipated demand to evacuate patients in LSCO. MG Patrick D. Sargent, former Commander of the Army Health Readiness Center of Excellence, writes, "operational commanders must plan to complement MEDEVAC assets with casualty evacuation, or CASEVAC, assets. This should include: dedicating [emphasis added] assets to assist in evacuation when there is a high likelihood that MEDEVAC capacity will be exceeded; designating assets to be prepared to assist in evacuation to enable rapid transition to an evacuation contingency; and conditioning the Force to provide lift of opportunity when absolutely required with least the impact to their primary mission/task" (Sargent, 2019, p. 7).

PART II: Aviation Solutions to a Division Problem

The CAB provides significant support to patient evacuation through aerial MEDEVAC. In LSCO, commanders typically reserve aerial MEDEVAC for *urgent* and *urgent-surgical patients*, and available aircraft, aircrews, and fighter management further limit employment. To augment aerial MEDEVAC, CABs can also conduct CASEVAC. Additionally, FM 3-04 states, "when AE [aeromedical evacuation] assets are not readily available or the MEDEVAC requirement exceeds capabilities, the utility and cargo helicopters may be required to conduct aerial CASEVAC operations" (DA, 2020a, p. 4-9).

Furthermore, the task, 'Conduct Aerial Casualty Evacuation,' (01-BN-5154) is a mission-essential task for both the general support aviation battalion and assault helicopter battalion.[1] Field Manual 3-04 includes CASEVAC as a critical component of one of Army aviation's core competencies and identifies three types of CASEVAC. Dedicated aerial CASEVAC dedicates aircrews for exclusive use of CASEVAC missions for a finite period. Designated aerial CASEVAC assets perform CASEVAC as a contingency while performing another mission such as an air assault. Last, opportune CASEVAC allows any UH/CH to execute CASEVAC on immediate demand. It is the riskiest form of CASEVAC (DA, 2020a, p. 3-45). Although aviation doctrine indicates that CH-47s can carry up to 24 litter patients or 31 ambulatory patients, the litter kits for CH-47s do not exist in the Army supply system at this time. UH-60 capacity varies based on configuration (DA, 2021, p. 4-12, 4-13).

[1]More information on this mission-essential task can be found via the Army Training Network with a valid common access card.

Despite these challenges and the CAB's robust CASEVAC capability, the CAB rarely conducts CASEVAC operations at corps and division warfighter exercises (WFX). Divisions rarely task the CAB for CASEVAC, and they rarely include rotary-wing CASEVAC in the health service support annex or the patient movement plan. Even as casualties exceed MEDEVAC capability, lift aircraft routinely sit idle and are under-flown during WFXs. This failure to make use of all available CASEVAC capacity (especially rotary wing) risks culmination for a division. MG Sargent writes, "failing to evacuate will jeopardize the operational mission through the drain on combat power required to secure/protect the accumulating casualties and through the drag effect these accumulated casualties will have on movement and maneuver" (Sargent, 2019, p. 6).

Complementing these struggles, CAB staffs are not proactive in recommending when and how the CAB can employ dedicated CASEVAC to assist the division with patient evacuation. Discussions with CAB staffs at WFX indicate there is a knowledge

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gap in aerial CASEVAC operations. The typical CAB staff only maintains a limited understanding of designated (usually as part of an air assault) or opportune CASEVAC. This is likely an indicator of 20 years of counter-insurgency experience where CABs rarely needed to execute CASEVAC to supplement aerial MEDEVAC. If the division is not tasking the CAB, and the CAB is not offering CASEVAC as an option for a division staff, then this capability slips through the cracks as the division struggles with patient evacuation.

To remedy this problem, CAB and division medical planners must fully understand how the CAB can conduct CASEVAC operations during critical periods where estimated casualty figures exceed MEDEVAC capacity. Division medical planners must begin by providing casualty estimates to the CAB, which does not always happen. This is a critical input to allow the CAB to anticipate and plan CASEVAC operations.

Furthermore, even if CAB staffs do receive casualty estimates, they do not integrate casualty estimates into mission planning. This is especially an operations officer responsibility. When planning missions, it is routine for the staff to omit CAB medical planners or to have an incomplete running estimate. Combat aviation brigade medical planners often have a limited speaking role, and they suffer from a lack of understanding of the friendly scheme of maneuver, enemy courses of action, and available friendly combat power. This ultimately limits or eliminates any informed analysis or discussion about the necessary factors for recommending a decision regarding how and when the CAB might dedicate combat power for CASEVAC operations.

Since there is often a lack of discussion within the CAB staff about CASEVAC operations, the staff falls short in describing the problem to create understanding for the CAB commander. This fails to provide the CAB commander with multiple courses of action, or a recommended course of action, to help solve a critical problem for the division commander in LSCO. The CAB staff should capture the decision to dedicate aircraft for CASEVAC operations on the CAB decision support matrix (DSM) (Figure). The CAB staff develops this with the assistance of the Division Surgeon cell, G3 Aviation, and G35 future operations cell. This forms a framework for continued discussion, and it will ensure the division understands the CAB's capability for CASEVAC operations.

SOUTHWEST ASIA-A UH-60M medical evacuation helicopter belonging to A Co., 2nd General Support Aviation Battalion, 149th Aviation Regiment, is swapped out to a desert helipad in the tri-border region. The 2-149th GSAB is a National Guard unit deployed as part of the 29th CAB, in support of Combined Joint Task Force—Operation Inherent Resolve. CJTF-OIR is the global Coalition to defeat ISIS in Syria and Iraq.
U.S. Army photo by SSG Isolda Reyes

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PIR (If - Enemy)	FFIR (And – Friendly)	Decision and Effects (Then)	Other Considerations / Actions
Enemy air defense threat supports movement of casualties as far forward as Phase Line XXXXXX Weather forecast is >700-2, and supports rotary wing operations as required	G-1 Casualty estimates exceed XXX for at least a 12- 24 hour period Available HH-60M combat power/crews is <6-8 for any available 24 hour period AHB combat power/crews is > 19 / 30 CH-47 combat power is > 7 / 12 AXPs, Role 1 or 2 can accommodate CH-47s at LZs Supported BCT is unable to perform ground MEDEVAC, or degraded CASEVAC for any reason (LOCs interdicted/closed) There are no other higher priority missions (Air Assault, air movement, insertion, volcano, etc) forecast or scheduled that would preclude use of available UH/CH for dedicated CASEVAC use	1A - Do not dedicate any UH/CH for CASEVAC (no change) 1B – Dedicate X UH-60Ms for aerial CASEVAC for XX amount of time 1C - Dedicate X CH-47s for aerial CASEVAC for XX amount of time 1D - Dedicate UH and CH for aerial CASEVAC for XX amount of time 1E - Assign DS relationship for MEDEVAC to a BCT (as required)	Task organize UH/CH assets TACON to GSAB Re-locate UH/CH assets to GSAB TAA, if desired. Brief dedicated crews for CASEVAC, as required Reconfigure aircraft for CASEVAC (as required) Task additional CAB 68Ws or CLS personnel to support CASEVAC mission Rehearse as required Coordinate with Division G33 and Division Surg Cell that CAB now has CASEVAC capability for Priority II-Priority, Priority III-Routine, and Priority IV – Convenience categories, as required. Available HH-60Ms are preserved for URG/URG-SURG only.

Figure. Dedicated aerial CASEVAC DSM "A way" (Sevigny, 2021).

In conclusion, the high casualty estimates with LSCO demand a deliberate evacuation plan that maximizes use of all available air and ground MEDEVAC and CASEVAC capabilities to prevent culmination against a peer or near-peer threat. Division medical planners must work with the CAB planners to fully understand the capabilities of CAB CASEVAC and plan for its use in the health service support and patient evacuation plan. The CAB staff must better integrate medical planners and casualty figures into its mission planning to provide better analysis to the CAB commander on how and when to dedicate available combat power for CASEVAC operations. By conducting this level of analysis with an informed recommendation to the CAB commander, the CAB will help solve a critical problem for the division in LSCO.

Biography:

LTC Steve Sevigny is currently the Senior Aviation trainer for Operations Group Bravo, Mission Command Training Program (MCTP). He has a total of 3 years as an OC/T with MCTP. He served as the S3 and XO of 4-3 Assault Helicopter Battalion, and served in the G35 and G5 of 3rd Infantry Division. He will assume command of the 404th Aviation Support Battalion at Fort Carson, Colorado in May 2022.

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2nd Cavalry Regiment unmanned aerial vehicle launch in Rose Barracks, Germany.
U.S. Army photo by MAJ John Ambelang

Manned-Unmanned Teaming Employment in Complex Terrain

By MAJ Ryan J. Kirkeby

During the evening of September 28th, 2019, the Soldiers of Chaos Troop, 2-6 Air Cavalry Squadron (ACS), were tasked to find and destroy tanks in a contested environment to support the 3/25 Infantry Brigade Combat Team's (IBCT) defense of key terrain. Both the BCT and the Aviation Battalion Task Force (ABTF), consisting mostly of elements from the 3-25 General Support Aviation Battalion and the 2-25 Assault Helicopter Battalion, provided aircrews with enough information to make and execute a hasty attack. This information included engagement area (EA) development (mostly through inputs from the troop) a developed information collection matrix (ICM) with named areas of interest (NAIs) informed by various enemy courses of action (ECOAs) and situation templates (SITEMPs) (complete commander's reconnaissance guidance), and a general knowledge of friendly locations within the area of operations. However, Chaos Troop elected to do something most do not (to any level or success, if at all) during hasty attack planning and execution: employ RQ-7 Shadows (unmanned aircraft systems [UAS]) in the deep fight, using their sensors to acquire and identify enemy armor and provide coded laser designation for remote Hellfire missile engagements.

What commonly separates those who try vs. those who do employ manned-unmanned teaming (MUM-T) at the Joint Readiness Training Center (JRTC) is the troop's/company's ability to successfully posture their platforms on the battlefield in such a way that allows them to be successful. This is largely driven by the BCT and ABTF staff–their understanding of where the enemy will be and how they will employ their weapon systems (through NAIs informed from thorough intelligence preparation of the battlefield, and an understanding of the enemy's SITEMP and order of battle [ORBAT] that are tied to a well-developed ICM) is critical in the scheduling of aircrews and operators, allowing them to be either airborne or within minutes of being airborne, with enough situational awareness to provide timely and effective reconnaissance, security, or fires.

Based on the outputs Chaos Troop received from the ABTF military decision making process (MDMP), the troop commander decided to establish his Shadows over a series of NAIs running along high-speed avenues of approach, because the very restrictive terrain at JRTC often limits wheeled and tracked vehicles to improved surfaces. Once on station, the troop commander's operators successfully acquired and identified columns of enemy armor traveling toward friendly defensive positions. A team of AH-64 helicopters then moved within the effective weapon range of Hellfire missiles and began conducting remote Hellfire engagements. This is where the Shadow provides coded laser designation for a target, while the AH-64 provides the Hellfire missile. In the course of an hour, Chaos Troop rendered Geronimo combat ineffective. First-hand accounts from opposition force leadership suggested they had no indication of what was happening until it was too late.

Oftentimes, MUM-T is reduced to a catchphrase that briefs well during a rehearsal of concept drill or a training exercise without troops. Intelligence preparation of the battlefield and reconnaissance push/pull requirements are often underutilized or their outputs are underdeveloped, leaving the BCT and the ABTF with an unclear picture of the battlespace and when or where the critical point of the battle will be.

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Additionally, attack aviation is routinely given very restrictive airspace coordination areas (ACAs) that do not adequately consider survivability of the platform or intervisibility between the aircraft and the target area. As secure frequency modulation communications and Force XXI Battle Command Brigade and Below/Joint Capabilities Release,[1] often frustrate a Primary, Alternate, Contingency, and Emergency plan more than they enable it, BCTs often resort to keeping ACAs active for entire mission windows to deconflict indirect fires, which typically results in the marginalization of attack.

What worked particularly well for Chaos Troop, Task Force (TF) Diamondhead, and the 3/25 IBCT was the latitude each allowed the other, and the ability of TF Diamondhead and Chaos Troop to maintain informed freedom of maneuver in the battlespace. The 3-25 utilized attack aviation for a shaping attack in support of the defense, allowing attack aviation to operate forward of the forward line of own troops with few restrictions placed on them by means of fire support coordination measures (FSCMs), etc. This flexibility also allowed Chaos Troop to employ their Shadow RQ-7s as they saw fit. A common observation from many JRTC rotations is that the ABTF task's individual platforms within Air Cavalry Troops (ACTs) (as is commonly the case in Central Command), limits many of the options the troop has when trying to defeat a contested environment with very restrictive terrain.

It is highly likely that Chaos Troop's ability to shape the 3/25 IBCT's defense would be drastically reduced if Chaos Troop did not maintain tasking authority over its organic Shadows. The nature of the restrictive terrain at JRTC often means platforms have to have near vertical look-down angles in order to identify or acquire any targets within the wood line. Because of the nature of the contested air environment and countermeasure limitations, AH-64s cannot simply fly at higher altitudes to gain better look-down angles. Instead, AH-64s commonly have to maneuver well within the weapon engagement zone of enemy weapon systems in order to simply acquire targets. When you consider the sound profile of an AH-64 (roughly a few kilometers), the element of surprise is quickly lost, and aircraft are often unable to maintain the fundamentals of the offense (surprise, concentration, audacity, and tempo) against larger elements. Shadows operating under blackout conditions (no anti-collision lights or position lights on) at altitudes much higher than rotary-wing aircraft often operate at not only a much more favorable look-down angle for the platform, but also present a very reduced radar and infrared (IR) signature that leaves them safe from small arms, radar, and IR-guided threats. This allows the Shadows to provide a bird's eye view of the NAI, EA, etc., to the AH-64s that can be monitored and used to determine triggers for AH-64s to depart their holding area/concealment in order to position themselves for remote Hellfire missile engagements.

[1] "FBCB2 JCR is a networked battle command information system…" (Office of the Director, Operational Test and Evaluation, 2011).

An Apache Longbow attack helicopter assigned to the 3rd Battalion, 501st Aviation Regiment, 1st AD Combat Aviation Brigade, also known as'Task Force Apocalypse,' fires a Hellfire missile Sept. 11, 2014 at Fort Irwin, California. Task Force Apocalypse is participating in 4th Armored Brigade Combat Team 1st Armored Division's National Training Center rotation '14-10.' U.S. Army photo by SGT Aaron R. Brady

The Importance of Home Station Training

As is true with any organization, how a unit approaches home station training is an indicator of its success at a combat training center or a deployed environment. Successful ACTs prioritize the training and development of their operators and pilots. The most proficient group of Shadow operators observed at JRTC (C/3-17 ACS) placed the onus of training readiness level (RL)3 operators on Aircraft Commanders (ACs) through a mentorship program consisting of pre-mission planning and executing tactical tasks in a simulator before beginning their RL progression. Those who demonstrate tactical and technical proficiency (relative to their experience level) are then prioritized in RL progression. The result is an operator achieving RL1 status and being practically ready for an AC evaluation. They are able to perform tactical tasks to standard, while also being able to communicate on radios at a level at or above their rotary-wing pilot-in-command-counterparts. Adopting a similar strategy with AH-64 pilots could

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serve to increase the tactical proficiency of pilots without increasing the demand on instructor pilots.

Additionally, successful ACTs execute MUM-T in daily training flights, regularly achieving level of interoperability (LOI)-2 between RQ-7 Shadows and AH-64 helicopters, while conducting a hasty attack or reconnaissance mission. A common observation over my 24 months of JRTC rotations is that UAS platoons are untrained at loading their radios (in their ground control stations) and communications relay systems, or their "Mini-C," which encrypts video feeds from the audiovisual. This is primarily due to a lack of familiarity with both the systems and the simple key loader (SKL), a portable device for securely receiving, storing, and transferring data between compatible cryptographic and communications equipment. This lack of familiarity is specifically how equipment sets must be built in the SKL in order to make it useable in the Shadow platoon's equipment. AH-64 helicopter pilots and crew chiefs can benefit from additional training focused on loading their remotely operated video enhanced receivers (ROVER® 6S). Three out of 18 observed rotations saw AH-64s and RQ-7s (or MQ-1 Predator remotely piloted aircraft) achieve LOI-2 during the rotation; any other instances of MUM-T relied solely on radio communications between platforms and drastically reduced their effectiveness.

Finally, successful ACTs conduct deliberate mission planning and execution at the troop level, co-locating operators and pilots throughout mission planning and rehearsals. Additionally, successful ACT's utilize forward GCSs, whenever able, to minimize the geographic separation of UAS operators and the troop command post. This allows mission operators to gain much better situational awareness of the troop or squadron commander's intent, adjacent units and their intent/scheme of maneuver, and S2 threat assessments, to include the ORBAT and SITEMP based on ECOAs. This provides an opportunity for available pilots to conduct over-the-shoulder training with Shadow operators in order to train the fundamentals of reconnaissance and security; remote Hellfire engagements; and other tactics, techniques, and procedures used while conducting attack, reconnaissance, and security missions.

Successful utilization of MUM-T at the JRTC is seldom seen primarily because of the amount of MDMP and troop leading procedures required to make it successful. Permissive FSCMs, clear guidance and intent, and the troop's ability to task and maneuver their platforms at the troop level are critical in the successful implementation of MUM-T, and ultimately, the ABTF's ability to enable the ground force commander's scheme of maneuver.

Biography:

Major Ryan Kirkeby is an AH-64D pilot who is currently at the Army's Command and General Staff College. Previous assignments include serving as the senior Attack and Reconnaissance Observer Coach Trainer (OC/T) at the Joint Readiness Training Center, Fort Bliss (1-501 Attack Battalion), and Germany (12th CAB/1-3 Attack Battalion).

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Det. 1, D Co., 177 BEB, 48th Infantry Brigade Combat Team flies the RQ-7B Shadow UAS in eastern Afghanistan. The unit conducts 24-hour operations to keep visibility over TAAC-East. U.S. Army photo by SGT Jordan Trent

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An AH-64 Apache helicopter lands at a Forward Arming and Refueling Point during a 1st Battalion, 501st Aviation Regiment, Combat Aviation Brigade, 1st Armored Division, gunnery at Range 83 at Orogrande, New Mexico, April 23, 2018. U.S. Army photo by Winifred Brown

Enabling Maneuver:

Aviation Mission Planning Process in Large-Scale Combat Operations

By LTC Cameron Gallagher, MAJ Kyle Friesen, CPT Zach Howard, 1LT Cami Ford, and CW3 Karl Knight

During the September 2021 National Training Center (NTC) Rotation 21-10, Task Force (TF) Iron Dragons, 1-501 Attack Battalion, 1st Armored Division (AD) Combat Aviation Brigade, supported 1/1 AD "Ready First Combat Team." While every rotation at the NTC is unique—based on the evolving and increased capabilities of the 11th Armored Cavalry Regiment (ACR) "Blackhorse" Opposing Force, or OPFOR; unique rotational design to meet specific unit training objectives; and the ever-changing operational environment of Atropia—TF Iron Dragons faced a significant challenge during the rotation from integrated air defense system (IADS) threats. A U.S. Marine Corps Stinger Detachment augmented the 11th ACR for the rotation, providing ~24 additional well-trained, concealed man-portable air defense system (MANPADS) teams scattered around the enemy's disruption and battle zones. These simulated SA-24 teams, augmenting an already robust and capable division and brigade tactical group IADS, presented a significant challenge for the Aviation Task Force (AV TF) regarding survivability, as they were all positioned on key terrain overwatching likely air corridors and historical battle/attack by fire positions.

From the very start of the rotation, we asked the question: How could we find the air defense artillery (ADA) threat to mitigate or eliminate it, and thus enable maneuver so aviation could fly to the fight and support the brigade combat team (BCT)? As we discuss further in this article, the integration of the battle staff utilizing fused mission planning techniques and target working groups, allowed the staff to truly set the conditions for the flight companies to not only fly to the fight (survivability), but to also fight in support of the ground force commander (lethality).

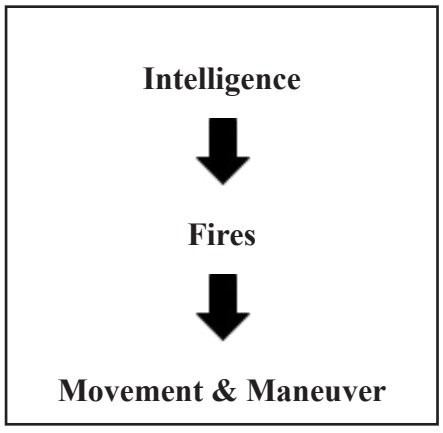

Figure 1. Use of INTs (eg., signals intelligence [SIGINT], electronic intelligence [ELINT], and communications intelligence [COMINT]) and intelligence, surveillance, and reconnaissance integration (1-501 Attack Battalion, Iron Dragons, 2021).

The role of an AV TF S2 is to provide the commander with relevant information about the enemy to allow for timely and accurate decision-making on the battlefield. An AV TF S2 must not only anticipate enemy decision points to conduct intelligence preparation of the battlefield (IPB), but also possess the ability to leverage collection assets to confirm or deny enemy courses of action. During TF Iron Dragon's NTC 21-10 rotation, the primary goal of the S2 was to successfully integrate collection assets to facilitate fused mission planning with the S3 section, thus enabling early detection of enemy IADS (Figure 1).

During mission analysis, the AV TF S2, AV TF aviation mission survivability officer (AMSO), AV TF fire support officer (FSO), and AV TF S3 operations officer conducted a target working group for each deliberate mission to determine high-value targets and high-payoff targets, or HVT/HPT. The target working group served as the "Decide" step in the targeting process (Decide, Detect, Destroy, Assess [D3A]), which proved critical to the development of focused priority intelligence requirements, named areas of interest (NAI), and a comprehensive intelligence collection plan (ICP). Priority intelligence requirements served as

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Task Force Iron Dragons conduct convoy operations during a Tactical Assembly Area Jump movement at Fort Irwin, California, during NTC 21-10. Photo credited to the1-501st Attack Reconnaissance Battalion "Iron Dragons" Facebook page at https://www.facebook.com/1stBN501stARB

the vehicle for attaining knowledge of the enemy and allowed focused development of the ICP.

During the rotation, TF Iron Dragons received an average of 8 hours of collection per day consisting of SIGINT, ELINT, and COMINT assets. The S2 utilized the multiple intelligence (Multi-INT) Spatial Temporal (MIST) toolsuite[1] to view the results of collection efforts. The MIST toolsuite utilized the Integrated Broadcast Service[2] to overlay collected SIGINT, ELINT, and COMINT signatures onto a map, saving the analyst time by organizing complex mission data into a cohesive and filterable product. This enabled the S2 team to compile signatures into an overlay of possible enemy locations with specific emphasis on the IADS threat. The process resulted in effective cueing of the MQ-1C Gray Eagle unmanned aircraft system (UAS) to confirm or deny IADS presence in NAIs (Judson, 2021). The Gray Eagle aided in targeting suspected IADS threats, resulting in increased aviation survivability on the battlefield. The mixing of SIGINT and Full Motion Video allowed the S2 to create an accurate enemy situational template (SITTEMP) to inform the S3 tactical mission planning and targeting process, as well as individual aircrews at the team, platoon, and company levels during mission execution (Army Small Business Innovation Research and Small Business Technology Transfer, 2021).

The utilization of cueing, mixing, and redundancy within the ICP proved to be highly effective in targeting and defeating the IADS threat. During the rotation, enemy MANPADS presented a dangerous threat to aircraft on the battlefield. The target working group identified the increased MANPADS threat and began to integrate MANPADS into the targeting process. The S2 utilized the Guardrail Common Sensor, an airborne signals intelligence collection (IC) and location system, to detect enemy COMINT signatures in potential observation post (OP) locations (PEO Aviation, 2020). These locations were then targeted by the FSO and informed the S3 and AMSO of the tactical scheme of maneuver for route planning. The MANPAD locations were assessed a majority of the time within 1 kilometer of OP locations. This decreased the overall MANPAD threat for the remainder of the rotation, due to increased situational understanding by both the aircrews and staff of the threat on the battlefield. Overall, use of Multi-INT, in combination with routine target working groups, proved critical to detecting the IADS threat to increase aviation survivability and lethality on the battlefield.

Battalion Target Working Group

The AV TF FSO has multiple roles inside an AV TF. The FSO is the subject matter expert in planning, coordinating, and resourcing fires to include cannon artillery, rocket and missile artillery, close air support, and electronic warfare. The FSO provides destruction of enemy air defense (DEAD) and suppression of enemy air defense (SEAD) to enable Freedom of Maneuver (FoM) for the AV TF. Additionally, the FSO provides targeting and fire support coordination to the commander and ensures the commander's intent for fires is met through fire support tasks (FST).

The FSO enables FoM for aviation assets by working with the AV TF S2, S3 planners, and the AMSO to understand the air scheme of maneuver, ADA threats, and fires assets available to support the AV TF during mission execution. During NTC 21-10, TF Iron Dragons utilized the Army's targeting methodology of D3A, in accordance with Army Techniques Publication 3-60, "Targeting," to conduct daily target working groups to synchronize the IC with the fires process to enable maneuver during mission execution.[3] The target working group's efforts resulted in an ability to provide bottom-up refinement to higher echelon targeting processes and enabled the S3 section to update the high-payoff target list (HPTL) associated with each deliberate mission, up to 72 hours out from mission execution.

Since aviation units do not organically possess artillery, the FSO must request all fires from higher

[1]The toolsuite is "a web-based tool built on the HTML5 specification that provides battlespace awareness in support of national security missions" (https://www.caci.com/jadc2).

[2]The Integrated Broadcast Service "is the worldwide Department of Defense (DoD) standard network for transmitting tactical and strategic intelligence and targeting data to all echelons of Joint Service operational users" (https://apps.dtic.mil/descriptivesum/Y2012/Army/stamped/0603850A_4_PB_2012.pdf).

[3]This publication is available via Enterprise Access Management Service-Army with a valid common access card.

UH60 assigned to Task Force Iron Dragons en route to deliver supplies in support Operation Freedom Sentinel. U.S. Army photo by SPC Tin P. Vuong

echelons to enable FoM for aviation assets. The most important FST to an aviation unit is SEAD/DEAD to enable FoM to and from the objective. The FSO must ensure higher fire support elements understand the significance of this FST and are able to provide the necessary support to the aviation unit. The outputs from target working groups allow AV TF FSOs to request appropriate fires assets required to accomplish FSTs, provide bottom-up targeting refinement during higher headquarters target working groups, and ultimately, enable FoM on the battlefield for aviation units through the fused mission planning process, as discussed further in this article.

Fused Mission Planning

As seen in Figure 2, the three tenets of fused mission planning are: Analysis, information circulation, and adaptation (Eagle Team Observer-Coach/Trainers [OC/T] for NTC rotation 21-10, 2021). During the NTC 21-10 rotation, a goal of the TF Iron Dragon staff was to successfully integrate members of the strategy tactics analysis team, consisting generally of the S2; AMSO; FSO; master gunner; and an S3-planner, to enable aviation operations in an IADS threat environment using the fused mission planning tenets.

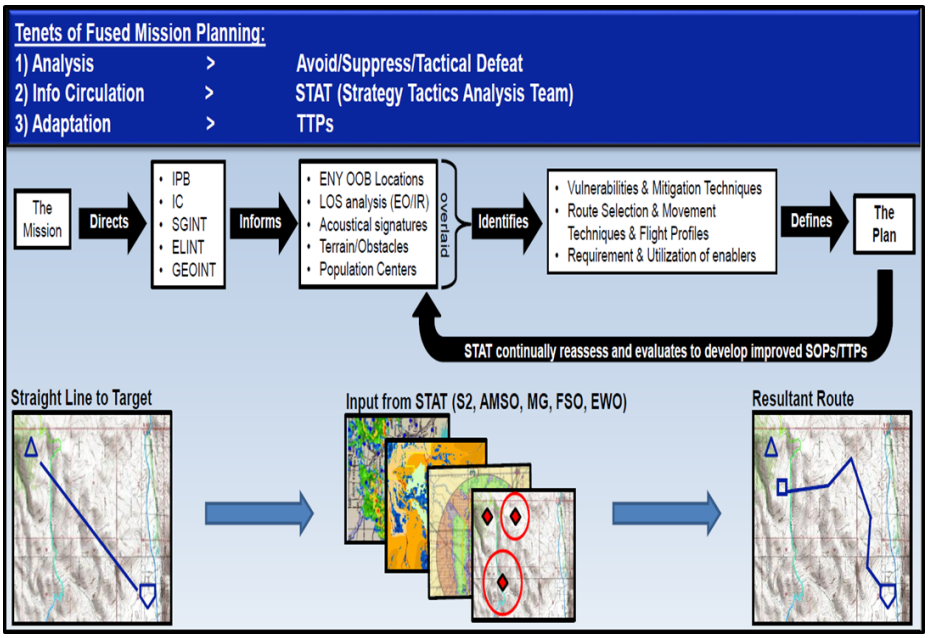

Figure 2. Depiction of fused mission planning, and its tenets, at work (Eagle Team OC/Ts for NTC rotation 21-10, 2021).

In the **analysis phase**, the AV TF S2 and AMSO collaborated using enemy order of battle templates, geospatial intelligence, and intelligence collection fusion systems, such as MIST, to provide the commander, staff, and aircrews with current threats to aviation operations. Following this, the AV TF FSO and S3 planner were incorporated during the target working group to refine the HPTL based on friendly advantages against each threat. The process allowed the FSO to request the most appropriate fires effects for each system on the HPTL. Additionally, the AMSO took the most current SITTEMP from the S2 for conversion to an aviation mission planning system (AMPS)-based threat file that aircrews downloaded prior to mission execution to support information circulation.

Information circulation prior to mission execution proved critical to ensure a shared common operational picture (COP) between the staff and aircrews conducting the mission. This process continued during mission execution in the main command post (MCP) following the future operations to current operations transition after the operation order brief to the subordinate units. During mission execution, the S2 and battle captain were successful in leveraging Gray Eagle UAS to search for and target HPTs in designated NAIs. Through Gray Eagle UAS collection efforts and reporting, the FSO requested fire missions

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to the supported BCT and 52nd Infantry Division Fires cell. The AMSO conducted line-of-sight analysis on the AMPS and provided mission updates to aircrews based on confirmed threats to adapt to changes on the battlefield.

The biggest lesson learned during the rotation for the AV TF staff and aviators is that fused mission planning is critical to mission success in a large-scale combat operations (LSCO) environment. Fused mission planning is a continuous loop in which analysis feeds information circulation, and **adaptation** feeds analysis and information circulation. Throughout the fused mission planning process, the staff made a deliberate effort to debrief flight crews after each mission to determine success and failure of aviation tactics, techniques, and procedures on the battlefield. Utilizing complex terrain as cover and concealment, a robust ICP, and fires integration throughout the mission planning process enabled increased FoM during mission execution. Additionally, it mitigated the IADS threat on the battlefield to increase aircraft survivability and crews' lethality in conducting air ground operations (AGO).

Fighting Products

To coordinate and track the targeting outputs for AGO, effective tools for utilization at the AV TF staff level are the synchronization matrix (SYNCHMAT) during planning and preparation phases, and the execution checklist (EXCHECK) during mission execution. Without a useful SYNCHMAT to help visualize operational actions and utilization of resources over time and space, the battalion staff risks stovepiped efforts that diminish operational efficiency by failing to include key resources such as UAS platform coverage and allocated indirect fire assets into the final plan. These elements are often considered individually during mission analysis; however, if they are not integrated into the COP and tactical scheme of maneuver during subsequent planning phases, they are easily left out of the final operational plan. This results in decreased lethality and an inability to bring to bear the full complement of available resources against the enemy. Utilizing a SYNCHMAT formatted in the higher, operational, planning, enemy, light/weather data, subordinate units, or HOPELS, in accordance with Army Techniques Publication 3-04.1, "Aviation Tactical Employment,"[4] and expanded to include IC/fires lines of effort ensures a staff's ability to leverage resources during mission planning (Department of Defense, 2020). These resources will maximize lethality, present multiple dilemmas for the enemy, and generate effective sequencing and timing of direct/indirect fires en route to and from, and on the objective.

During execution, utilization of the SYNCHMAT or a refined EXCHECK across command and control node elements such as the MCP, tactical command post, and air mission commander's cockpit increases redundancy and promotes independent interoperability through a common "fighting product." Including critical fire support measures such as SEAD/DEAD, along with IC coverage windows in the SYNCHMAT and EXCHECK, ensures enablers are synchronized with the aviation scheme of maneuver. Additionally, these tools codify sequencing and timing of dedicated munitions on specified HPTs to enable FoM to the IADS-protected objective. During attack, reconnaissance, security, and even air assault operations, an integrated IC/fires plan ensures dedicated munitions are allocated to specific HPTs and are not expended on targets of lesser value.

This construct proved effective during TF Iron Dragons' operations at the NTC's China Lake Live Fire Range, in which the AV TF was given the task of simultaneously executing a Deliberate Attack out of Contact and Air Assault (AASLT) mission on separate objectives against an IADS threat in the contested deep area. Staff planning cells, through fused mission planning and target working groups, successfully identified threat systems and developed an IC/fires plan to effectively suppress, neutralize, and destroy IADS threats preventing friendly force maneuver capability along planned routes. Use of the MQ-1C Gray Eagle UAS provided vital IC capability undetected by enemy systems. Integrated threat analysis revealed the necessity for aircrews to vary airspeed and altitude as effective movement/maneuver techniques against the presented IADS threat. Utilizing SYNCHMAT and EXCHECK tools to facilitate sequencing and timing, the above factors combined to present multiple dilemmas for the IADS threat operators, enabled FoM to the objective, and resulted in successful actions on the objective for the deliberate attack and AASLT operations. Moving forward, routine incorporation of fused mission planning, target working groups, and integrated IC/fires plans into AV TF standard operating procedures will ensure aviation units maximize allocated resources and maneuver capabilities to effectively survive and operate continuously in a LSCO environment.

[4]This publication is available via Enterprise Access Management Service-Army with a valid common access card.

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Summary

Synchronizing fused mission planning, target working groups, and IC/fires outputs into the AV TF operations process provides a constructive framework to effectively plan, prepare, execute, and assess continuous and simultaneous aviation operations in a LSCO environment. Central to Army aviation in these environments, there is an ability to operate independently and continuously during each phase of the operation. Autonomy is critical to Army aviation because of the layered threat presented across all domains that is sure to occupy higher echelon resources at both the operational and strategic levels. Therefore, an AV TF must be able to independently leverage allocated resources to not only tactically accomplish its mission at the objective, but also maneuver effectively to the objective to increase survivability against the IADS threat present in a LSCO environment. Fused mission planning and target working groups, combined with S2 collection efforts, improve the ability to operate independently by generating outputs that effectively utilize direct and indirect fires to mitigate IADS threats hindering aviation FoM.

Biographies:

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SPC Joshua Beer, an AH-64 armament, electric, avionic systems repairer assigned to 1st Battalion, 501st Aviation Regiment, Combat Aviation Brigade, 1st Armored Division, loads 2.75-inch Folding-Fin Aerial Rockets onto an AH-64 Apache helicopter at Range 83 at Orogrande, New Mexico, April 23, 2018. U.S. Army photo by Winifred Brown

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U.S. Soldiers, assigned to 1st Combat Aviation Brigade, 1st Infantry Division, conduct aerial gunnery training flying in an AH-64D Apache Longbow attack helicopter at the 7th Army Training Command's Grafenwoehr Training Area, Germany, Aug. 4, 2021. U.S. Army photo by Markus Rauchenberger

How we Fight:

Developing the Next Generation of Army Aviation Leaders

By CW5 Leonard Momeny and CW5 James Steddum (Ret.)

Introduction

The aviation branch, like the rest of the United States Army, is at a distinct inflection point regarding the future of warfare and the branch's position and role within that future. It is no secret that the Army, to include the rest of the Department of Defense, is posturing its future force to be multidomain operations-capable by 2028 and MDO-ready by 2035. To accomplish this, the branch and Army as a whole, must refocus its efforts on meaningful training and relevant leader development to ensure both relevance and effectiveness on the future battlefield. The leaders of the future must be agile and far more adaptable to change than any previous force, but the manner forward is tested and true. How we fight in the future must be grounded in relevant training and professional military education (PME), doctrinal literacy, and contextualized unit-based training.

Training and Professional Military Education

Ground force commanders everywhere constantly request aviation branch assets for service, training, and actual combat missions. Since force utilization remains incredibly high, opportunities to pull away for individual training and attendance to PME remains challenging for both the branch and individual organizations. This can unintentionally foster negative opinions about the quality or value of individual training and PME that leaves the Soldier, Noncommissioned Officer, Warrant Officer, or Officer considering formal education to be less than meaningful. The next generation of Soldiers and leaders cannot afford to adopt this approach to formal military education. They must seek opportunities for individual and organizational improvement and encourage their subordinates to do the same. Developing leaders must appreciate every opportunity at self-development, because it is in those moments of dedicated learning that Soldiers can and should contextualize their capabilities with respect to their organization's greater role in future combat.

Training is Important

So, where does initial leader development take place? Initial leader development takes place during training, specifically, training that relates to their future military occupational specialty (MOS). It is in the heat of MOS training that all Soldiers develop a true appreciation for their craft. This period of initial development strikes a special chord with every Soldier as it relates to a specific action or specialty that only they can perform. These moments form the foundational bedrock of the future leader's identity and understanding of core capabilities that can be brought to bear on the battlefield by every aviation Soldier. In this sense, training is invaluable to the success of every organization. However, is individual skill training the sole determinate

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for the perceived value of a Soldier and their organization's capability? Some would say that it is and others would say that it is not. Can a leader develop with only an individual skill set to apply within the confines of the future battlefield?

The Case for Professional Military Education

Individual skill training by every developing leader is a critical element to both their growth as a professional Soldier and the effectiveness of their organization. However, this skill training is not everything to a leader's development into a meaningful and holistic warfighter capable of maintaining both agility and relevance in the future fight. A developing leader must be refined and polished at appropriate times within their professional growth to be better prepared for follow-on assignments of greater responsibility. The main source of this development originates within the confines of PME, e.g., Captains Career Course; Advanced Leader Course.

There are instances when Soldiers will receive experiences that differ wildly from their peers, and this can create moments of tedium at PME because learning occurred earlier at a duty station. However, the Soldier must not mistake the value of PME based simply upon a misconception that they might be duplicating efforts to acquire knowledge they already experienced firsthand. Instead, the professional Soldier and developing leader must understand that they bring significant value to the table for their fellow PME students, as they can attest to the application of knowledge and its effectiveness within a "field setting." Additionally, there is an opportunity to go deeper in the progressively elaborate educational framework.

Professional military education offers critically significant knowledge-sharing and doctrinal refreshment opportunities for all those in attendance. Doctrinal refreshment reminds developing leaders how to best contextualize their knowledge, skills, and experiences at the appropriate echelon and within the confines of the greater Army mission. Professional military education, regardless of prior experience, is tremendously valuable to the Soldier student, the professional peer group (to include instructors), and the Army as a whole. Professional military education can and should be the epicenter of active knowledge-sharing within the branch and integration of warfighting functions across the entirety of the Army.

The Importance of Doctrinal Literacy

Leader development is critical to the success of our future force, specifically as it relates to how we fight as both a branch and an Army. Earlier, it was explained that individual tasks or skill-centric training is critical to the development and effectiveness of the future leader. There is no arguing the value of individualized training. However, skill without context lacks the potential valuable application in the confines of war, specifically with respect to the latest domains of war (cyber and space). Context for application of skill by Soldiers, regardless of their branch, lies in the knowledge of doctrine.

Many could argue that the nature of their expertise or skill set lies above the requirement of knowing doctrine. Some consider doctrine to only be the realm of commanders and commissioned officers. Nothing could be further from the truth. Every member of the aviation enterprise must understand doctrine, specifically as it relates to the employment of their skill set within the service of others. After all, doctrine is the context of skill application to the domains of war. If developing leaders lack a discernable understanding in doctrine—then they are

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not leaders—but followers. A leader can see and develop a viable vision for others to share and achieve.

Leaders can find relevant doctrine in multiple locations. The preponderance of our doctrine can be accessed via the Army Publishing Directorate (APD).[1] However, many branch-specific documents are maintained and refined by the Directorate of Training and Doctrine (DOTD). Each Center of Excellence maintains a DOTD, and it is up to professional Soldiers and developing leaders to reach out to these phenomenal resources to stay doctrinally literate and relevant in the future fight.

Remember, doctrine joins the efforts of the holistic force. Within doctrine, there is purpose, commonality of effort, and a viable lexicon that connects every member of the aviation force to the Army enterprise. When a Soldier is doctrinally literate, they maintain agility and capability to communicate in both a frank and effective manner with their leadership about the capabilities they offer. The ability to effectively communicate in these terms means that the developing leader is knowledgeable about how they fight within the context of their echelon and those above and below.

[1] Found at https://armypubs.army.mil/

Contextualized Unit-Based Training

So, what is the final step in the developing leader's capability to best understand how we, as a branch, fight effectively both today and on the battlefield of the future? The developing leader has thus far found value in foundational individual skill-based training, PME, and being doctrinally literate. However, the final piece of the success puzzle is not up to the individual or the greater institution. Instead, the organization or home station must fill the void.

No matter the organization, leaders and commanders everywhere are responsible for establishing meaningful individual, collective, and even joint training opportunities. Training must seek to enhance realism and be as complete as possible. Leaders do this to ensure that developing future leaders can see that everything mentioned thus far comes together in a meaningful way, allowing for clarity of understanding in application of the organizational skill set and talents.

Training cannot only be grounded in real-world scenarios. It should also be inclusive of realistic capability, while simultaneously stressing rigor by demanding the most from all members of the collective fighting force. Leaders cannot forget that training in context is best accomplished through utilization of orders and the requisite briefs, and making sure that developing leaders and organizations are training as they fight. When contextualized unit-based training occurs correctly, then developing leaders are being offered an opportunity to apply both their skills and that of their teams' within the confines of the training environment. This is the ideal situation. No one wants to learn on-the-go in the future fight, as it might not be survivable.

Conclusion

How we fight as a branch and Army is dependent upon how we, as leaders, develop and train the future force. We cannot simply rely on past experience as the best teacher, because our experiences do not completely align with the future fight. Multidomain operations and large-scale combat operations have created a need for change in doctrine and PME. We are all trying to figure out the best way forward in light of these changes spurred on by the rapidly changing operational environment. To ensure the best possible outcome of future leader development, it is imperative that leaders continue to encourage and prioritize foundational skill-based training, active participation in PME, acute doctrinal literacy, and meaningful organizational training. Doing so will create a force that knows both how we fight now and how we should fight in the future.

Chief Warrant Officer 3 Scott D. Mark, an instructor pilot and platoon leader with Company A, 1st Battalion, 212th Aviation Regiment, reviews flight information while his student pilots conduct preflight procedures on a UH-60M Black Hawk helicopter at Fort Rucker, Alabama, Aug. 3, 2021. U.S. Army photo by LTC Andy Thaggard

Biographies:

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Jim Steddum is the Academic Lead and Subject Matter Expert for the Communications and Management Systems Department, US Army Warrant Officer Career College. He retired from the U.S. Army in 2019 as a Chief Warrant Officer Five after 30 years of service culminating as the Chief Warrant Officer of the Judge Advocate General's Corps, Headquarters, Department of the Army. He served in every operational echelon from Division to Army Service Component Command and Joint Commands. He holds a Master of Business Administration and is working toward a graduate certificate in National Security Studies from the Army War College.

Three UH-60 Black Hawk helicopters, carrying the U.S. Army Chief of Staff, GEN Mark A. Milley, arrive in the box at the National Training Center, Fort Irwin, California, Nov. 6, 2016. During his visit with 11th Armored Cavalry Regiment Blackhorse Troopers, Milley offered insight about the future of the Army, the importance of the National Training Center, and the value of finishing a college education. U.S. Army photo by Private Austin Anyzeski, 11th ACR

OWNING THE EDGE:

HOW WE MUST TRAIN ARMY AVIATORS TO WIN IN LARGE-SCALE COMBAT OPERATIONS

By CW4 Chris Crawford

INTRODUCTION

"Owning the Edge" was the Army's slogan for conducting composite risk management, but it also describes how Army aviation must adapt its training strategy for large-scale combat operations (LSCO). To meet the challenge of future missions including LSCO, the Army has developed a new family of aircraft called Future Vertical Lift. These aircraft will bring tremendous new capabilities to the Army, but new capabilities alone will not ensure mission success. General James McConville, Army Chief of Staff, has stated, "People are the Army's greatest strength and most important weapon system" (McConville, 2021). Future Vertical Lift will require that we address significant gaps in how we train Army aviators. But is Army aviation ready to make substantive change?

The current generation of Army aviators completed formal flight training that focused on training students to be helicopter pilots rather than on developing aviator warriors capable of effectively employing aircraft as weapons systems. More time was allocated to general knowledge and professional pilot skills like navigating the national airspace than to understanding threat and combat skills like maneuver tasks in relation to tactical objectives. The next generation of Army aviators, however, will start to reap the benefits of changes to training, some of which have already begun. One significant change is the adjustment of the Instructor Pilot Course into the Aviation Tactics Instructor Course. This will allow our new tactics instructors to focus on tactical training at the company and platoon level. To synchronize parallel efforts, the Aviation Mission Survivability Officer (AMSO) track will also complete a modification producing an AMSO capable of evaluating aviation mission survivability (AMS) tasks through the unit trainer–evaluator initiative. The Army has also made changes to professional military education courses, such as the redesign of the Aviation Warrant Officer Advanced Course into the Advanced Warfighter Skills course, in order to shape our tactical skill sets and the mentality of our aviators earlier in their career path as new pilots-in-command. These efforts in the U.S. Army Aviation Center of Excellence's (USAACE) transformation will certainly aid in improving our tactical focus and the proficiency of our warfighting ability; however, change is a process and that process is often a sluggish one with many obstacles and barriers to overcome.

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A HISTORY OF CHANGE

Culture, even more than money or materiel, is often the greatest barrier to change in an organization. Army aviation has a history of thinking outside the box when it comes to changing culture. We can trace Army aviation's culture of innovation back to 1920, when the Army Air Corps created the Air Corps Tactical School (ACTS). The ACTS was built out of the need to convince leaders that air warfare was changing after World War I and had the motto *Proficimus More Irretenti* ("We Make Progress Unhindered by Custom") (Finney, 1998, p. v). The ACTS helped to create what later became known as the "Bomber Mafia." The tactics officers who graduated from this course helped to reshape how bombers were utilized in World War II and later led to a revolution in air-to-air combat known as the "Fighter Mafia" (Gladwell, 2021). Graduates of this generation include Colonel John Boyd, who famously developed the decision cycle known as the Observe, Orient, Decide, and Act, or OODA, loop. This method is still utilized in all the military branch's separate weapons and tactics instructor (WTI) courses.

The Army is the only service component that currently does not have a WTI course. The discussion of developing a WTI course for Army aviation is not a new one and can be seen discussed in doctrine dating back to the Army Field Manual 1-107, "Air-to Air Combat," dated 12 October 1984. The U.S. Army Aviation Center of Excellence has attempted to build such a course several times, each time unsuccessfully. The Army has analyzed why we have not been successful, and the answer varies from the resistance to change our culture to the funding required to establish such an organization. One key factor is how we examine our capability gaps. The Army disproportionately looks toward materiel solutions to solve these gaps. Materiel solutions create training requirements, but we have not looked at training holistically as the gap we need to fix.

THE SOLUTION

Future Vertical Lift and other developmental aircraft systems will have an embedded training capability; however, this does not solve today's problems or the issues that arise when these systems will need to be interoperable in the Joint environment to train multidomain operations. The Army has learned, at USAACE and through quick reaction tests (QRT), that no single organization has both the requirement and capability to conduct tactics development. The QRT effort was born out of questioning whether techniques utilized by other services were correct, and then conducting flight tests to quantify and validate tactical maneuvers. The Army succeeded in this tactics development effort by creating teams consisting of members of each directorate with a stake in the process. These directorates, however, had differences in responsibilities and priorities that constrained the process. Simply creating an Army aviation WTI course does not solve the problem; however, it is a necessary component of the overall solution. The Army must develop a single, permanent organization solely responsible for tactics testing and development, aviator warfighter training, aviation support personnel training, and one that feeds the requirements process.

The aviation enterprise can take note of how the infantry solved this problem. The Maneuver Center of Excellence is configured in the same manner as the rest of the Centers of Excellence (COEs), to include aviation. The main difference is they have an airborne and ranger training brigade (ARTB) that specializes in the warfighter development process. For Army aviation to solve its training gaps, it will require an aviation warfighter training brigade comparable to the ARTB, which can be the single proponent for developing, testing, and training tactics. This organization would in turn "drive the train," feeding information into our functional and professional military courses. It must also be tied into requirements and aviation testing to ensure it has a key role in shaping and validating what is needed to fight, survive, and win on the modern battlefield. This will save considerable time and money in the developing, testing, and fielding of new materiel by applying appropriate tactics and finding and fixing issues early on in the process. This specific issue of user involvement early in the developmental testing process is partly why it takes so long to update aircraft to meet warfighter needs. The bigger issue though, is how a technique is created, supplied from the field, and validated by the COE to create a procedure.

Tactics, techniques, and procedures (TTPs) are often used in the common vernacular to describe how to solve a problem. I have heard it stated many times, "Just apply TTPs." The issue is that each portion of this acronym is distinctly different and accomplished by different entities. Plainly stated, a tactic is how an adversary fights, and a technique is how the field adapts to overcome said tactics. Those techniques must

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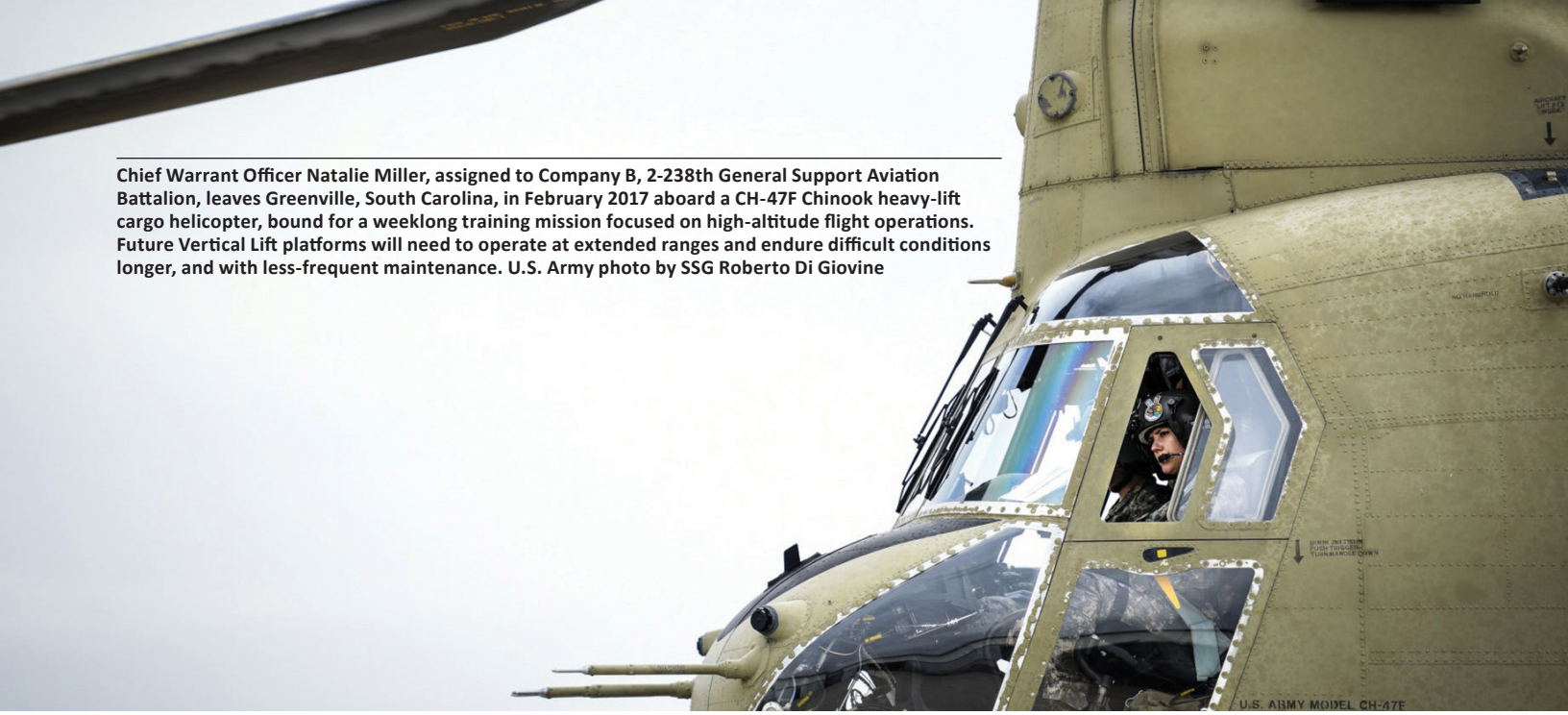

Chief Warrant Officer Natalie Miller, assigned to Company B, 2-238th General Support Aviation Battalion, leaves Greenville, South Carolina, in February 2017 aboard a CH-47F Chinook heavy-lift cargo helicopter, bound for a weeklong training mission focused on high-altitude flight operations. Future Vertical Lift platforms will need to operate at extended ranges and endure difficult conditions longer, and with less-frequent maintenance. U.S. Army photo by SSG Roberto Di Giovine

be refined and eventually sent back to be validated scientifically and turned into procedures that are then established as doctrine. Once published in doctrine, the adversary may develop new tactics, thus restarting the process. Having an Army aviation organization that not only trains aviators like a WTI course, but is rooted in tactics testing and development, ensures that Army aviation maintains a link to the force for collection of techniques and a process for validating the techniques that will be published as procedures. This, in turn, increases lethality and survivability.

CREATING A TACTICS ORGANIZATION

So how does this idea become a reality? The answer is twofold. First, Army aviation must acknowledge the training gaps already discussed and base training requirements on those gaps. Requirements drive everything, but how can Army aviation build such an organization in an era of zero growth? This can be accomplished through doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy, or DOTMLPF-P, analysis and strategy. The QRT efforts showed the expertise that should be in this organization. Observing the WTI courses in other services indicated an instructional overlap between multiple Army aviation courses. This new organization could be structured with existing USAACE resources. This course of action is bound to face resistance in an already resource-constrained environment, but it would align and focus Army aviation's efforts in tactics to a singular response. This is what is desperately required to shape training and prepare for LSCO. For too long, the tactics development process has been an extracurricular activity for personnel separated by organizations with different priorities. This method is to the detriment of the Army's ultimate success and must be rectified.

Future Vertical Lift will allow Army aviation to travel faster and have better agility against peer and near-peer adversaries. Aviation training must be equally optimized and in place well before we reach initial operating capability. Army aviation is tied to the ground force commander's intent, and as such, has the ability to lead the Joint services in the development of low-altitude training and tactics. Leadership must take the initiative on this effort and make the hard calls, which will have great impacts on the entire aviation enterprise. In order to fight, survive, and win, Army aviation must be focused in developing tactics, providing training for aviation support, and most of all, on producing aviation warriors rather than helicopter pilots.

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CONCLUSION

Army aviation is moving in the right direction, but to take this to fruition will require an organization capable of collecting and influencing all aspects of the aviation enterprise when it comes to tactics. For aircrews to be capable of flying legacy systems safely to their limits and "own the edge," will require a reshaping of the training strategy and the requirements that enable them. Army aviation units are practicing tactics at home station, in warfighter exercises, and at our Combat Training Centers, but is that training being resourced and conducted to Army aviation's full capability? Simply practicing tactics is not enough, though. I had a baseball coach who loved to quote inspirational coaches, and the one saying that has stuck with me comes from American football coach, Vince Lombardi. He stated, "Practice does not make perfect. Only perfect practice make perfect" (Lombardi, n.d.). The U.S. Army Aviation COE has made great strides in starting the much needed transformation, but much still remains to be done. Creating an aviation warfighter training brigade is necessary to maintain the current momentum and achieve the ultimate goal to win. Let us work to **own the edge** and perfect the warrior ethos that all Army aviators carry by creating such an organization that can embody that ethos and mitigate the perceived risk associated with training to master it.

Biography:

CW4 Chris Crawford is an Aviation Mission Survivability Training Developer with Survivability Branch of the Directorate of Training and Doctrine, and is responsible for overseeing Aviation Survivability doctrine, training, and assisting in various course developments. He also serves as deputy director for USAACE's quick reaction test effort.

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Chief Warrant Officer 4 Duane Sandbothe, a native of Savannah, Georgia, pilot assigned to Bravo Company, 1st Battalion, 169th General Support Aviation Battalion, a CH-47F Chinook heavy-lift helicopter unit comprised of Georgia and Alabama guardsman, scans the horizon as he maneuvers the Chinook to provide overwatch. U.S. Army photo by SGT Michael K. Selvage, 10th Sustainment Brigade

Current large UAS platforms like this Gray Eagle provide important capabilities but need a runway to take off. These systems also have lower airspeeds and depend on data links and GPS signals. Future systems will need to be more independent to operate in a complex battlespace. Image courtesy of AMRDEC

The Army Still Needs a Light Fixed-Wing Attack Aircraft

By LTC John Q. Bolton

The U.S. Military needs to revisit the 1966 Johnson-McConnell Agreement.[1] The Agreement stripped the Army of most fixed-wing aircraft in exchange for freedom to pursue helicopters without U.S. Air Force (USAF) opposition and interference. Additionally, the Army needs a fixed-wing attack aircraft to supplement USAF jets, which are ill-suited for the type of close air support (CAS) the Army needs and are increasingly unavailable due to declining overall numbers and other higher priority USAF missions. An Army aircraft would supplement the Joint Force's ability to operate across the spectrum of conflict, rather than simply focusing on the high end. A light, turboprop aircraft, bridging the performance gap between Army helicopters and USAF jets, would be inexpensive and considerably alleviate ground-support requirements in all but contested environments. Historically, Army deployments have taken place in permissive environments during partnered or counterinsurgency operations. Current USAF aircraft development favors multirole aircraft (MRA) ill-suited to CAS and too expensive for non-contested environments, limiting utilization. The services already share the air domain, and its focus on CAS means it does not represent a threat to traditional Air Force missions like air superiority and global strike (U.S. Air Force, 2021). Given the importance of aerial-delivered fires to the Army's core mission of decisive action, it is foolish to deny such fires just because they come from a fixed-wing platform. Letting the Army develop a light attack aircraft would improve the Joint Force's options and flexibility across the spectrum of conflict.

"No high cost aircraft demonstrated superior performance in all, or even most, measures, and no low cost aircraft was generally inferior."

-U.S. Government Accountability Office, *"Desert Storm-Evaluation of the Air Campaign"*

Three main points support this argument: 1) the Joint Force needs tools across the spectrum of conflict, not merely the high end; 2) the Air Force has historically failed to field aircraft conforming to ground force desires; 3) partially alleviating tactical air support requirements is in the interest of the Air Force. I begin by describing the conceptual challenge of developing tools across the spectrum of conflict before explaining why the Army needs a fixed-wing attack aircraft. I conclude by explaining why "jointness" requires sharing domains and, to some extent, platforms.

The Spectrum of Conflict Requires a Spectrum of Tools

The American Military's force structure, despite 20 years of small-scale fighting is built, if dated, for large-scale combat operations (LSCO), predominantly consisting of systems designed against peer adversary systems. There is a much-needed debate as to the Joint Force's *organizational competence* at employing these systems, which are aging. However, the overall force structure remains largely unchanged from the 1980s, despite 20 years of counterinsurgency and high-profile cuts such as the Army Comanche helicopter and former Secretary of Defense, Robert Gates, suspending F-22 production (Freier et al., 2020). Exceptions include the Army's modular brigade combat teams (BCTs), themselves a reimagining of WWII division combat commands and

[1] "The Johnson-McConnell agreement of 1966 was an agreement between United States Army Chief of Staff General Harold K. Johnson and United States Air Force Chief of Staff General John P. McConnell on 6 April 1966. The U.S. Army agreed to give up its fixed-wing tactical airlift aircraft, while the U.S. Air Force relinquished its claim to most forms of rotary wing aircraft. The most immediate effect was the transfer of Army DHC-4 Caribou aircraft to the Air Force" (https://military-history.fandom.com/wiki/Johnson-McConnell_agreement_of_1966).

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security force assistance brigades (SFABs), which are designed to assist host-nation forces.

Large organizations are loath to change, even under pressure. The Army did not develop the SFAB for nearly 15 years, despite a clear need for units designed to train host-nation forces and the futility of haphazardly transitioning BCTs to this task (Bolton, 2021). Notably, the Army's adaptations over the past 20 years have largely been *doctrinal* and *organizational* adjustments to address contemporary operations, rather than *structural*.

"If a hostile state is threatening the sovereignty of a neighboring U.S. ally, then the ability of the Joint Force to respond with armored forces, air wings, and carrier strike groups sets the conditions for competition… If the country seemed ready to align with the adversary by getting training or equipment, the United States placing an amphibious readiness group off the shore would have no bearing on the decision."

GEN James C. McConville,
"*The Army in Military Competition*"

These adjustments fall into a larger American pattern of mistaking how force is *employed*, as opposed to the mission for which units, *platforms*, and *systems* are designed (Figure 1). Despite the Joint Force's late-breaking focus on LSCO, American forces have predominantly been utilized in small-scale operations against non-peer or guerrilla threats. Even during the Cold War, though American forces trained for the Soviets, they *fought* mostly small unit engagements (even in Korea after mid-1950), while both superpowers actively limited conflicts (Stueck, 2004). Put simply: "Great Power Competition" does not imply "Great Power War." Competition implies limited conflict for limited goals with fighting often done by, with, and through partner (proxy) forces. Thus, the emerging multipolar strategic environment resembles 18th–century Europe more than the Cold War (Bertram, 2016).

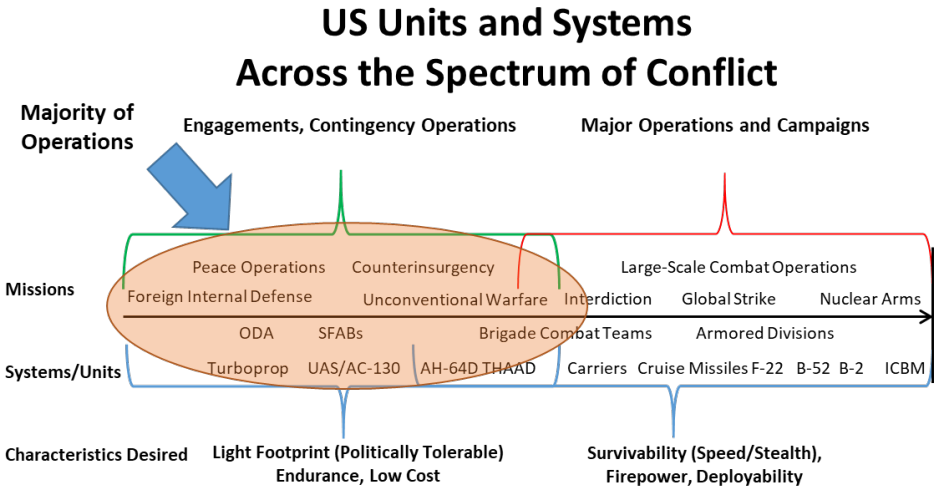

Figure 1. U.S. military units & systems (Bolton, 2021).

None of this is to say that the service(s) need not train for LSCO, only that the Joint Force should not focus *solely* on LSCO. Doing so requires adroit development and training programs, but is necessary, lest the U. S. Military become an obsolete, rusting tool rather than a flexible instrument of policy (Blumenthal, 2012). In implementing the long-delayed "pivot" to the Pacific, in addition to modernizing the force for the Indo-Pacific, we must consider the entire *spectrum* of military operations to provide options for U.S. policymakers. Doing otherwise is as futile as the 1990s pursuit of facile "network-centric" concepts that presume America can fight as it wants rather than as the geopolitical situation requires.

Failure to consider requirements across the spectrum has created a gap in the Joint Force aircraft fleet, particularly in the Air Force. Using limited high-tech aircraft for low-tech missions created is a fleet that is numerically "flown up" and consequently, less prepared for missions like interdiction, strategic strike, and air superiority. As predicted by a 2009 Congressional Budget Office Report, the Air Force fighter inventory has fallen 400 aircraft short of requirements, despite F-35 production (Congressional Budget Office, 2009). Average fighter age exceeds 30 years (bombers are even higher), and over 80% of fighters have exceeded half their expected lifetime hours (Congressional Budget Office, 2009) (Figure 2). Though F-35

A UH-60 Black Hawk helicopter, operated by Soldiers with 2-104th General Support Aviation Battalion, 28th Expeditionary Combat Aviation Brigade flies over the 28th ECAB's area of operations in the Middle East. U.S. Army photo by CPT Michael Rant

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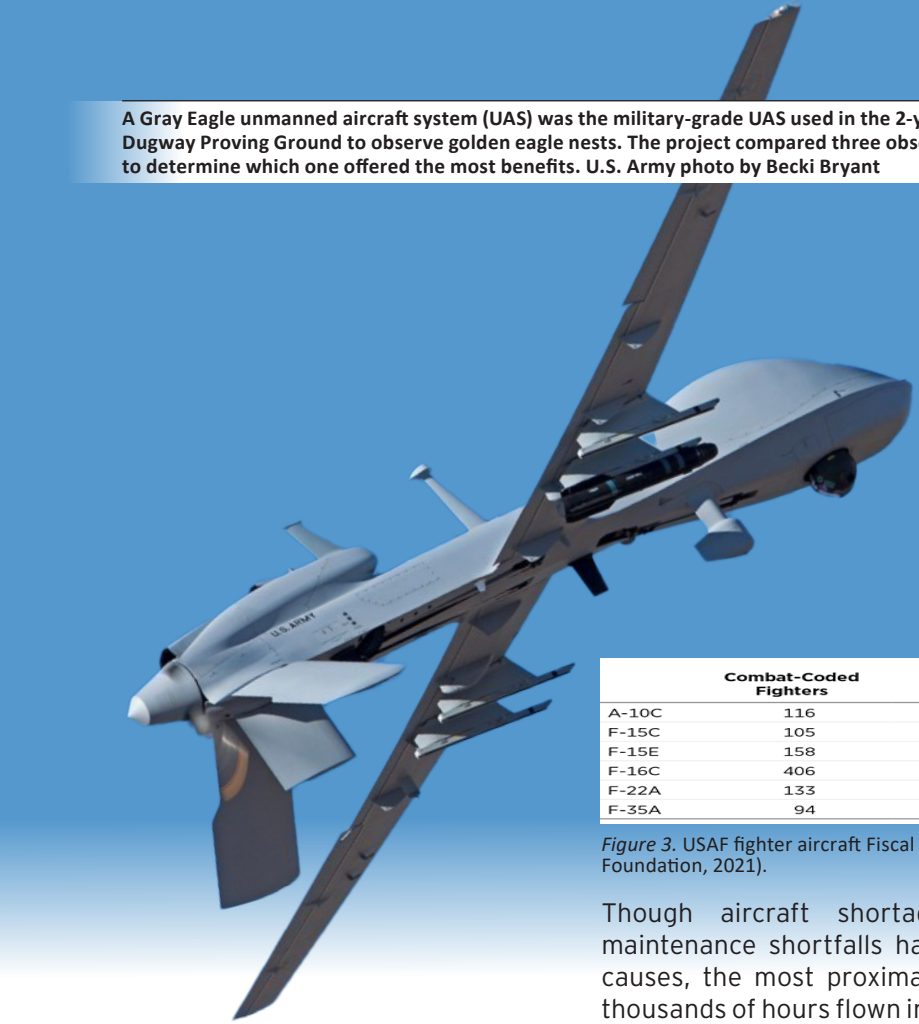

A Gray Eagle unmanned aircraft system (UAS) was the military-grade UAS used in the 2-year project at Dugway Proving Ground to observe golden eagle nests. The project compared three observation methods to determine which one offered the most benefits. U.S. Army photo by Becki Bryant

on-ramping will reduce the average age problem, it will remain due to limited quantities of F-35s and their slow fielding schedule.

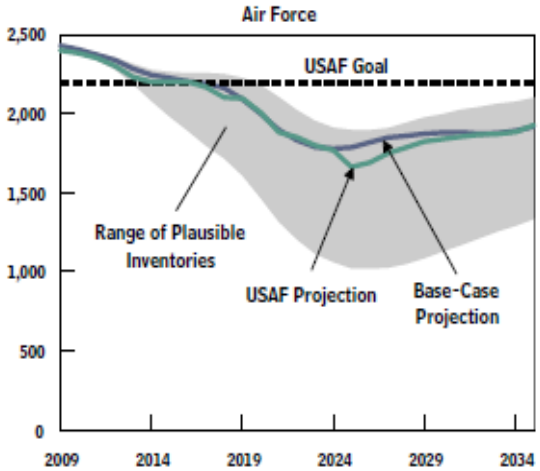

Figure 2. USAF fighter shortfall projection Source: Congressional Budget Office based on *the Depar*tment of Defense's fiscal year 2009 plans (Congressional Budget Office, 2009).

By 2019, high utilization combined with aging aircraft to crater readiness rates. Every fighter type fell below 75% (The Heritage Foundation, 2021) (Figure 3).

	Combat-Coded Fighters	Average Age	FY 2019 Mission-Capable Rate	Mission-Capable Combat-Coded Fighters
A-10C	116	37	0.71	82
F-15C	105	35	0.70	74
F-15E	158	27	0.71	112
F-16C	406	29	0.72	292
F-22A	133	13	0.51	68
F-35A	94	4	0.62	58

Figure 3. USAF fighter aircraft Fiscal Year 2019 readiness rates (Everstine, 2020; The Heritage Foundation, 2021).

Though aircraft shortages and maintenance shortfalls have many causes, the most proximate is the thousands of hours flown in Iraq and Afghanistan. While USAF support has been extensive, responsive, and effective, using aircraft that cost tens of thousands of dollars per hour for low-threat environments is a foolish way to spend taxpayer dollars. Additionally, most USAF fighter aircraft are not designed for these missions. Though the USAF trained foreign forces how to employ light turboprop aircraft, it did not develop this capability for itself, despite a near decade-long "experiment" (Reim, 2020). Instead, the Air Force used legacy aircraft such as the B-1 that were ill-suited for CAS (and far too expensive for Afghanistan).

Lack of flyable aircraft also contributed to increased accidents, largely due to lack of proficiency. According to the National Commission on Military Aviation Safety, pilot hour shortfalls were the leading cause of over 200 deaths and the loss of 157 aircraft over 5 years (Reim, 2020). Old jets and pilots are not flying enough; when they are flying, they are not getting repetitions on critical tasks.

The Multirole Aircraft Problem

The Air Force prefers MRA. The rationale typically derives from a combination of emerging technology and selling "do it all" platforms to USAF leadership and Congress. Unfortunately, MRA demonstrate a high cost to capability ratio and overall low performance outside of limited mission profiles (Bolton, 2015b). They tend to be large, complex, and costly. Like the Army's failed universal camouflage, when you try to do everything, you end up doing many things poorly, producing "expensive white elephants" (Fallows, 2015).

Adding missions inevitably increases costs, leading to lower production and, paradoxically, a need to perform more missions. This "complexity vortex" is at the heart of escalating aircraft costs since the 1960s (Grazier, 2018). Multirole aircraft invariably cost more than the aircraft they replace. Despite projections of low cost and savings due to technological advances, MRA cost more, do less, and result in fewer aircraft built (Lorell et al., 2013). Operationally, this results in fewer

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pilots flying fewer aircraft and less reliable aircraft in multiple distinct missions—hardly an effective way to create well-trained pilots.

The F-35 is only the most recent iteration of MRA issues (Pietrucha, 2014; Smith, 2012). During the 1960s, Secretary of Defense McNamara pressed the Air Force and Navy

Figure 4. The F-111. Photo credited to the Federation of American Scientists.

to jointly develop the multirole F-111. Designed to perform air superiority, CAS, all weather attack, nuclear attack, and high-speed intercept while being aircraft carrier-capable, the Frankenstein F-111 weighed 50,000 pounds empty, nearly double that of a B-17 bomber (Fallows, 1981, p. 104; Hammond, 2001; Knaack & U.S. Air Force, 1971). The F-111 (Figure 4) incorporated emerging technology such as all-weather intercept and bombing radars, as well as variable-sweep wings to meet its enormous mission profile. However, high-tech systems designed to make the F-111 all-weather and night-capable, as well as cheaper, had the opposite effect. Advanced avionics "failed more often than predicted, and the time and costs to repair their failures were far greater than expected" (Burton, 2014, p. 74-75). Radar bombing proved inaccurate over Vietnam (Burton, 2014, p. 74-75; Murray & Millett, 2009, p. 306; Office of Statistical Control, 1945). By 1979, maintenance requirements were 23 times higher than forecasts, and cannibalizing parts was commonplace (Burton, 2014, p. 74). Rather than improve the aircraft's effectiveness, unproven technology and designing for multiple missions created an expensive aircraft, often ill-suited outside of a core mission set. Cost and complexity devolved into a pernicious loop: technology escalated cost, reducing the number of aircraft produced; increasing the mission set. When rising costs caused the Navy to drop out of the F-111 program in 1968, it foreshadowed U.S. allies curtailing F-35 purchases.

According to a 2013 RAND report, "the need to integrate multiple service requirements in a single design increases the complexity of joint programs and potentially leads to higher-than-average cost growth [over 30% on average] that could reduce or even negate potential savings" (Lorell et al., 2013, p. xiii). RAND also cautioned that a single platform increases risk: "Having a variety of fighter platform types across service inventories provides a hedge against design flaws and maintenance and safety issues that could potentially cause fleet-wide stand-downs" (Lorell et al., 2013, p. xviii). The authors concluded, "unless the… services have identical, stable requirements, DoD [should] avoid… complex joint aircraft programs" (Lorell et al., 2013, p. xix). These recommendations mirror a General Accounting Office Gulf War survey, which found "no clear link between the cost of either aircraft or weapon system and their performance in Desert Storm" (U.S. General Accounting Office & National Security and International Affairs Division, 1997, p. 165).

Conversely, examples abound regarding single-role aircraft that performed many missions well. The P-51 Mustang dominated the skies of Europe during WWII as a fighter, fighter-bomber, and reconnaissance aircraft. The P-51 later performed CAS in Korea more effectively than USAF jets (Millett, 1990, p. 363). Developed in the 1970s, the F-16 and A-10 are both "pure expression of a function," designed to perform a specific mission very well (Fallows, 2015, p. 20). As a result of performance-focused design, both aircraft, like the AH-64A Apache helicopter, had enough performance "white space" that could be used for additional equipment and/or missions as technology, and the operating environment developed.

Multirole aircraft do not reduce cost. As Figure 5 shows, complexity-generated costs have become the norm for American military aircraft. With only two exceptions since the 1950s, (A-10 and F-16) marginal costs exceeded 200%. The Air

An AH-64 Apache helicopter from the 1st Battalion, 25th Aviation Regiment, engages a target at dusk on McMahon Range with a 2.75-inch rocket during the battalion's live-fire aerial gunnery range April 14, 2021. U.S. Army photo by John Pennell

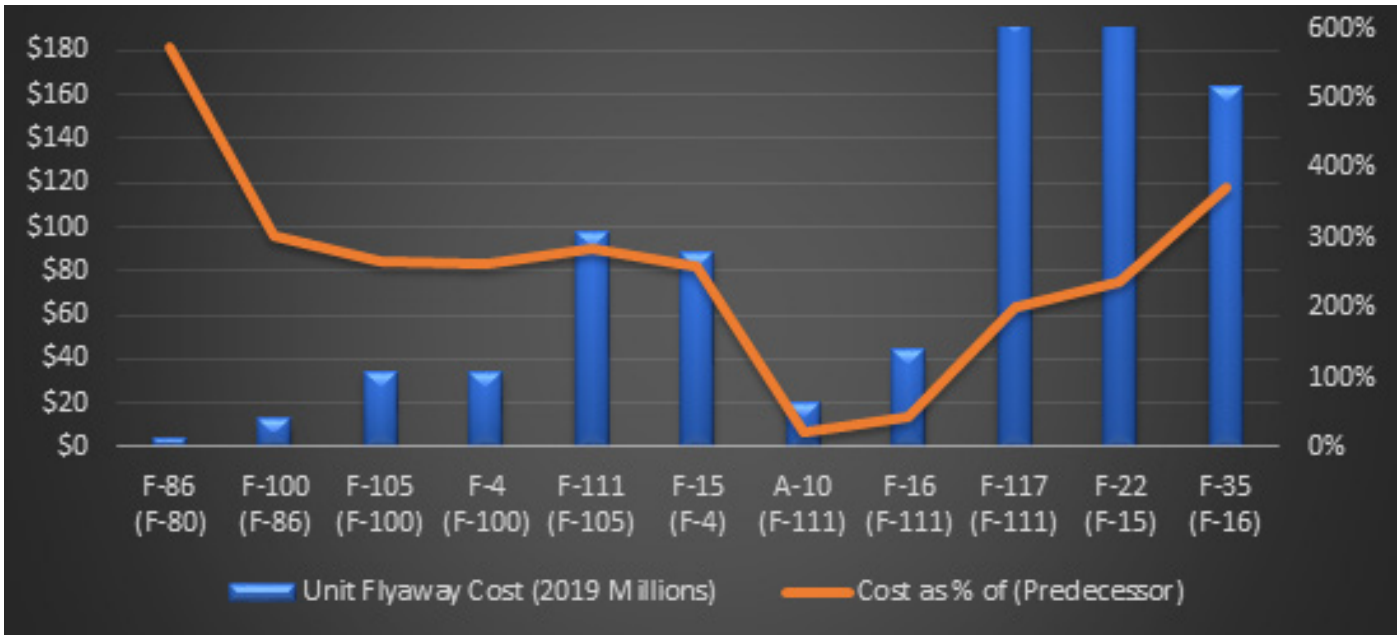

Figure 5. USAF aircraft cost and number produced (Ruehrmund & Bowie, 2010; Office of Statistical Control, 1945; U. S. General Accounting Office & National Security and International Affairs Division, 1997; Knaack & U. S. Air Force, 1971).

Force's existential desire to be everything aerospace-related has led it to overfly and exhaust its fleet, all to protect its dominance of the aerial-not against an enemy, but against doctrinal encroachment from the U.S. Army.

An Army Aircraft for Army Needs

At the tactical level, the Army requires aircraft able to bridge the capability gap between its helicopters and USAF jets. Though the Army's Future Vertical Lift Program attempts to bridge the gap, the difference is one of physics. Fixed-wing aircraft offer great advantages over helicopters in terms of speed, loiter time, and cost. The prohibition on all but niche transport aircraft places the Army in a poor position: requiring CAS but lacking the organic capability while depending on another service to perform the mission with aircraft designed for other purposes.

The friction points surrounding CAS remain largely unchanged since acrimonious WWII debates surrounding Air Force independence (Bolton, 2015a; Goldberg & Smith, 1971). The issues are relative priority between CAS and interdiction; operational control of CAS aircraft; and CAS aircraft characteristics. The history of Army-Air Force CAS largely consists of poor initial efforts followed by the development of workable systems success as effective air-ground teams and aircraft developed on the battlefield. Successful teamwork is then largely forgotten after conflict ends, only to be relearned under fire thereafter. This cycle repeated itself after WWII and Korea; in Vietnam, the services largely skirted the issue after the Johnson-McConnell Agreement, which gave the Air Force Army fixed-wing transports in return for Army autonomy to use the helicopter as it saw fit (Davis, 1987). Though Air-Land Battle and subsequent integration in Iraq and Afghanistan have improved cooperation, it remains limited, especially during training (U.S. General Accounting Office, 2003).

The debate is historical, but events demonstrate the folly of using aircraft ill-suited to CAS and untrained personnel can create disaster. In June of 2014, "A B-1B Lancer bomber dropped its ordnance on five U.S. soldiers, including members of an elite Special Forces team" (Lamothe, 2014). The errors and confusion present are endemic to CAS. The controller was unfamiliar with the B-1's equipment, and the aircrew could not visually acquire either the friendly or the enemy positions from high above; air and ground personnel mistakenly believed the infrared targeting pod could identify friendly strobe lights, resulting in an attack on friendly forces (Harrigian, 2014). The institutional error was using a Cold War nuclear strike bomber for CAS because the USAF lacked the wherewithal to provide an effective, manned, aircraft from a permissive environment like Afghanistan.

The answer is simple: If aerial fires are an essential to combined arms maneuver—which it is according to Army Doctrine (Army Doctrine Publication 3-0, "Operations")—the Army should have the requisite tools. The Army should abrogate the Johnson-McConnell Agreement to acquire its own fixed-wing attack aircraft to supplement its helicopter fleets. Doing so would fill the gap between the limitations of helicopters and relatively scarce USAF jets. Additionally, fielding such aircraft would free the USAF to focus on its institutionally preferred and arguably more important missions such as air superiority, interdiction, and global strike. An Army fixed-wing attack aircraft would enhance Army capabilities against low-end threats, leaving the Air Force to focus on high-threat environments. Notably, the Army is already flying fixed-wing drones, such as the RQ-7

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An AH-64 helicopter from Company B., 4th Attack Reconnaissance Battalion, 4th Combat Aviation Brigade, 4th Infantry Division, hovers while acquiring targets during aerial gunnery training at Fort Carson, Colorado, Dec. 4, 2017. U.S. Army photo by SSG Jeremy Ganz

Shadow and Gray Eagle, with little objective from the Air Force.

An Army attack aircraft could also potentially eliminate the distinction between CAS and what the Army calls attacks "against enemy forces in close friendly contact" (Department of the Army, 2020, p. 3-3). The latter is an update from what was previously called "Close Combat Attack (CCA)" (Department of the Army, 2007, p. 1-3). Despite much handwringing, CCA was simply CAS for Army aviators; it did not require a terminal controller and the information was simplified, but the result was the same—air-delivered fires supporting troops in enemy contact. An Army fixed-wing attack aircraft could potentially bridge this distinction without a difference and improve the way ground and air crews interact. Moreover, should the Joint Force Commander need additional airpower, he or she could direct Army units for interdiction, such as the AH-64A attack that opened Desert Storm (Mackenzie, 1991).

The authors of the rebuttal to my argument in the March-April 2017 issue of *Military Review* (*Multidomain Operations and Close Air Support*),[2] stress two points to dissuade an Army fixed-wing attack platform: joint control of airpower and the need for high-tech aircraft during LSCO. On the first point, it is difficult to take USAF arguments about jointness and burden-sharing in good faith given the service's assumption that all things air-related fall under its purview (except Army helicopters, drones, and artillery among others). Here the authors use "jointness" to justify service parochialism, segregating by domains. If it is not "parochial" for the Air Force to develop air superiority systems and long-range aerial refueling, then it is hard to see how the Army having a different type of aerial platform to support its core maneuver warfare mission is parochial when it could potentially support the air component, if required.

An Army-developed fixed-wing attack aircraft would naturally be well-suited for CAS, countering the authors' second point: that CAS is a mission, not a platform (Bartels et al., 2017). Rather than offering a "fresh perspective" as the authors suggest, they are simply rehashing Air Power dogma from the 1930s and WWII Army Field Manual 100-43 (U.S. War Department, 1943) using the F-35 as evidence. The basic disputes remain; ground forces want certain aircraft characteristics (loiter time, air-ground training, smaller ordnance) that are ill-suited to the air service's desires for interdiction. The 2014 B-1 incident illustrates problems with the current approach, and the limitations of using non CAS-specific aircraft. Additionally, CAS may be platform-immaterial as the authors assert, but integrated maneuver is not, and is predicated on close coordinating and habitual relationships. Current USAF structure, priority, and platform design (with some exceptions) all inhibit air-ground integration.

The authors use Inherent Resolve as an example of the air component rapidly shifting aircraft across the battlefield. But a sizeable number of air strikes were from Army Apaches, oriented to the target by ground and air forces. This is exactly the type of multidomain team any Army BCT with aviation support could be, while also demonstrating that an Army platform can be cued to targets if not direct by the air component. Indeed, the lopsided victory in the Gulf War was itself not an airpower victory, but a result of "unprecedented cooperation between the Air Force and the Army" (Dietz, 2021).

The Joint Force owes policymakers flexible options to respond to crises and threats worldwide. Military options cannot simply focus on the high-end of conflict and hope that units, training, equipment, and doctrine designed for LSCO somehow work across the spectrum of conflict. Letting the Army acquire a light fixed-wing attack platform would provide exactly the kind of aircraft Army forces need in low-threat environments, which have comprised most operations. Doing so would meet an Army need but also substantially reduce the burden on the Air Force, which has increasingly limited aircraft available and other missions such as interdiction to focus on.

Biography:

Lieutenant Colonel John Bolton is an Army Goodpaster Scholar currently assigned to Johns Hopkins School of Advanced International Studies (SAIS), where he is pursuing a PhD American Foreign Policy. A Mandarin speaker and a graduate of the U.S. Army Command and General Staff College's Art of War Scholars Program, he holds degrees in military history and mechanical engineering. His most recent assignment was as a Battalion Executive Officer and Maintenance Company Commander in the 25th Combat Aviation Brigade. He is an AH-64D/E aviator with over 2,000 flight hours and has deployed multiple times with Engineer, Infantry, and Aviation units.

[2] This article is available at the following link: https://www.armyupress.army.mil/Journals/Military-Review/English-Edition-Archives/March-April-2017/ART-011/

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The 25th Infantry Division Lightning Academy conducts rappelling operations with Bravo Company, 3rd Battalion, 25th Aviation Regiment. CH-47s will be reintegrated into Lightning Academy's Air Assault School next month. U.S. Army photo by MSG Lekendrick Stallworth

Army Aviation Air Movement Automation for the Mission Planner

By LTC Russell Nelson, LTC Tyler Espinoza, and Dr. Brandon M. McConnell

Background

Army utility and cargo helicopters are scarce and impactful resources. Through the proper planning and execution of air assault and air movement missions, Army aviation provides ground force commanders a significant tactical advantage over the enemy. From the aviation units' perspective, air assault mission planning usually incorporates a battalion-level effort, with a role for every staff planner and aviator executing the mission. Although lacking the same preeminent status of air assault planning, air movement operations comprise a majority of combat aviation operations in terms of volume of customers and endless appetite for rapid movement of troops across the battlespace. Moreover, air movement operations typically lack the same "all hands on deck" planning mentality of its more well-known cousin. A proficient utility or cargo helicopter crew has the ability to arrive at mission brief hours prior to scheduled takeoff, receive their tasked air mission requests (AMRs) and sequence of stops from the aviation mission planners, complete the necessary planning, and execute the mission. Often, the aircrew is oblivious to the amount of effort required of aviation mission planners to efficiently task AMRs to helicopter teams and generate a rudimentary route (sequence of AMR execution) for each of the aviation unit's aircraft teams.

With each crewmember's flight time tracked by hour and type of mission, AMR planning can be a daunting task to weigh mission priorities, assign missions to flight crews, verify available routes, and conduct feasibility checks on possible execution schedules. In 2022, it is possible to quickly generate multiple solutions in near-real time that meet a specific commander's intent and highlight the tradeoffs for decision-making. U.S. Army aviation, supported by academia or industry, should spearhead an effort to design a Soldier-friendly planning tool to empower units to more efficiently and effectively conduct these operations (Figure).

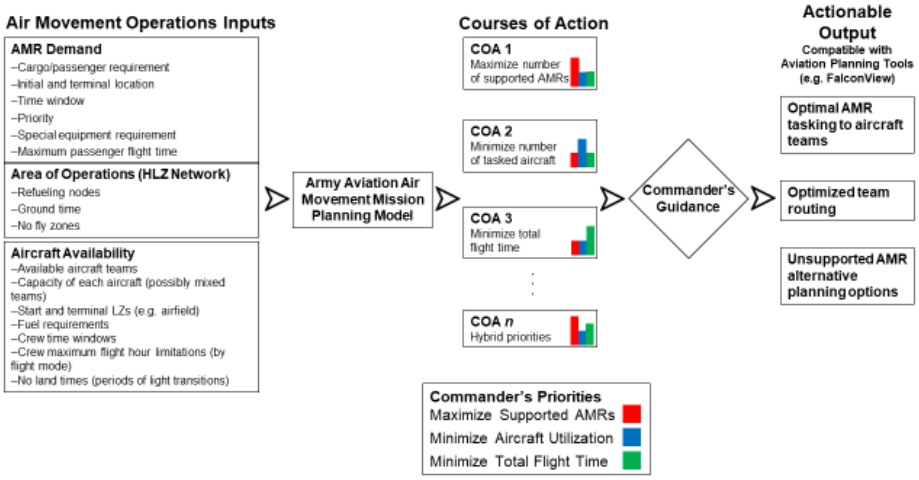

Figure. Concept sketch to provide units with access to proposed automation (Nelson, 2021).

Problem

An *air movement* is the "air transport of units, personnel, supplies, and equipment, including air-drops and air landings" (Office of the Chairman of the Joint Chiefs of Staff, 2021, p. 12). Air movements enable the ground force commander to sustain the tempo of operations, extend tactical reach, overcome complex terrain, and sustain operations to maintain a position of relative advantage over the enemy (Army Techniques Publication 3-04.1).[1] Aviation units receive AMRs from supported units to move personnel and equipment. Currently, aviation units use manual methods to resource and route the AMR demands. This manual process is time-/resource-consuming and produces suboptimal solutions. These inefficiencies often result in unsupported AMRs, additional personnel,

[1]You may access this publication via the Enterprise Access Management Service-Army with a valid common access card.

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increased maintenance, and sustainment resource requirements, as well as undue additional risk to aircrew and passengers. **Ultimately, air movement planning inefficiencies put a greater resource burden on aviation units and reduce lift capacity to the supported commanders at echelon**.

Vision

Create an Army aviation air movement mission planning model to assist the mission planner by rapidly providing courses of action based on the commander's priorities. The model will coordinate AMRs at the combat aviation brigade- or aviation task force-level to quickly generate feasible courses of action that optimize helicopter fleet resourcing and routing decisions against mission variables such as: mission priority, terrain, aviation weather, and enemy air defense networks, while supporting the optimal number of AMRs that sustain combat power over time.

Proposed Planning Model Features

Air Mission Request (Demand)

- Cargo/passenger requirement
- Initial and terminal locations (can be multiple)
- Time window (possible hard time)
- Priority (initial categories, with human in the loop adjudication)
- Special equipment requirement (e.g., slings)
- Maximum passenger flight time
- Scheduled demands
  - Known 24–96 hours prior
- Unscheduled demands
  - Added in transit or post-routing (e.g., priority AMRs)
  - Dropped in transit (e.g., no-show AMRs)

Area of Operations (Helicopter Landing Zone [HLZ] Network)

- Refueling nodes
- Ground time
- No-fly zones
- Known features (threat, terrain, airport/forward operating base closures, etc.)
- Probabilistic features (restricted operating zone, threat, weather, etc.)

Aircraft (Utility or Cargo Helicopters)

- Number of aircraft teams with possible standby teams for surge demand
- Capacity of each aircraft (possibly mixed teams)
- Start and terminal LZs (e.g., airfield)
- Fuel requirements
- Crew time windows
- Crew maximum flight hour limitations (by flight mode)
- No land times (periods of light transitions)

Conclusion

The Army has pivoted from conducting counterinsurgency operations with air supremacy to training for large-scale combat operations (LSCO) in an integrated air defense system environment. In LSCO, Army aviation will have a new role to enhance combat capabilities in which air movement operations will continue to be instrumental. Ground force commanders will need large-scale air movement operations to stage units and equipment prior to joint forcible entry (JFE). Post-JFE, air movement operations will be essential in sustaining the tempo of operations over large distances and complex terrain. Army aviation air movement operations will continue to be relevant in future warfare.

The concept of the Army aviation air movement mission planning model is to enhance the mission planner's capabilities and provide the aviation commander with solutions to maximize lift support to the supported commanders. Instead of spending hours allocating AMRs and routing aircraft teams to find a working course of action, the aviation mission planning model quickly generates multiple courses of action. The courses of action give aviation commanders options by trading off the number of teams used, flight hour distribution between teams, and the option to identify potential changes to AMRs that will reduce aviation resource requirements. These courses of action assist in aviation maintenance and aircrew flight hour planning, reduce planning and operational resources, and most importantly, expand the capabilities of the aviation unit. It is time for Army aviation to take the next step in automating Army aviation air movement mission planning.

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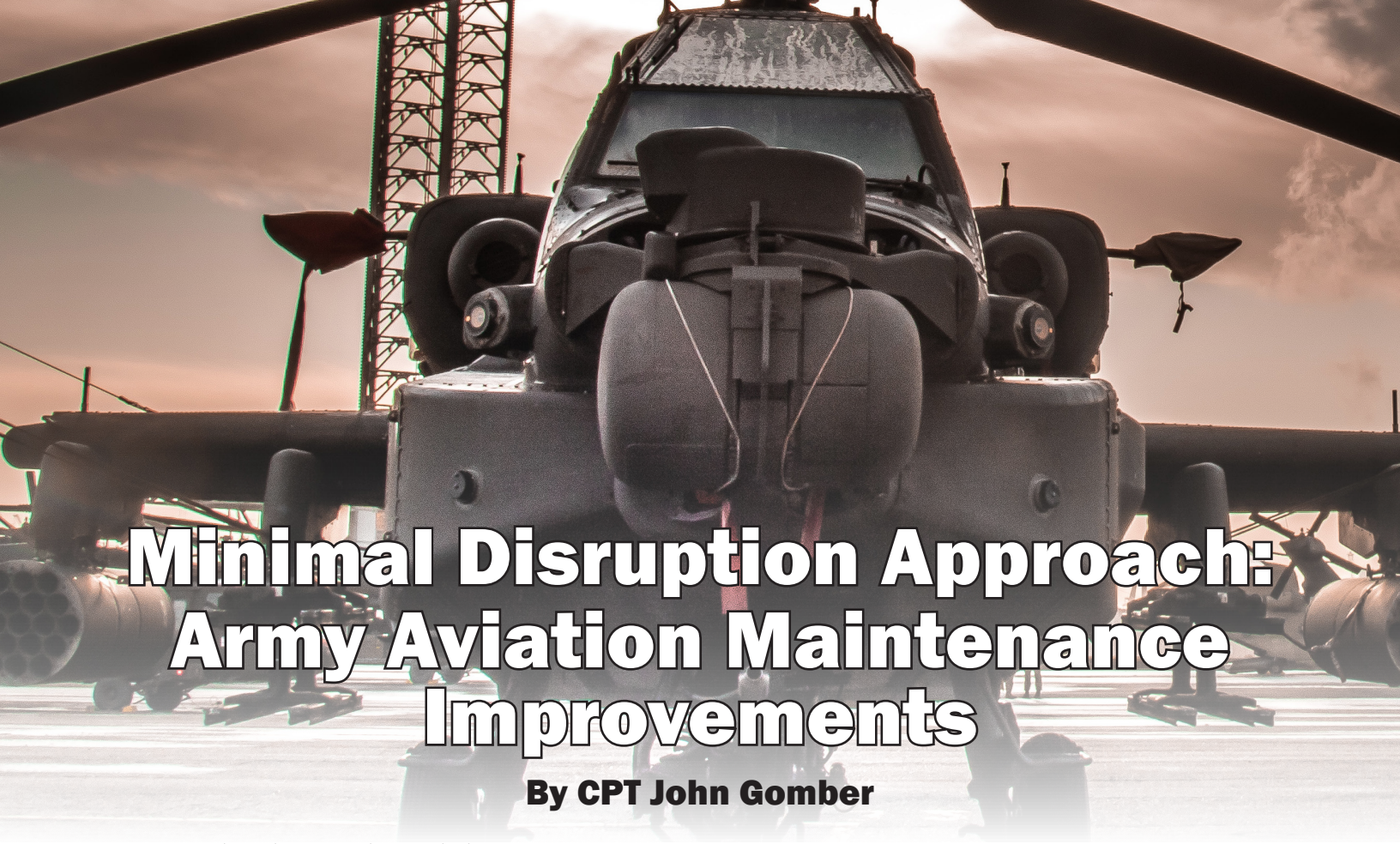

Minimal Disruption Approach: Army Aviation Maintenance Improvements

By CPT John Gomber

Modern large-scale combat operations (LSCO) will bring new challenges to warfare, including denied or degraded communications, austere forward operating bases, and smaller footprints to reduce the effects of enemy artillery. After 2 decades of conducting maintenance at hardstands with contractors readily available in support of the Global War on Terror, Army aviation maintenance must improve its ability to conduct aviation field maintenance without contractor support. Since Army aviation has become essential to the land component's role in unified land operations, Army aviation must make changes to avoid continuing to hemorrhage aviation maintenance expertise.

Improving Aviation Maintenance

To mitigate loss of organic aviation maintenance proficiency in a fiscally constrained environment, Army aviation can incrementally improve aviation maintenance in three ways:

1. **Increase Retention Control Points (RCPs):** Increase all RCPs by 2 years for specialists, sergeant, and sergeant (Promotable) (SPC, SGT, and SGT [P]). This would enable the Army to retain already trained maintainers longer and increase continuity within formations.

2. **Recreate the specialist 5 (SP5)[1] position**: The Army promotes E4s (SPCs) for leadership aptitude, but Army aviation requires maintenance experience. The re-creation of the SP5 rank allows commanders the flexibility to promote maintenance experts who do not exhibit the requisite leadership aptitude to be promoted to SGT. The Army would recode some current SGT positions for SP5 positions in D companies and brigade support battalion/aviation support battalion (ASB) companies to ensure no new Soldiers are required.

3. **Create video instructions to complete maintenance tasks:** This is a low-cost solution to diversify the interactive electronic technical manual's (IETM) instructions to cater to audio and visual learners by creating task completion videos. These videos will complement the written instructions and exploding diagrams already contained in the IETM.

These three options provide commanders low-cost solutions and do not add to the Army's total population.

Challenges in Army Aviation Maintenance

Army Techniques Publication 3-04.7, "Army Aviation Maintenance," notes: "Aviation maintainers must be able to execute maintenance operations in all environments to support operational requirements. During LSCO, aviation maintenance practitioners must fully exploit opportunities, while conducting expeditionary maintenance operations"

[1] The rank of SP5 was discontinued in 1985 (The 3rd Armored Division History Foundation, 2019). http://www.3ad.com/history/at.ease/army.ranks.html

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AH-64 Apache helicopter staged for maintenance operation checks at the Port of Vlissingen, Netherlands, Nov. 27, 2021. U.S. Army photo by CPT Taylor Criswell

(Department of the Army, 2020, p .ix). Since 9/11, Army aviation maintainers honed their maintenance skills fixing aircraft inside hangars. It accomplished this with an abundance of contract subject matter expert (SME) support, connectivity to engineers, and adequate aircraft ground support equipment (AGSE).

For complex maintenance faults, Army aviation has relied heavily on contracted maintenance support such as field service representatives (FSRs) or logistics assistance representatives (LARs) to provide expertise and fix the fault. Future conflicts and combat environments may not permit the deployment or co-location of FSRs, LARs, or any other non-service member to provide maintenance support. Coupled with degraded, denied, or intermittent communications, Army aviation must be ready to rely on organic maintenance expertise to regenerate combat power.

In a LSCO fight, Army aviation must be prepared to execute maintenance without hangars, with organic, uniformed maintenance personnel in a denied communications environment, or with minimal AGSE. The worst-case scenario would be encountering all these factors at once, which Army aviation has not been forced to do over the past 2 decades of low-intensity conflict in the Middle East. Army aviation is not prepared to adequately regenerate combat power under the combination of these factors, and therefore, Army aviation might be incapable of completing these mission essential tasks (METs): Conduct Helicopter Maintenance (01-CO-9016), and Conduct Aircraft Maintenance Support (01-CO-7730).[2]

An additional consideration is the anticipated introduction of completely new aircraft from Future Vertical Lift programs into the inventory later this decade. The addition of a new airframes with new technologies will bring unforeseen challenges to Army aviation mechanics, such as differences in avionics, new mechanical components, potential new tools, or systems integration. If Army aviation does not solve the issue of improving organic subject matter expertise before the fielding of new aircraft, the combination of these challenges will exponentially increase the risk to mission because Army aviation will still be attempting to solve the issue of retaining expert maintainers.

[2] You can learn more about these METs through the Enterprise Access Management Service-Army with a valid common access card.

In Training and Doctrine Command's (TRADOC) Pamphlet 525-3-1, "The U.S. Army in Multi-Domain Operations 2028," the central idea is: "if deterrence fails, Army formations, operating as part of the Joint Force, **penetrate** and **disintegrate** enemy anti-access and area denial systems [A2AD]" (TRADOC, 2018). Army aviation will utilize its ability to rapidly reposition Soldiers and equipment on the battlefield to create dilemmas for the enemy or deliver fires to disintegrate enemy A2AD to enable freedom of maneuver for other Joint Force assets. Aviation assets should be disaggregated and dispersed to reduce the effects of enemy operations. Consequently, Army aviation must ascertain a way to possess exceptional aviation maintenance expertise at each outstation to regenerate combat power.

Personnel Improvements

A blended approach of personnel and materiel changes are required to solve Army aviation's challenge of possessing exceptional aviation maintenance expertise at each outstation to sustain and regenerate combat power. This blended solution will minimize organizational disruption and costs, while still providing the requisite end state

for Army aviation to execute maintenance operations in a LSCO or multidomain operations (MDO) war.

With the option to retain maintenance experts longer, units will require fewer Soldiers to attend classes, courses, and specialize in their training. As an example, Army aviation has a requirement to maintain hazardous materials (HAZMAT) such as petroleum, oils, and lubricants. The certification course is an 80-hour block of instruction and takes Soldiers away from their daily tasks for 2 weeks, while reducing the number of available maintainers at the unit for the duration of the course. With increased continuity in units, fewer Soldiers must attend the HAZMAT course less frequently, while simultaneously allowing qualified HAZMAT Soldiers longevity to increase HAZMAT expertise. To increase maintenance expertise within formations, Army aviation should increase RCPs and create the position of SP5, while simultaneously upgrading the IETM.

Retention Control Points

The first recommendation to incrementally improve Army aviation maintenance is to increase RCPs. Current regulations allow E4s (corporals [CPL] and SPCs) to serve for 8 years, E4 promotables to serve for 10 years, and E5s (SGT) to serve for 14 years (Army Reenlistment, LLC, 2021). Each RCP should be increased by 2 years to improve continuity within the Army aviation maintainer military occupational specialty to retain trained mechanics. Figure 1 depicts the recommended changes to RCPs for Army aviation.

Mechanics who transition from the Army due to RCP gates are not progressing as *leaders*, either voluntarily or due to an absence of aptitude, but not due to maintenance skills. For these Soldiers, Army aviation should reinvigorate the SP5 rank.

Re-create the SP5 Rank

The second recommendation to incrementally improve Army aviation maintenance is to re-create the SP5 rank. The Army already uses similar logic to fill a need: CPLs are promoted from SPCs when a unit experiences a shortage of SGTs to fill a modified tables of organization and equipment (MTOE) *leadership* position. In dispersed LSCO or MDO wars, the Army experiences a dearth of *maintenance* expertise and therefore, requires provisions to allow Soldiers with better maintenance skills to be retained. Specialist 5 positions would replace SGT positions on ASB and aviation maintenance company (AMC) TOEs and MTOEs. For example, an attack reconnaissance battalion's (BN) AMC currently has 20 x SGT positions; this recommendation would change five SGT positions to SP5 positions.

Specialists and CPLs can be designated as a SP5 via Department of the Army Form 4187, "Personnel Action," approved by the BN commander and forwarded to Human Resources Command (Department of the Army, 2014). Specialist 5 positions are managed by the BN command sergeant major. Specialist 5 promotions to SGT still require successful completion of a SGT's promotion board. Both manpower efforts will reduce turnover, save costs on training new maintainers, and provide continuity of maintenance expertise within Army aviation formations. The tradeoff between SP5 positions and SGT positions will decrease formal leadership within Army aviation units; however, it will increase informal leadership due to the SP5's mechanical expertise. As Army Doctrine Publication 6-22, "Army Leadership and the Profession," notes: "informal leadership is not exercised based on rank or position in the organization. It stems from personal initiative, special knowledge, unique experiences, or technical expertise specific to an individual or a team" (Department of the Army, 2019, p. 1-18). Less formal leaders will require aviation units to reorganize their leadership chain at the team, squad, and platoon level but will not require changes to company-level leadership. Additionally, fewer formal leaders in an organization increases the positional authority of those remaining in leadership roles.

Interactive Technical Manual Improvements

The third recommendation to incrementally improve Army aviation maintenance is to enhance the current IETM to better interface with younger Soldiers and new trainees. The current IETM includes detailed written descriptions and some pictorial representations, which are effective at presenting the material in a written form but do not cater to individuals with different learning styles. It should include videos, verbal descriptions of tasks, and extended explanations of maintenance techniques to provide descriptions to conduct any task without communications with an FSR, LAR, or other SME.

The U.S. Army's Training and Doctrine Command seeks to immerse Soldiers in a "learner-centric" environment. The Army Learning Concept (ALC) notes that "technology must be mastered to contribute to readiness. Technological advances

Pay Grade	Rank	Current RCP	Proposed RCP
E4	SPC, CPL	8 Years	10 Years
E4 (P)	SPC (P), CPL (P)	10 Years	12 Years
E5 and E5 (P)	SGT, SGT (P), SP5	14 Years	16 Years

Figure 1. Proposed retention control point modifications for Army aviation (Gomber, 2022).

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must complement and augment Soldier abilities, decrease their cognitive burden, increase trainability and enhance—not inhibit or distract—teams to win…" (TRADOC, 2017, p. 23). Additional multimedia supports the ALC by satisfying all requirements noted in the preceding sentence. Multimedia on IETMs will also improve error management by providing maintainers the ability to see and hear task completion, while still retaining the ability to read the task description. For example, the bolt and nuts illustration in Figure 2 depicts the differences between assembly and disassembly. If a task requires the bolts to be disassembled, there is only one way to complete the task. If another task requires the bolts to be assembled in order, there are over 40,000 ways to reassemble the nuts on the bolt in the wrong order (Reason & Maddox, 1995).

Figure 2. The bolts and nuts example (Reason & Maddox, 1995, Figure 14-4).

The Army aviation enterprise should record task execution in multimedia format and upload the multimedia to IETMs currently at units. The Army may need to acquire new audio- and video-recording equipment to ensure multimedia productions are of a professional quality. The risk of not implementing the MDA is a "Risk of not developing competent forces," (TRADOC, 2017, p. 42) because "experience produces competence, but experience alone will not ensure success" (TRADOC, 2017, p. 42). Army aviation must increase experience while improving ways to accommodate all learning styles. If Army aviation is able to incorporate multimedia expanded explanations in IETMs, readiness and expertise will be increased for Army aviation units.

Multimedia descriptions uploaded onto IETMs are force multipliers, but the current configuration will remain the baseline standard. As a result, units could choose to add these multimedia products onto the IETMs. If a unit chose to utilize the additional multimedia, new task and troubleshooting descriptions on IETMs will require changes in training and standardization because all maintenance actions must be performed in accordance with approved procedures. As with all official documentation and descriptions, it is critical for Army aviation to ensure currency and standardization of materials on IETMs. These tasks will be inspected by the quality control section as the BN's publication managers. Notification of changes can be administered via aviation maintenance action messages by the appropriate aircraft's maintenance proponent.

1st Air Cavalry Brigade, 1st Cavalry Division Soldiers conduct maintenance operations checks on UH-60 Black Hawks at the Port of Vlissingen, Netherlands, Nov. 27, 2021. U.S. Army photo by CPT Taylor Criswell

Conclusion

The Army aviation enterprise must reduce its dependence on contract maintenance support. Additionally, the Army aviation enterprise can increase its resident maintenance expertise and reduce reliance on contract maintenance by implementing these changes. Increasing RCPs and adding an SP5 rank enable Army aviation to retain resident skilled maintenance expertise within formations. Improvements to the IETM create a multimedia solution that aids a maintainer's ability to complete reassembly tasks, troubleshoot difficult maintenance faults, and conduct proper inspections without heavy reliance on FSRs, LARs, or outside contract maintenance support. The combination of these three solutions provides Army aviation low-cost improvements to Army aviation maintenance.

Biography:

CPT John Gomber is currently CGSOC, Fort Leavenworth, Kansas. He served as a PL in 1-101 ARB and deployed to Afghanistan for OPERATION FREEDOM'S SENTINEL. After graduating the AVCCC, he Commanded A/1-227 ARB and deployed to Europe for OPERATION ATLANTIC RESOLVE. He is qualified in the AH-64D and E.

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U.S. Army Soldiers assigned to 2-158th Assault Helicopter Battalion, 16th Combat Aviation Brigade, assisted 17th Field Artillery Brigade during battalion sling-load external evaluations (EXEVALS) on Joint Base Lewis-McChord, November 15, 2019. Field artillery units conduct EXEVALS in order to assess the organization on their mission essential tasks and drills. The Soldiers used inactive, lightweight HIMARS rocket pods to conduct the evaluation. U.S. Army photo by SGT Adeline Witherspoon, 16th Combat Aviation Brigade

Letter to the Editor

Aviation Evaluations Should Reflect Crew-Integrated Evaluations

In April, 2020, the Directorate of Evaluations and Standardization (DES) released standard communication (STACOM) Message 20-01, "Response to Emergencies Implementation Guidance."[1] The DES and the United States Army Combat Readiness Center (CRC) have put many man-hours into this issue and, in Special Edition Number 2 of Flightfax, stated "as our aircraft have evolved to become more capable and sophisticated, our approach to training flight crews must evolve as well" (Flightfax, 2020).[2] This brings me to my point: Why are we still conducting 'single-pilot' check rides?

Back when the Army was flying Bell products, those aircraft were single-pilot certificated and many of us flew them with a crew chief in the other seat. But now, all Army advanced aircraft, both rotary wing and fixed wing, are dual-pilot aircraft. And yet, we are still conducting 'single-pilot' check rides. Every check ride I've taken, when given an emergency procedure, I am the Pilot Flying (P*), and it has gone something like this: (emergency procedure [EP] initiated) I fly the aircraft, I announce the emergency, I fly the aircraft, I ask for confirmation, I fly the aircraft, I remember the EP, I fly the aircraft, I tell the other pilot the steps to follow, I fly the aircraft, I watch the other pilot perform the step-by-step procedure, I fly the aircraft, I look for a landing area, I fly the aircraft, I talk on the radio, I fly the aircraft, I ensure the EP is complete, I fly the aircraft, I set up for landing, I fly the aircraft, I land the aircraft, I shut down the aircraft, and we evacuate the aircraft. You see the error?

This style of evaluation goes against the Aircrew Coordination Training (ACT) standards taught by DES. While we train our aviators and crew chiefs in ACT, we don't evaluate it to the standard taught. The pilots don't talk out the problem. There is very little "Ask Assistance, Seek Assistance," etc., because the instructor pilot is trying to evaluate the other pilot on his/her knowledge and skill. While the pilot being evaluated may perform pilot duties and ACT to standard during the evaluation, there is one crew member position that never gets his/her duties evaluated during an EP: the Pilot Not Flying (P). The P very, very seldom has his/her skills evaluated during an EP. Aircrew Coordination Training procedures are not evaluated. Nothing is.

We are reinforcing negative habit transfer between both crew members by our evaluation methodology. Some units may scratch this area during simulator training periods—and if they do—that is awesome; however, I suspect that most units do not. And Army fixed-wing pilots only attend simulator training once every 18 months. Does this negative habit transfer propagate the transfer of controls from pilot (PI) to pilot-in-command (PC) so often read about in *Flightfax* and other post-incident reports? Why

[1]More information regarding this STACOM is available on the DES Sharepoint site and requires a valid common access card.

[2]More information on the Emergency Response Methodology is available in the April-June 2020 and October-December 2020 issues of *Aviation Digest* at https://home.army.mil/rucker/index.php/aviationdigest

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does the PC think he must take the controls from the PI? Is the aircraft out of control, or have we beaten into the PC's head he must be on the controls by continuing evaluations using a "single-pilot" evaluation method? I would think that at the very initial stage of an aircraft emergency, transferring controls is the last thing the crew should do. When this is done, now the PC is also diagnosing, talking, and his attention is focused too much on the problem. Meanwhile, the PI is left with nothing to do but stare at the instruments and try to help the PC.

So the question becomes, "Who is flying the aircraft?" Shouldn't the P* at the time of the emergency remain on the controls being able to hold heading, altitude, aircraft control, and talk on the radio while the P works the problem? I foresee "our approach to training flight crews" evolving to where more evaluations are conducted in the simulator to more exactly simulate an emergency or abnormal situation. I say abnormal, because an EP does not need to be present to cause an aircrew to make mistakes and cause an incident. Yes, sitting in a simulator, being thrown various and continuous "curve balls" will be a huge pain, but to overcome this institutional inertia of negative habit transfer, it will take significant effort and determination by both the DES and CRC communities.

Sincerely,

DAC Sharm Kuch
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Aviation Safety Officer
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Reference:
Flightfax. (2020). *Introduction of the emergency response methodology.* U.S. Army Combat Readiness Center. https://safety.army.mil/ON-DUTY/Aviation/Flightfax

Reprint article

This reprinted article was originally published in the Center for Army Lessons Learned (CALL) 4th quarter, FY21 newsletter and is used with permission from CALL

"Army 21: Brigade Combat Teams" gets an upgrade; corps and division operations in development

Army leaders looking for a way to visualize and understand doctrine fundamentals at the brigade, division and corps levels of command will soon be able to access "Army 22 How We Fight" (AR22 HWF), an updated product from CALL. AR22 HWF is a web-based, interactive learning tool that uses instructional technologies to organize and animate content from a European large-scale combat operation (LSCO) scenario.

CALL launched a brigade-centric version of this website, called "Army 21 Brigade Combat Teams" (AR21 BCT), in fall 2020. Over the past year, AR21 BCT moved to a more secure, cloud-based platform and is currently available at https://hwf.army.mil (Common Access Card [CAC] required). Concurrently, the development team has been working to release the expanded AR22 HWF in late fall 2021. AR22 HWF builds on the original BCT concept, with the addition of learning objectives at the division and corps levels. These objectives include both organizational and operational aspects that range from unit locations and capabilities to division/corps activities during major events executed during LSCO.

CALL Director COL Scott Mueller sees this enhanced product as an essential tool for developing leaders, especially those at the company and battalion levels. "Today's leaders need to understand doctrinal principles and be able to visualize those concepts on the battlefield," he said. "Professional military education, combat training center rotations and unit-level training events all contribute to an individual's knowledge and skill. AR22 HWF brings together aspects of all these experiences into a widely accessible self-development platform."

Authoritative sources underpin all the information within AR22 HWF, and subject matter experts from across the

Combined Arms Center and the Centers of Excellence (CoEs) are contributing to this effort. The tool uses the Mission Command Training Program-developed European LSCO scenario, and doctrine writers from the Combined Arms Doctrine Directorate write and review content to ensure the end products are foundationally sound.

The scenario provides the user with details on several critical events: deployment; Joint reception, staging, onward movement and integration; shaping operations; wet-gap crossing; forward passage of lines; division attack; and transition to the defense.

The team at CALL is encouraging users to provide feedback on the current BCT platform to improve current products as well as future versions. Currently, the plan is to release an update annually.

"Army 22 How We Fight will adapt to meet the needs of the force," said Mueller. "Future iterations may include more warfighting function-specific information developed by the CoEs. Like any other educational product, it will evolve, improve and grow."

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The Bomber Mafia:

A Dream, A Temptation, and The Longest Night of the Second World War

Author, Malcom Gladwell, 2021, Publisher: Little, Brown, and Company, 210 pages.

A book review by COL Jayson A. Altieri (Ret.)

Malcolm Gladwell's *The Bomber Mafia: A Dream, A Temptation, and The Longest Night of the Second World War* is an attempt to retell one of the most debated topics of the first half of the 20th century–the employment of U.S. airpower, led by Generals like Curtis E. LeMay, against the Empire of Japan in the last days of the Second World War. This book weaves together the stories from the inventor of the Norden Bombsite, the U.S. Army Air Corps and Royal Air Force (RAF) Bomber advocates in the 1930s and 40s, and Harvard University chemists to their ultimate confluence over the contested skies of Tokyo in 1945. In an age of the "Better Man and Better Machine," the development of the Strategic Bomber as a national instrument of power was, and still is, one of the crowning technical achievements of the Second World War.

Airpower historians will find Mr. Gladwell's book, reexamining the U.S. bombing strategy of Japan, an interesting 21st century take on the decisions of Second World War air combat leaders who had experienced firsthand or were a generation removed from the experiences of First World War trench warfare. As a result of those struggles, these air power leaders believed that the brand-new airplane could prevent mass battlefield slaughter by means of precision bombing. The theory was that destroying vital pieces of enemy infrastructure would prevent an opponent from fighting. But to do so required new airplanes and, especially, a bombsite that would allow pinpoint accuracy. Bomber theorists in the late 1930s got what they wanted in the form of aircraft like the B-17, B-24, Lancaster, and Sterling bombers equipped with improved bombsite, only to find out that the reality of warfare meant that the pinpoint bombing accuracy rate was not and would not be possible until the late 20th century. As a result, RAF bomber strategists, and later their U.S. counterparts, switched to area bombing in an attempt to end the war quicker than a conventional land campaign and, ultimately, validate the value of strategic airpower. *The Bomber Mafia* does a good job of telling the story of this transformation through the lenses of military, political, and technical developments of the period.

The Bomber Mafia, however, has a number of historical challenges. First, Mr. Gladwell's critical take on decisions made by General LeMay is one of the most obvious. General LeMay was the commander of U.S. Army Air Forces in the field, so he attracted the most attention. In the end, he was a tool for implementing Brigadier General Lauris Norstad's notions of strategic bombing, though a very gifted tool in terms of constructing the missions flown by the Air Forces. Norstad, serving as the Director of Operations for the 20th Air Force, was ensconced in the newly constructed Pentagon, along with the Commander of the Army Air Forces, General Henry H. "Hap" Arnold, picking the targets for LeMay to attack. When LeMay went down with his fourth heart attack of the war in mid-January 1945, Norstad essentially got a green light from General Arnold to put his ideas in motion—without having to take any credit for them—or the blame.

While we know that Mr. Gladwell interviewed many excellent historians and also cited oral histories of many American and British air leaders, the book is a cherry-picked selection of anecdotes that cites no primary documents. Inaccuracies are abundant, and Mr. Gladwell's portrayal of Air Marshal Sir Arthur T. "Bomber" Harris as a "psychopath" who led the RAF's Bomber Command in Europe, is especially egregious. While true that Harris' implementation of the "Area Bombing" campaign caused a great deal of devastation to cities in Nazi Germany, the concept of taking the war to Germany's industrial cities was the brainchild of Professor Frederick Lindemann, a confidant of Prime Minister, Winston Churchill. Approved by Churchill in 1942, the doctrine of area bombing called for raids against

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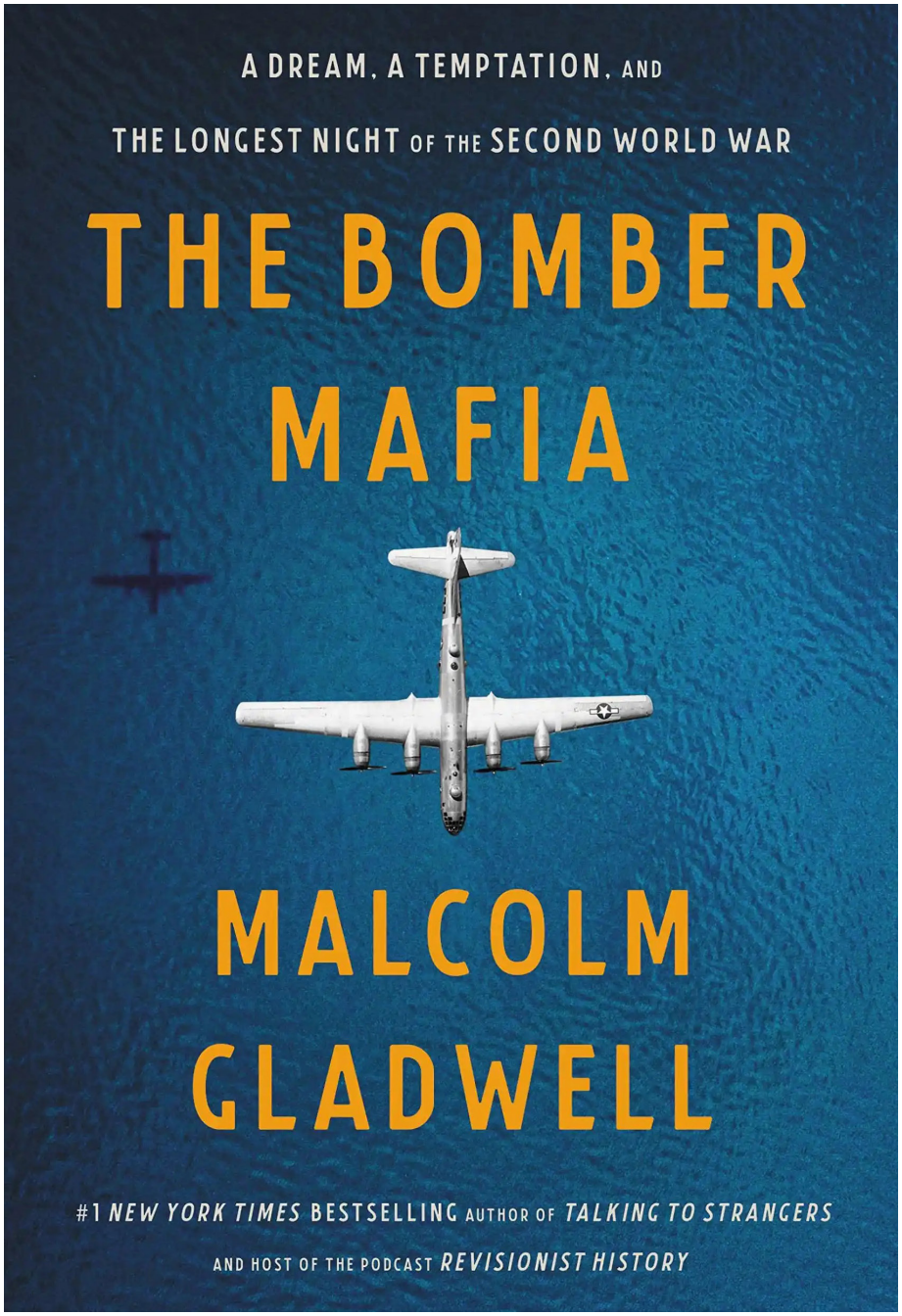
urban areas with the goal of destroying housing and displacing German industrial workers. Though controversial, it was approved by the British War Cabinet, as it provided a way to directly attack Germany. As a result of the aforementioned hyperbolic descriptions of field combat leaders and other historical revisionist assessments of the Second World War allied bombing campaigns in Germany and Japan, Mr. Gladwell's book is not recommended for serious students of air power history.

Malcolm Gladwell is the author of six *New York Times* bestsellers, including *Talking to Strangers, David and Goliath, Outlier, Blink, and The Tipping Point. The Bomber Mafia* began as episodes of his podcast, *Revisionist History*, and the production team behind that show also produced the audiobook edition. Gladwell is cofounder and president of Pushkin Industries, an audiobook and podcast production company. He was born in England, grew up in rural Ontario, and now lives in New York.



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Aviation DIGEST

We hope that *Aviation Digest* provides you with interesting, relevant, and informative material in each issue. If our authors did not take the time to share their thoughts, personal experiences, and advice, *Aviation Digest* would not exist as Army Aviation's Professional Bulletin.

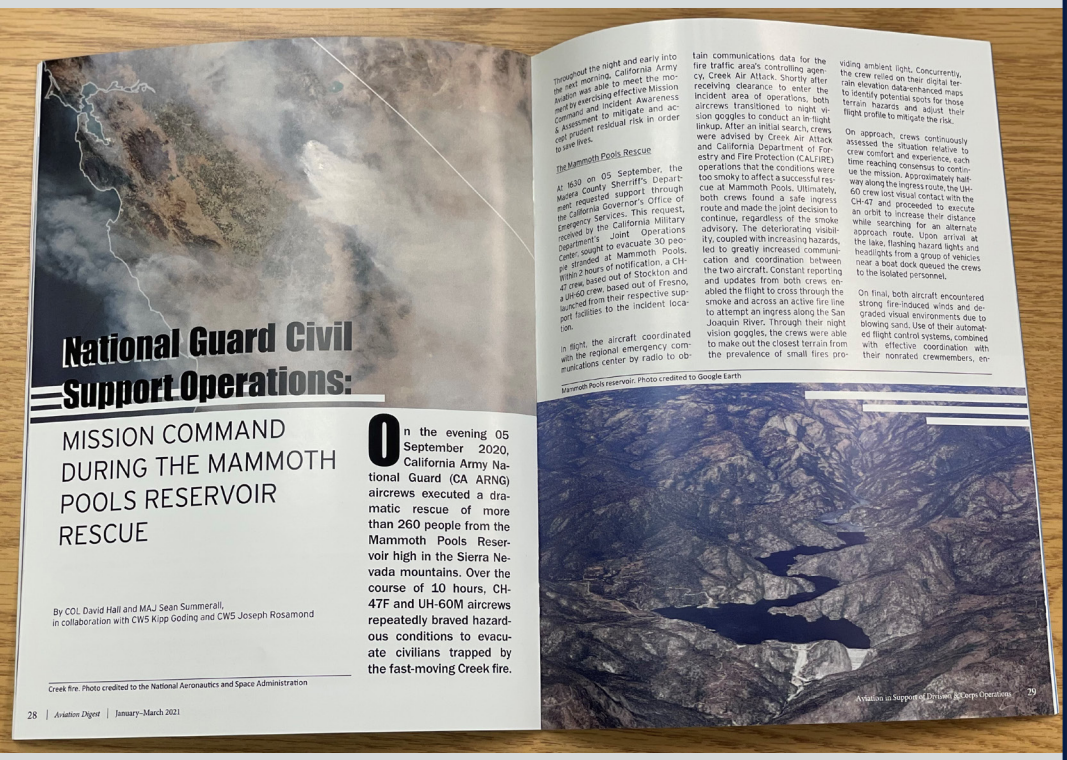
To show appreciation for each *Aviation Digest* contributor sharing his/her professional opinions and ideas with the Army aviation community, MG David J. Francis, Commanding General (CG), United States Army Aviation Center of Excellence, acknowledges each contribution with a Certificate of Appreciation and a printed copy of *Aviation Digest* containing the author's article.

At the end of each year, the *Aviation Digest* Editorial Review Board reviews all articles from the year's four issues and recommends one article to the CG for the *Aviation Digest* Annual Writing Award. The author of the selected article will receive a Certificate of Appreciation designating his/her article as the *Aviation Digest* Article of the Year.

The *Aviation Digest* Annual Writing Award for 2021 is presented to BG David L. Hall, MAJ Sean T. Summerall, CW5 Kipp C. Goding, and CW5 Joseph A. Rosamond for the article "National Guard Civil Support Operations: Mission Command During the Mammoth Pools Reservoir Rescue" (published in the January-March 2021 issue [Vol. 9, Issue 1]).

Congratulations, BG Hall, MAJ Summerall, CW5 Goding, and CW5 Rosamond!

Read their article online in our issue archive at: https://home.army.mil/rucker/index.php/aviationdigest



The *Aviation Digest* Editorial Review Board uses the following criteria to select *Aviation Digest's* Article of the Year.

Does the article have a purpose?

Has the author identifiedanissuewithinthe aviation branch requiring command attention/action to improve existing procedures or operations?

Has the author recommended revised tactics, techniques, and procedures for commonly accepted operational practices that simplify and increase efficiencies?

Has the author presented an article that improves audience knowledge of doctrine or other established operational procedures?

Has the author related an experience that others may benefitfromprofessionallyor that may potentially prevent an aircraft accident?

Does the author present factual and researched information to support the article?

Has the author recommended a realistic solution to remedy or improve those conditions causing a perceived deficiency?

Has the author presented a discussion based on facts and not suppositions, generalizations, or vague innuendos?

Does the author present his/her article as an organized discussion—introduction to the issue, background information, and meaningful presentation of discussion points, summary, and conclusion?

Was the article easy to read and did it follow the discussion points?

Did you understand the author's message?

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A Word From the Tactics Division Chief

A pilot and copilot of an AH-64 Apache helicopter provide aerial support for Soldiers with the 1st Battalion, 6th Infantry Regiment, 2nd Brigade, 1st Armored Division, during a training exercise for Network Integration Evaluation 13.2 at Fort Bliss, Texas, May 2, 2013. The pilots conducted reconnaissance of the area to relay key information to their team to potentially reduce the number of casualties. U.S. Army photo by SGT Betty Y. Boomer

The next *Aviation Digest* topic, "Aviation Training for Large-Scale Combat Operations" (LSCO), can seem a daunting topic. At this point, we all likely have a wave-top understanding of the implications to Army aviation from the Army's wider counterinsurgency to LSCO pivot, kick-started in 2017 with the rebirth of Field Manual (FM) 3-0, "Operations." (A pivot soon to be updated this coming summer with the first major revision of FM 3-0, as well as FM 3-90, "Tactics" this fall). This 30,000-foot view allows us to know just enough to keep up in causal doctrinal conversation; the common phrase, "I know enough to be dangerous," comes to mind. But should a LSCO scenario break out for real, especially if akin to WWI or WWII in scope, what does that really mean for us other than a baptism by fire with a lot of mission execution through experimentation?

We are reprinting the Robert Blanchard *RealClear History* article from 2019 titled, "Sobering Stats: 15,000 U.S. Airmen Killed in Training in World War II," to drive thought for some of the bigger-picture impacts of gearing up for a true LSCO fight in the hopes that our readers will take this and run with it to the betterment of our professional dialogue. Some topics to consider that would greatly impact our branch in training for LSCO employment are:

1: Risk-aversion, especially when it comes to training, has received a lot of attention in recent years as a corrosive to unit morale and critical task proficiency. The philosophy of mission command was formally established (initially in 2012 and refined in 2019, via Army Doctrine Publication 6-0, "Mission Command") in part, to counter zero-tolerance cultures by codifying commander acceptance of "prudent risk"[1] or "risk acceptance."[2] In several years' worth of dialogue with Aviation Captains Career Course cadre, students, and field grade peers, it seems many units still struggle

[1] "Commanders accept prudent risk when making decisions because uncertainty exists in all military operations. **Prudent risk is a deliberate exposure to potential injury or loss when the commander judges the outcome in terms of mission accomplishment as worth the cost.** Opportunities come with risks. The willingness to accept prudent risk is often the key to exposing enemy weaknesses… Commanders focus on creating opportunities rather than simply preventing defeat—even when preventing defeat appears safer," Department of the Army. (2012). *Mission command: Command and control of Army forces* (Army Doctrine Publication 6-0, p. 5, para. 20-21). https://caccapl.blob.core.usgovcloudapi.net/web/repository/doctrine/adp6-0.pdf

[2] The term *"prudent risk" was rescinded in 2019 with the equivalent mission command principle renamed, "Risk Acceptance." "Because risk is part of every operation, it cannot be avoided… When considering how much risk to accept with a course of action, commanders consider risk to the force and risk to the mission against the perceived benefit… The greatest opportunity may come from the course of action with the most risk… While each situation is different, commanders avoid undue caution or commitment of resources to guard against every perceived threat. An unrealistic expectation of avoiding all risk is detrimental to mission accomplishment,"* Department of the Army. (2019). *Mission command: Command and control of Army forces* (Army Doctrine Publication 6-0), pp. 1–13 to 1–14, para.1-66 through 1-68. https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN18314-ADP_6-0-000-WEB-3.pdf

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with this. Is Army aviation prepared to accept the higher accident rate that would come from training for a LSCO fight, whether from changing tactics, learning new technologies/platforms, or both? Do we honestly even accept the increased risk from merely executing the training we've already been talking about for years, such as low-level in the most demanding conditions?

As a comparison to the sobering statistics in the following article, the Army Class A–C manned flight mishap rate has averaged just shy of 7 per 100,000 flight hours over the past decade. Prior to the Gulf War, the Class A rate hovered around 2, spiked to 3.5 for that conflict, and then to less than 3 for Operations Enduring and Iraqi Freedom, before settling on an average of 1 per 100,000 flight hours over the past decade. However, in looking at the article's statistics of number of accidents, aircraft wrecked, and fatalities for 1941 and 1944, the past decade has had comparable percentages of "wrecks" to accidents and number of fatalities per accident.[3]

[3] The following statistics, provided as of 19 January 2022 from the Combat Readiness Center, Fort Rucker, Alabama, use Class A-C flight mishaps to compare to the article's "number of accidents," Class A flight mishaps for "aircraft wrecked," and assume the 1940's numbers do not reflect any ground mishaps. Over the past 10 years (2012-2021), an average of 15.71% of in-flight accidents were Class A, with spikes of 24.19% in 2014 and 20.00% in 2019. Per the following article, the 1941 rate was 17.48%, jumping to 25.8% in 1944. Over the past decade, we averaged .13 fatalities per accident, with spikes of .18 in 2015 and .23 in 2021, with 2016, 2017, and 2020 matching 1941's rate of .15. The cited 1944 rate jumped to .27 as our wartime participation led to greatly increased training and ferrying flight requirements.

2: Army aircraft are exponentially **more advanced** than they were in WWII, and though we can argue that the similar increase in survivability counteracts the cost and complexity that mass production would entail (by not needing to produce so many), the threat is also now exponentially more advanced and able to mitigate our technological gains. Thus, industry will need to rise to the challenge of rapidly producing vastly more complex combat platforms to replace expected high losses in theater. How quickly could industry pivot to such production (and at what expense to a civil society increasingly insulated from any day-to-day impacts of military operations)? How much could we rely on modern quality control processes to ensure we don't face the same mechanical safety issues from WWII-era production? Would our Nation be willing and able to afford it if industry could rise to the challenge?

3: Considering the incredible complexity of modern combat aircraft, how quickly would we be able to turn civilians or ground Soldiers into **pilots ready to deploy to combat** as replacements? Even with the benefit of years of on-the-job/unit training and multiple iterations of professional military education, I think most of us would feel ill-prepared for a real world LSCO-paced deployment. And despite the increasingly integrated autopilot capabilities of advanced airframes, pilot workload doesn't decrease-it just shifts to more mission-focused systems instead of traditional "stick and rudder" skills.

We look forward to hearing thoughts from the field on these and many more deep questions that arise when thinking of the holistic challenges the Army, and especially the aviation branch, will need to overcome to fully train for a LSCO fight, whether preemptively or as a crisis response.

JULIE A. MACKNYGHT
LTC, AV
Tactics Division Chief
USAACE Directorate of Training and Doctrine

The Air Education and Training Command Commander joins 23rd Flying Training Squadron instructors in a TH-1H Huey orientation flight at Fort Rucker, Alabama, 11 January 2022. U.S. Army photo by Jim Hughes

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This article is reprinted with the express permission of its author and publisher. It was originally published by *RealClear History* on February 12, 2019

Sobering Stats: 15,000 U.S. Airmen Killed in Training in WW II

By Robert Blanchard

February 12, 2019

World War II was immense. So many numbers boggle the mind. Every day from Sept. 1, 1939-Aug. 14, 1945, 27,000 people were killed. That's nine 9/11s every day for six years. Nearly 14 million Americans served during the war, the U.S. manufactured 300,000 airplanes. Even narrowing the focus, the numbers still amaze.

Three of every four German submariners died. The Soviets killed more of their own soldiers than total U.S. combat deaths. Even those who have studied the war for years cannot help but be stunned by such figures and many, many more.

But even more than 70 years on, there are still relatively unexplored areas of the war whose numbers are also quite astonishing. So it is with the number of Americans killed during aircrew training. The number of pilots and crew that died in training accidents in the U.S. during the war is 10 times the number of American deaths on D-Day. The heroism of those that stormed the Normandy beaches has been celebrated in countless books and movies.

Yet the fact that 15,000 young men died in aircrew training in the U.S. is virtually unknown. Aviation was still in its infancy during the 1930s. Only a tiny fraction of Americans had ever been on a plane. Even civil aviation was far from safe, military aviation even less so. In 1930, the accident rate for military aviation was 144 accidents per 100,000 flying hours. By 1940, the rate had been reduced to 51 accidents per 100,000 hours, a reduction of more than two thirds. But even this improved rate would be considered intolerably unsafe today.

As war loomed, the U.S. dramatically ramped up aircraft production and aircrew training. Many new aircraft designs were rushed into production. Even though there were dozens of aircraft manufacturers in the U.S., to meet the numbers demanded by the military, only large scale producers could hope to get contracts. So companies such as GM and Packard that had never produced planes or aircraft engines before were given huge contracts because they had the manufacturing capacity. The resulting retooling and production achievements were indeed impressive, but came at a cost. Many planes were put into use without proper testing, and in many cases even when design flaws were known, there was no time to investigate and take corrective action. Engine failures and on-board fires were common.

The crews knew what they were dealing with. The B-24 bomber was nicknamed the "flying coffin" due to its many problems. Not surprisingly, more trainees died in B-24s than any other plane. But the war took precedence over safety. The planes continued to fly. With the massive increase in aircraft production came a commensurate increase in aircrew training. From mid 1939-August 1945, the U.S. trained hundreds of thousands of new pilots. In 1939, fewer than 1,000 pilots graduated basic flight training, and in 1943 that figure had grown to 165,000. Over the course of the war 200,000 trainees flunked out or died in training accidents.

The huge increase in pilot training numbers (including many who just didn't have what it took), coupled with the operation of tens of thousands of complex aircraft that had been hurriedly designed and produced, spelled disaster. A comparison of two years tells the story:

Year	Number of Accidents	Aircraft Wrecked	Fatalities
1941	1304	228	199
1944	20,883	5,387	5,616

And this was just in the continental U.S. There were many thousands more wrecks and deaths overseas. Looking at totals for the entire war is even more sobering. The U.S. suffered 52,173 aircrew combat losses. But another 25,844 died in accidents. More than half of these died in the continental U.S. The U.S. lost 65,164 planes during the war, but only 22,948 in combat. There were 21,583 lost due to accidents in the U.S., and another 20,633 lost in accidents overseas.

Many more planes were lost due to pilot error or mechanical failure than were shot down by the enemy. More than 1,000 were lost while being delivered to their duty stations from the U.S. So the danger of non-combat flying did not end with the conclusion of training. The planes continued to be unreliable, and to make things worse, once overseas, many green pilots were given the controls of planes in which they had little to no flying experience.

As the figures show, non-combat flying continued to be extremely hazardous whether in training in the U.S. or after arrival overseas. The courage displayed by aircrews in combat over Germany and Japan, and the losses they sustained, is one of the most memorable stories of World War II. But it should not be forgotten that nearly 15,000 young men died in training accidents without ever leaving the United States. Although they never faced flak or Messerschmitts, their sacrifice was as real and memorable as those shot down over Germany.

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Look for the April-June 2022 Issue:

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Aviation Training for Large-Scale Combat Operations

... and More

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Focus Topic: Airspace Integration and LSCO
July-September 2022

(published on or about August 15, 2022)

Focus Topic: Leadership and Leader Development
October-December 2022

(published on or about November 15, 2022)

Along with articles corresponding to the listed focus topics, the *Digest* is always receptive to letters to the editor, leadership articles, professional book reviews, anything dealing with the aviation 7-core competencies, training center rotation preparation, and other aviation-related articles.

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