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AVIATION AND EXPEDITIONARY OPERATIONS

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UNITED STATES ARMY Aviation DIGEST
The Professional Bulletin of the Army Aviation Branch, Headquarters, Department of the Army, PB 1-20-1
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The Doctrine 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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About the Cover:

U.S. Army Reserve Soldiers representing various units fly in a UH-60 Black Hawk helicopter from the 54th Battalion, 159th Aviation Regiment, 244th Expeditionary Combat Aviation Brigade, during the helocast event at the 2019 U.S. Army Reserve Best Warrior Competition at Fort Bragg, North Carolina, June 27, 2019. U.S. Army Reserve photo by SGT Erin Hodge/Released

The Command Corner

The Next Fight

"That men do not learn very much from the lessons of history is the most important of all the lessons that history has to teach."

–Aldous Huxley

Recent history in places like Crimea and the Donbas have provided us with critical insight as to what a near-peer conflict might look like. The tactics and strategies employed in these conflicts look remarkably similar to those we faced when Air Land Battle was our doctrine, except for the application of more lethal and modern technology combined with an expanded use of non-conventional forces.

So what does that mean for Army aviation? With dispersed battlefields necessary for survival, gone are the days when aviation battalions and brigades will be able to congregate on a fixed air field producing an easily located and targetable signature.

This, in turn, will drive changes to how we conduct command and control, mission planning, rehearsals, maintenance, logistics, and many other facets of operations.

An additional aspect is that most of our forces are CONUS-based, which drives us to be an expeditionary Army that must deploy task-organized forces on short notice to austere locations with the capability of conducting operations immediately upon arrival.

While these are all challenging issues, they are not insurmountable. I highly encourage you to use this forum, Aviation Digest, as the place to broach ideas and have professional discussions on how to address these topics.

Above the Best!

David J. Francis
Major General, USA
Commanding

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U.S. Army photo by CPT Roxana Thompson

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Army Aviation's Crew Endurance

By CW3 Emilio Natalio

Employment within the aviation industry can be an exciting venture. The freedom of flight allows an aviator to experience new places and cultures. The freedom of flight also has its pitfalls. Civil and military aviation is regulated by policies and procedures. An Army aviator must adhere to all Federal Aviation Administration (FAA) regulations, in addition to all military aviation regulations. Army Regulation (AR) 95-1 sets the minimum guideline to operate as an Army aviator. This regulation mandates the minimum weather an Army aircraft may fly in, what survival equipment an aviator must wear, and stipulates that commanders must have a crew endurance or fighter management program. Army Regulation (AR) 95-1, "Flight Regulations" states, "Commanders will design a crew endurance program tailored to their unit mission and include it in their standard operating procedures (see DA PAM 385-90) (Department of the Army [DA], 2018, p. 20). Cross-referencing DA Pamphlet 385-90, "Army Aviation Accident Prevention Program," one will find the following statement to commanders: "Ensure [flight] fatigue is controlled or eliminated as a risk factor in all operations" (DA, 2007, p. 14). It further refers the reader to review AR 40-8, "Temporary Flight Restrictions Due to Exogenous Factors Affecting Aircrew Efficiency" (DA, 2019). This regulation does not dive into any crew endurance requirements. There is a gap that should be filled that would allow commanders to maximize their aviators' performance in order to accomplish the mission safely. Each aviation unit creates and interprets crew endurance differently (Natalio & King, 2016).

U.S. Army Sergeants Steve Skramstad (left), John Cerda (middle left), Roger Smith (middle right), and Anthony DiSalle (right), all UH-60 Black Hawk helicopter crew chiefs, stand in front of one of their airframes at the High Altitude Army National Guard Aviation Training Site (HAATS), Gypsum, Colorado, April 17, 2019. HAATS trains between 300-400 students a year about power management on various airframes. U.S. Army National Guard photo by SPC Michael Hunnisett

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With today's battlefield and garrison requirements, it is imperative to understand and implement a crew endurance program. Understanding the difference between acute and chronic fatigue or the importance of one's circadian rhythm is vital in developing a fighting force. A person's circadian rhythm is a day-oriented "body clock." This clock regulates multiple facets of the body. It synchronizes the specific release of hormones, controls levels of alertness, and monitors the core body temperature. With a majority of operations conducted between the hours of darkness, leaders must understand the risk associated with shifting an aircrew's circadian rhythm (Blackwell et al., 2015).

Research has shown a direct correlation between aviator fatigue and the aviator's level of alertness. One study surveyed 63 rotary-wing aviators. The aviators were given a demographics and sleep history questionnaire (Sharp Community Medical Group, 2012) and provided with an ActiGraph watch. The ActiGraph is a wrist-worn sensor that can estimate a person's sleep quantity and quality. The testing used Fatigue Avoidance Scheduling Tool software, in conjunction with a standardized neurocognitive functioning assessment tool named SynWin (Synthetic Work for Windows). SynWin consists of four screens with separate tests. The first screen required each aviator to memorize six random letters. After a 5-second delay, the aviator must confirm or deny if the letter presented was one of the original six. The second screen has a simulated fuel gauge displayed. The aviator must not allow the needle of the gauge to drop within the red zone by clicking on the fuel gauge. On the third screen, the aviator must complete a math problem and click the "Done" button. The final screen plays an intermittent aural tone while other boxes are negotiated. An "ALERT" button must be clicked after the aviator hears a tone higher than the normal established one. The posttest data suggest that there are a high-risk subgroup of aviators with multiple sleep problems (Rabinowitz, Breitbach, & Warner, 2009).

Another study conducted by the U.S. Army Aeromedical Research Laboratory (USAARL), Fort Rucker, Alabama, surveyed 157 Army aviators and support staff. The 157 personnel were stationed at Fort Campbell, Kentucky; Fort Rucker, Alabama; and Fort Benning, Georgia. This allowed a mixture of aggressive "go to war" mission of units with the training and support missions of garrison units. The 157 personnel were given a one-page questionnaire to complete. The survey revealed that 97.6% of the respondents had experienced working a night shift or reverse cycle in the past 6 months (Caldwell & Gilreath, 2001).

This article addresses the positive impacts a standardized crew endurance program would have on leaders and aviators. Additionally, organizational commitment is discussed in regard to its relevance with an aviator and crew endurance.

EFFECTIVE TEAM LEADERSHIP

The U.S. Army Combat Readiness Center (CRC), Fort Rucker, Alabama, must lead the charge in creating a standard crew endurance program. The CRC has published a leader's guide on crew endurance. This guide could be the foundation in which a standard crew endurance program is built upon (Blackwell, et al., 2015). The CRC will have to survey the

CSM Terry D. Burton, senior enlisted adviser for the U.S. Army Combat Readiness Center, shows recent incident statistics involving Soldiers and civilians during a leader professional development session with noncommissioned officers of the 101st Airborne Division Sustainment Brigade, 101st Abn. Div. (Air Assault), at the Kinnard Mission Training Complex, Fort Campbell, Kentucky, Aug. 18, 2016. U.S. Army photo by SSG Kimberly Lessmeister/101st Airborne Division Sustainment Brigade Public Affairs

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aviation community to understand the need for a crew endurance program. The CRC is the custodian of all historical accident data for the U.S. Army. With this information, the CRC could aid in the building of a high-performance team. The aviation community and commanders would have the knowledge to be successful in a non-combat and combat situation (Warrick, 2014).

CAPABLE AND COMMITTED TEAM MEMBERS

The employment of the CRC is just the start. The commitment of leaders throughout the aviation community is a must. Warrick (2014) points out how the capabilities and attitudes of individual team members can handicap the entire team. The CRC will need to determine how to employ the different skill sets at their disposal. Army aviation is comprised of many specialties. Tapping into the knowledge and experience of the aviation safety officers and instructor pilots, the CRC would be able to develop a comprehensive crew endurance program.

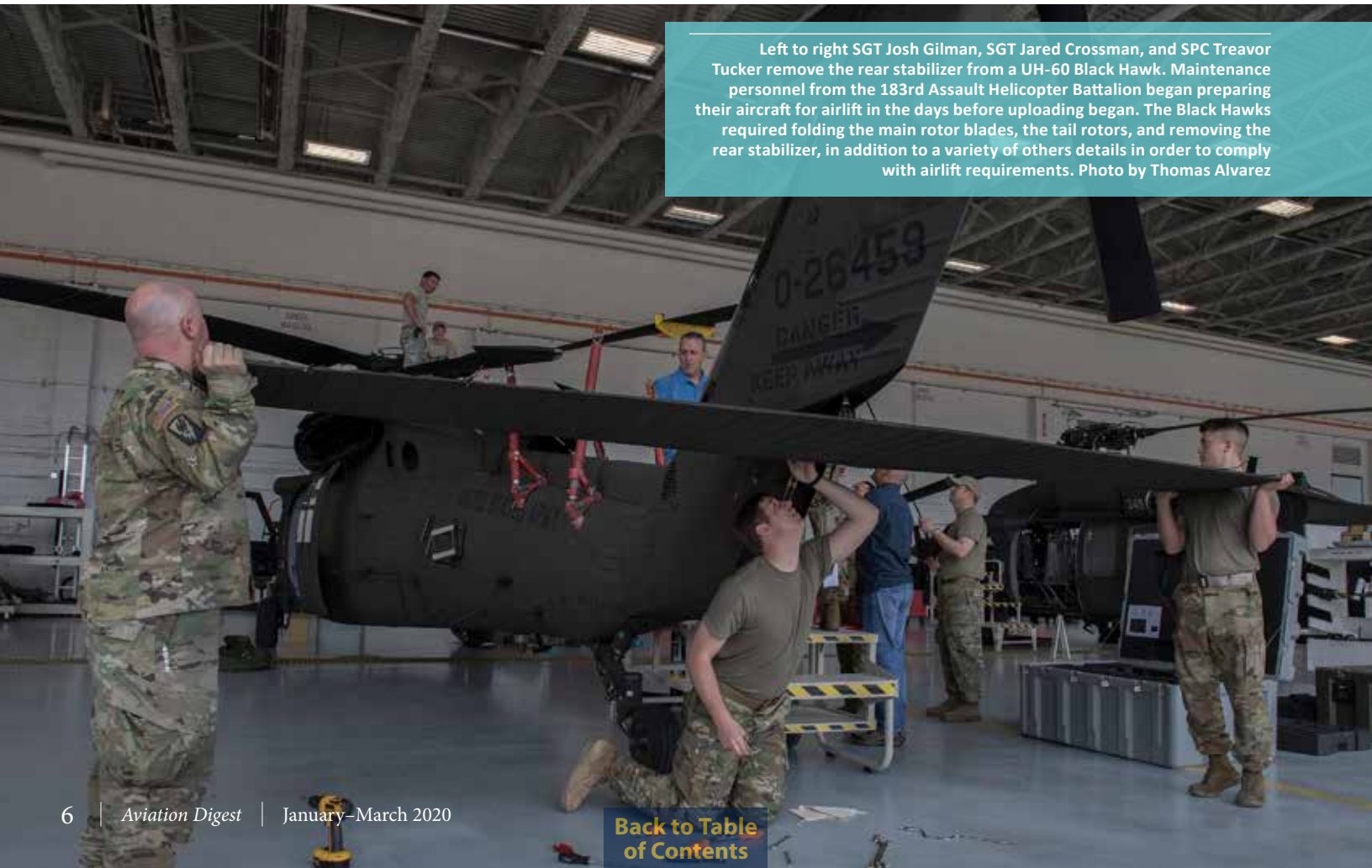
TEAM NORMS THAT CREATE A CLIMATE FOR EXCELLENCE

Establishing a standardized crew endurance program would create a cultural norm within the aviation community. Currently, when an aviator moves from one post to another, the aviator must learn the local policy on crew endurance.

STRUCTURING THE TEAMS FOR RESULTS

Each aviator understands the mission of an Army aviator. The mission statement and vision of each organization is normally along the lines of "provide aviation assets to worldwide at a moment's notice." No aviator wants to purposely negate their organization's mission or vision. Aviators adopt the mission statement as their own mission statement. The 'buy-in" is there (Marimon, Mas-Machua, & Rey, 2016). This is considered a positive in most organizations, but in Army aviation when the missions are complex and dynamic it may result in death.

Leaders can engage within their organizations. It is mandated through AR that a safety and standardization council is held quarterly (DA, 2007). The commander will schedule this quarterly meeting through their aviation safety officer (ASO). The ASO will need to ensure the required personnel are present, and the venue is conducive to the audience. Advanced notice of the safety and standardization council will allow participating personnel ample time to prepare. Crew endurance should be a topic included in the safety and standardization council.



Left to right SGT Josh Gilman, SGT Jared Crossman, and SPC Treavor Tucker remove the rear stabilizer from a UH-60 Black Hawk. Maintenance personnel from the 183rd Assault Helicopter Battalion began preparing their aircraft for airlift in the days before uploading began. The Black Hawks required folding the main rotor blades, the tail rotors, and removing the rear stabilizer, in addition to a variety of others details in order to comply with airlift requirements. Photo by Thomas Alvarez

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During post safety and standardization counsel, the meeting minutes are disseminated throughout the unit (Fransico, 2007).

AN ORGANIZED WAY TO MANAGE AND IMPROVE TEAM PROCESSES

Army aviation's world revolves around regulations and checklists. This has allowed Army aviation to be the most lethal rotary-wing asset on the globe. Teams that have a standard method to receive and transmit information tend to have less opportunities for misunderstandings (McAlister, 2006). Standardized crew endurance programs would allow commanders at all levels to communicate their capabilities and their limiting factors effectively.

AN ORGANIZED WAY TO MANAGE AND IMPROVE TEAM RESULTS

Utilizing the historical demographic and sleep history questionnaire as the baseline, the CRC could initiate subsequent studies. The studies could be divided into combat or garrison environments. The data collected would be applied to customize the crew endurance program. The frequency of the updates would be dependent on the results of the study or by location.

ORGANIZATIONAL COMMITMENT

Effective Commitment
According to Rusu (2013) an "employee's emotional attachment to the organization, identification with and involvement in this," is an affective commitment.

Continuance Commitment
This category of commitment is described by Rusu (2013) as the "recognition of costs associated with the departure from the organization."

Normative Commitment
Normative commitment is associated with the employee's sense of obligation to the organization. People will remain with an organization out of moral obligation (Meyer & Allen, 1991).

Army Aviators' Commitment
Understanding the level or category of commitment each aviator exudes will enable a properly structured crew endurance program. Some aviators personify affective commitment. These aviators are emotionally attached to the Army and the mission. These aviators are also second- or third-generation Army aviators. This familial tie to Army

Aviation maintainers of Task Force 127 inspect and repair parts of a CH-47 in Afghanistan ensuring the unit's aircraft are operational, safe, and ready to fly. Photo by U.S. Army CPT Roxana Thompson

aviation drives them to complete the mission. Another group of aviators can be placed into the continuance commitment category. These aviators remain in the Army solely for the benefits and the potential for retirement. The remaining aviators are placed in the normative category. These aviators look at themselves in the mirror before a mission and think "if not me, then who?" Regardless of the level of commitment of an aviator, the mission will be accomplished. Without a proper crew endurance program, an aviator may operate an aircraft fatigued due to their level of commitment.

CONCLUSION

The lack of a standardized crew endurance program is the issue. Multiple independent studies have proven the correlation between fatigue and aviator performance. Analyzing the data provided from historical studies could be the baseline for the improved crew endurance program. Future studies could be performed to help tailor a more comprehensive crew endurance program. The CRC should spearhead the standardization of the program through the historical accident data. A standardized program would allow aviation commanders the ability to crew mix properly to enhance their organization's combat capabilities. An aviator's organizational commitment level will not allow them to fail the mission. The CRC should not fail the aviator by not standardizing the crew endurance program.

References:

Blackwell, N. J., Caldwell, J., Caldwell, L., Leduc, P., Noback, R., Persson, J., . . . Lai, M. (2015). *Leader's guide to soldier and crew endurance*. Retrieved from the U.S. Army Combat Readiness Center: https://safety.army.mil/Portals/0/Documents/REPORTINGANDINVESTIGATION/TOOLS/Standard/LEADERS_GUIDE_TO_SOLDIER-CREW_ENDURANCE_15JAN2015.pdf

Caldwell, J. L., & Gilreath, S. R. (2001). Work and sleep hours of U.S. Army aviation personnel working reverse cycle. *Military Medicine, 166*(2), 159–66. doi: 10.1093/milmed/166.2.159

Department of the Army. (2007). *Army aviation accident prevention program* (Department of the Army Pamphlet 385-90, p. 14). Washington DC: Headquarters, Department of the Army.

Department of the Army. (2019). *Temporary flying restrictions due to exogenous factors affecting aircrew efficiency* (Army Regulation 40-8). Washington DC: Headquarters, Department of the Army.

Department of the Army. (2018). *Flight regulations* (Army Regulation 95-1, p. 20). Washington DC: Headquarters, Department of the Army.

Fransico, J. M. (2007). How to create and facilitate meetings that matter. *Information Management Journal, 41*(6), 54–56, 58.

Marimon, F., Mas-Machua, M., & Rey, C. (2016). Assessing the internalization of the mission. *Industrial Management & Data Systems, 116*(1), 170–187.

McAlister, D. T. (2006). The project managment plan: improving team process and performance. *Marketing Education Review, 16*(1), 97–103.

Meyer, J. P., & Allen, N. J. (1991). A three-component conceptualization of organizational commitment. *Human Resource Management Review, 1*(1), 61–89.

Natalio, E. B., & King, J. N. (2016, October). Army aviation safety standardization. *Aviation Digest, 4*(4), 48–49.

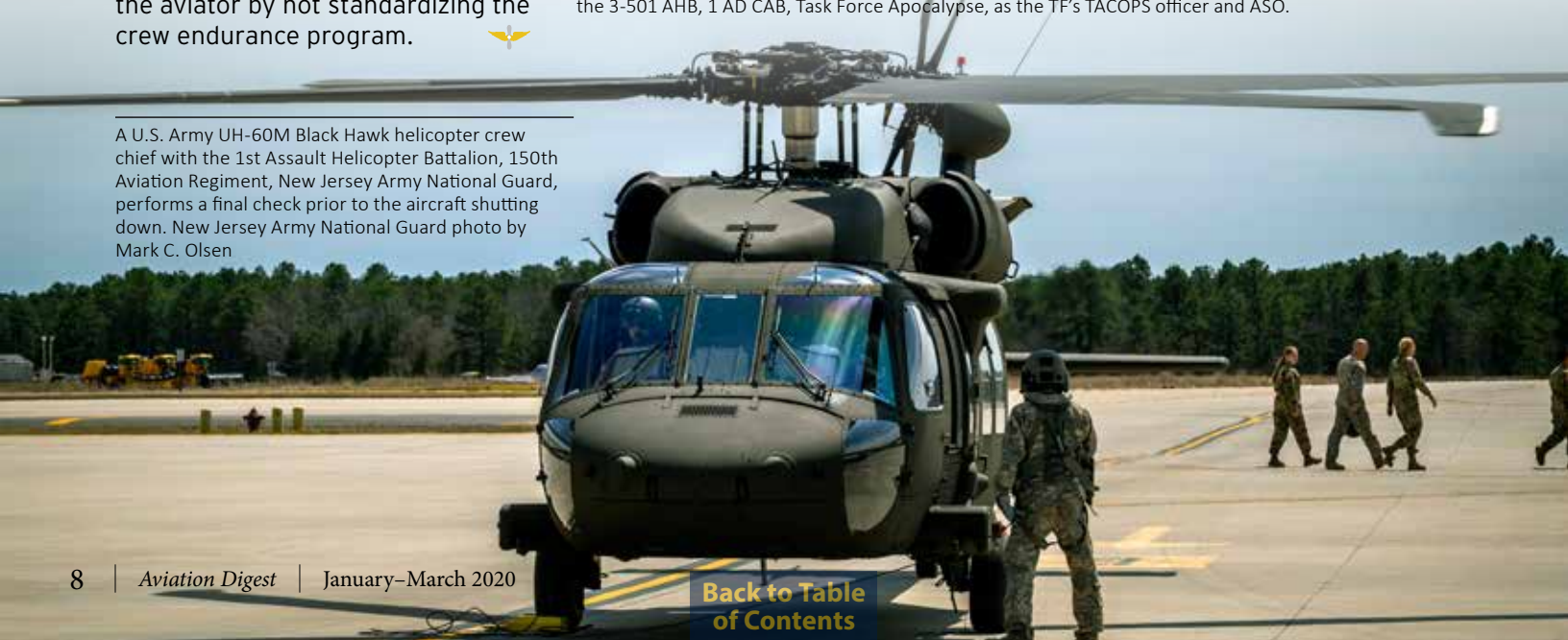
Rabinowitz, Y. G., Breitbach, J. E., & Warner, C. H. (2009). Managing aviator fatigue in a deployed environment: the relationship between fatigue and neurocognitive functioning. *Military Medicine, 174*(4), 358–62. doi: 10.7205/MILMED-D-01-5008

Rusu, R. (2013). Affective organizational commitment, continuance organizational commitment or normative organizational commitment? *Revista Academiei Fortelor Terestre, 18*(2), 192–197.

Sharp Community Medical Group. (2012). *Sleep history questionnaire*. Retrieved from ehr.wrshealth.com: https://ehr.wrshealth.com/live/shared/practice-documents/2037725/pf_1122_SleepStudy%20Attachment%20A.pdf

Warrick, D. D. (2014). What leaders can learn about teamwork and developing high performance teams from organization development practitioners. *OD Practitioner, 46*(3), 68–75. Retrieved from https://c.ymcdn.com/sites/odnetwork.site-ym.com/resource/resmgr/Connections/Warrick.pdf

CW3 Emilio Natalio joined the United States Air Force in 1998. He then transitioned into the United States Army in 2007. CW3 Natalio attended the ALSE Course in 2009. In 2012, CW3 Natalio completed the ASOC and was assigned to C/6-101 GSAB as the ASO. He attended the TACOPS course in 2015 and deployed with C/6-101 GSAB as a TACOPS officer. After leaving Fort Campbell, Kentucky, CW3 Natalio was assigned as the 1-228th AVN REGT's BN ASO. CW3 Natalio is currently deployed to Afghanistan with the 3-501 AHB, 1 AD CAB, Task Force Apocalypse, as the TF's TACOPS officer and ASO.



A U.S. Army UH-60M Black Hawk helicopter crew chief with the 1st Assault Helicopter Battalion, 150th Aviation Regiment, New Jersey Army National Guard, performs a final check prior to the aircraft shutting down. New Jersey Army National Guard photo by Mark C. Olsen

Modernizing the Aviation Force:
USING OUR RESOURCES TO TRAIN DEVELOPERS

By CW4 Dustin Case and Dr. Tim Boileau

U.S. Army National Guard photo by SSG Brian Schroeder

Modernizing our force is a tremendous challenge. The processes for modernization are complex and interwoven almost to a fault. The primary components that contribute to these processes are often referred to in shorthand as the doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy (DOTMLPF-P) board employed in assessment of performance needs. Confusion often arises from the circumstance in which the acronym is used and in communications coordination between the different components. DOTMLPF-P represents the following categories affecting change associated with modernization: Doctrine, Organization, Training, Materiel, Leadership and education, Personnel, Facilities, and Policy. Added complexity is introduced because each category is championed by one or more agencies; this chunking strategy was intended to simplify the challenge of seeing into the future.

The Army naturally uses chunking strategies to create frameworks allowing for compartmentalization and systemic identification of causal factors, to design interventions needed to overcome otherwise overwhelming challenges. Applying the DOTMLPF-P framework allows planners to consider broadly defined issues prior to undertaking a new effort; sometimes referred to as a needs assessment in response to a triggering event. In this way, DOTMLPF-P analysis occurs on the front-end of a concept, an idea, a study, or even during wargaming for informed decision-making.

When these studies and exercises are at their best, the DOTMLPF-P framework becomes innate, allowing participants to focus on finding solutions to performance problems, thereby reducing the time needed for implementation. Good wargaming will penetrate the surface of a concept and spotlight indications of gaps or problems. Through purposeful and applied research, we can often find multiple solutions to any given gap. On the backside of the analysis, using an integrated form of DOTMLPF-P, the framework helps to group or categorize a problem and then implement a solution. Each category has a proponent, and this helps determine which organization is responsible for closing the gap.

Each category in the DOTMLPF-P acronym also employs dozens of people and processes in the background working away at their individual tasks, while supporting any given initiative. That's where things get tricky. If we can't keep the dozens, if not hundreds, of people oriented on the original analysis—we lose our way. Additionally, the concept has to remain flexible and adaptive to new information. When the concept is modified, we again need a method to keep all of our developers on the same track.

Adding to the complexity, the new Army Futures Command is shaking up the principle proponents of the modernization process. The lead agency or DOTMLPF-P proponent may (or may not) have recently changed. Where the rubber meets the road, however, the processes remain mostly unchanged. Force modernization is a necessary technical competency for Soldiers and Civilians alike (Nguyen, 2015).[1] The remainder of this article focuses on professional development to build competency in force modernization within each of the components of the DOTMLPF-P framework.

DOCTRINE–The Doctrine Developers Course (Course 9E-F93/920-F86) (Department of the Army [DA], 2019)[2] provides a foundation of the fundamentals of doctrine and the processes used to develop and revise doctrine. The course has a broad focus including Army doctrine, joint doctrine, and multinational doctrine. For U.S. Army Training and Doctrine Command (TRADOC) organizations, the developmental process and the doctrine life cycle is managed using a product called the Doctrine Literature Master Plan.

We often mistake doctrine for a concept of operations (CONOPS). There are many developers who would say doctrine drives the DOTMLPF-P process. This is a misconception. Doctrine is changed parallel to, and synchronized with, any other change or improvement to an Army capability.

ORGANIZATION–The Manpower and Force Management Course (Course 7C-F49/500-F74) (DA, 2019) underscores the strategic importance of manpower requirements-determination for the Army. Subject areas include determining and doc-

[1] This document is available via milSuite with a valid common access card.

[2] All courses listed in this article may be accessed via the Army Training Requirements and Resources System with a valid common access card.

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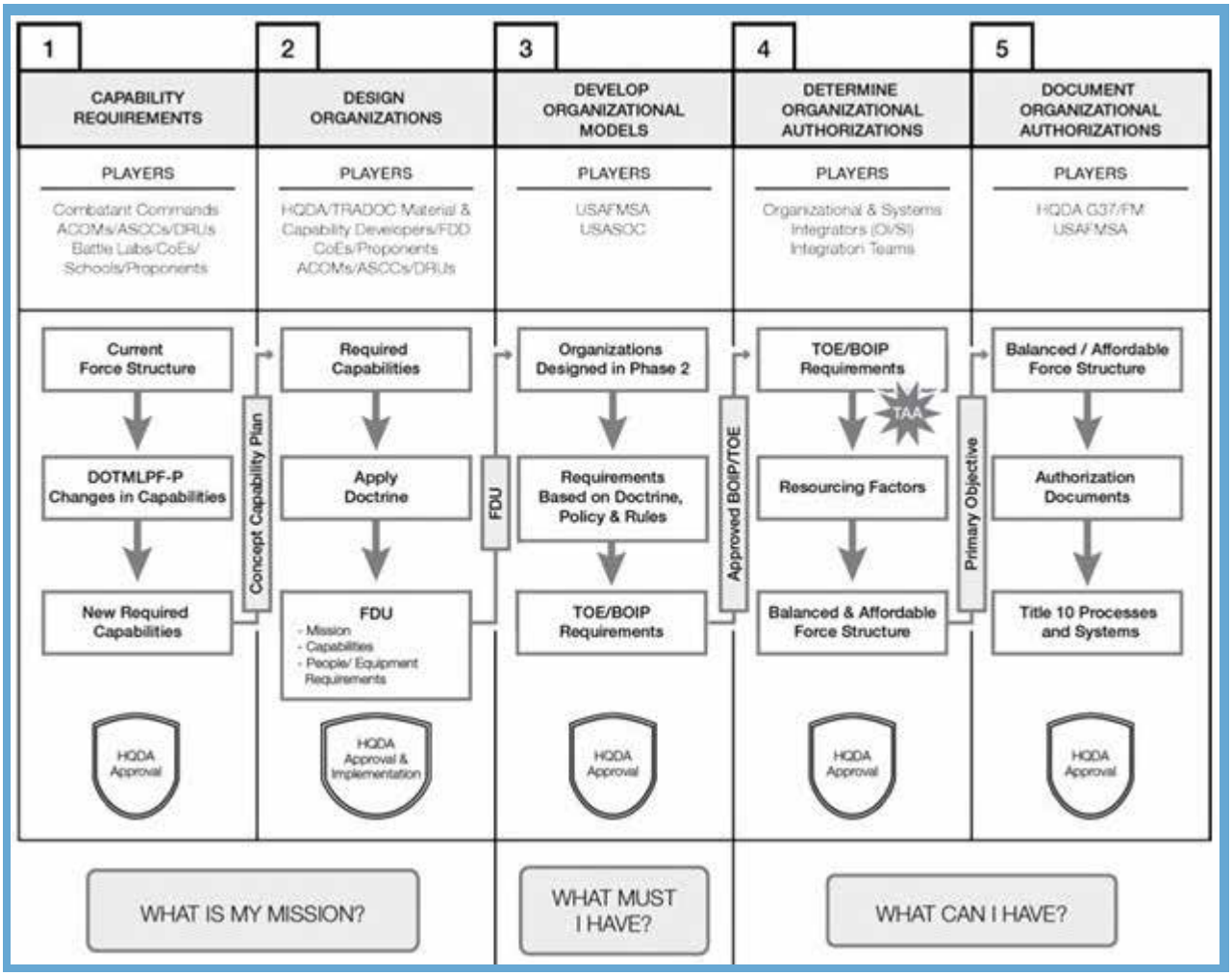

***Figure 1*. The Force Development Process from DA Pamphlet 71-32 (DA, 2019).**

umenting manpower requirements, defense financial management, and generating force standardization. Students gain an understanding of the force design update, the total Army analysis, table of organization and equipment development, basis of issue plan development, and of manpower requirements criteria. In addition, the course addresses automated manpower-management information systems and current force structure issues (Figure 1).

TRAINING–The goal of the Common Faculty Development–Developer Course–(CFD-DC) (Course 7B-SI7Q/570-SQI2) (DA, 2019) is to introduce training developers to the TRADOC Analysis, Design, Development, Implementation, and Evaluation stages that make up the ADDIE process for training development. The CFD-DC provides new content superseding two other courses. In 2017, the Foundation Training Developer Course and the Systems Approach to Training Basic Course were superseded by the CFD-DC to align with changes to the Army Learning Model. Soldiers and Civilians attending this course follow the development of a lesson plan from cradle to grave. The course primarily supports training development for the institutional domain. However, the ADDIE process can be applied under widely varied circumstances. Large-scale collective training development and expensive individual training (such as flight training) development is highly dependent on synchronization with other modernization categories.

Training developers also attend the Training & Education Developer Middle Manager Course (Course 7B-F40/570-F27) (DA, 2019) to learn about the information system used to manage training development products such as lesson plans, a course master, and training support packages. Our instructors attend the Common Faculty Development-Instructor Course (CFC-IC) (Course 9E-SI5K/920-SQI8) (DA, 2019) to learn to deliver the training we develop.

MATERIEL–The Capabilities Development Course (Course 9E-F94/920-F87 [MC]) (DA, 2019) introduces processes focused on determining; documenting; and staffing warfighting concepts, capabilities, and other force modernization requirements including cost-benefit analyses of some solutions. This course addresses the Joint Capabilities Integration and Development System (JCIDS) and the Planning, Programming, and Budget Execution system. The course guides development of the capabil-

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ities-based assessment, initial capabilities document, capabilities development document, and capabilities production document.

LEADER DEVELOPMENT AND EDUCATION–The relevance of leader development and education to this discussion is twofold. Developing leaders is an important step in maintaining any fighting force, and we also develop specific leadership characteristics to modernize our force in response to changes in the operational environment.

There is a tendency to separate leader development and education from training when applying the DOTMLPF-P framework. The effect is to split training and education within the cognitive learning domain. These development functions are combined in the U.S. Army Learning Concept for Training and Education (ALC-TE) 2020-2040 (DA, 2017). Learner-centric instruction and lifelong learning are key attributes of the Army Learning Model. The ALC-TE 2020–2040 represents a sea change to leader development and education in that it demonstrates a competency-based model for professional development. The definition of a competency in this context is the knowledge, skills, and attitude required for completion of a critical task. Taking it a step further, the ALC-TE 2020-2040 recognizes that the three learning domains are interrelated in the development of competence. Specifically, the learning domains characterized as cognitive, psychomotor, and affective (i.e., knowledge, skills, and attitude) enable lifelong learners to grow in different ways. We recognize that learning happens everywhere, throughout the career of an Army Soldier or Civilian.

Another factor in leader development and education is the proponent or preparing agency. Individual skill-based training generally has a different preparing agency for each military occupational specialty (MOS). Conversely, Army education has a broader application, traversing all MOSs by linking specialized training with general learning outcomes applicable to all Army Soldiers and Civilians. The preparing agency for leadership and education literature is generally a commandant or college cadre. The CFD-DC, previously discussed, helps to develop important competencies required of developers working for many different proponents and agencies.

***Figure 2*. Administrative publication life cycle from Army Regulation 25-30 (DA, 2018).**

PERSONNEL–Taking a look at the goals for development of Army personnel and developing Army organizations, we find the two are closely related. While the Manpower and Force Management Course (Course 7C-F49/500-F74) (DA, 2019) we've already discussed is appropriate here, another course covering multiple aspects related to force modernization is the Capabilities, Training, & Doctrine Development Integration Course (9E-F94/920-F87 [MC]) (DA, 2019); also teaching JCIDS, and the effects of coordinating and integrating requirements throughout the planning process. Additionally, students gain an understanding of relationships between three disciplines: capabilities determination, doctrine, and training.

FACILITIES–Here we look at the Installation Logistics Management Course (8A-F45/551-F40 [MC][RF]) (DA, 2019). The course provides exposure to all logistical functional areas at the installation level. One course objective is to educate the individuals who will work with organizations at the installation level. The course also presents an introduction to installation logistics management from the National Guard and the Army Materiel Command perspectives. Managing facilities is extremely important to training. The best well-developed training outlines don't work without adequate ranges, communications, and other resources.

POLICY–We find another connection in this category; policy developers use a strategy similar to doctrine developers to staff and publish literature. As we saw with the training and the leadership & education categories, a key difference is the proponent. The Doctrine Developers Course (Course 9E-F93/920-F86) (DA, 2019) helps policy writers with the Army's publishing programs and techniques regardless of whether they work for a directorate, a command, or a headquarters (Figure 2).

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CONOPS–Organizing the overall modernization process has its own challenges, and we use a CONOPS document to inform the development processes (Figure 3). The Senior Training and Education Managers Course (Course 7B-F11 [VTT]) (DA, 2019) provides a practitioner's overview of how TRADOC supports centers and schools in terms of mission and function. The focus is on managing and integrating training development activities with capability development, force design, and material development (U.S. Army Training and Doctrine Command, n.d.).

CONCLUSION–The CFD-DC and CFD-IC courses developed by Army University and administered by the Directorate of Training and Doctrine within the U.S. Army Aviation Center of Excellence represent two of many courses used to fill the training gap in aviation force modernization. These courses provide us with important tools and resources to develop competence in each of the processes and by promoting an interdisciplinary view of the DOTMLPF-P. Through deliberate training and an ongoing focus on professional development, we can create experts to see into the future and develop the future force.

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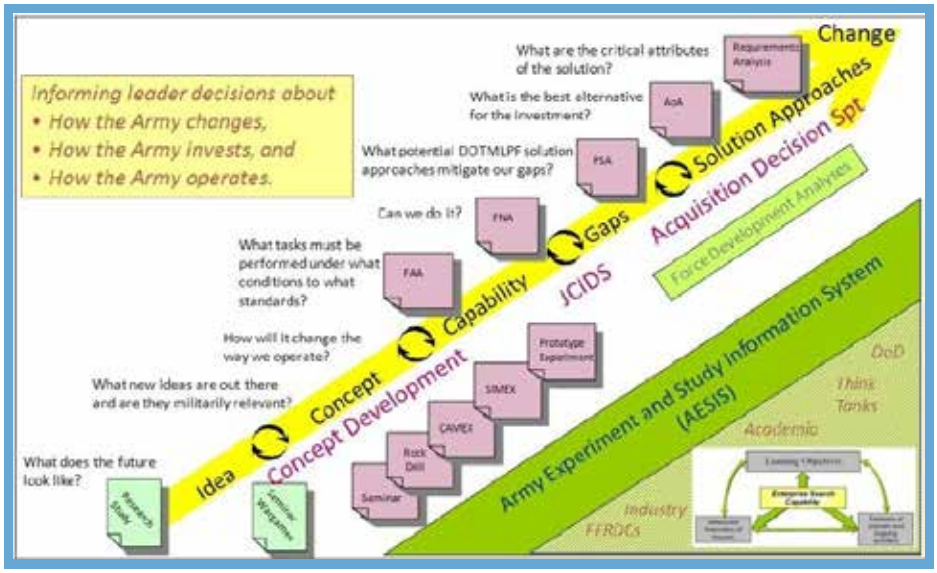

Figure 3. **Concept development from TRADOC Regulation 71-20 (DA, 2013).**

References:

Department of the Army. (2013). *Concept development, capabilities determination, and capabilities integration* (TRADOC Regulation 71-20). Fort Eustis, VA: Headquarters, United States Army Training and Doctrine Command. Retrieved from https://adminpubs.tradoc.army.mil/regulations/TR71-20.pdf

Department of the Army. (2017). *The U.S. Army learning concept for training and education 2020-2040* (TRADOC Pamphlet 525-8-2). Fort Eustis, VA: Headquarters, United States Army Training and Doctrine Command. Retrieved from https://adminpubs.tradoc.army.mil/pamphlets/TP525-8-2.pdf

Department of the Army. (2018). *Army publishing program* (Army Regulation 25-30). Washington, DC: Headquarters, Department of the Army.

Department of the Army. (2019). Capabilities development course (Course 9E-F94/920-F87 [MC]). *Army Training Requirements and Resources System*. Retrieved from https://www.atrrs.army.mil/atrrscc/courseInfo.aspx?fy=2020&sch=907&crs=9E-F94%2f920-F87+(MC)&crstitle=CAPABILITIES%2c+TRNG+%26+DOCTRINE+DEVELOPMENT+INT&phase=

Department of the Army. (2019). Capabilities, training, & doctrine development integration course (9E-F94/920-F87 (MC). *Army Training Requirements and Resources System*. Retrieved from https://www.atrrs.army.mil/atrrscc/courseInfo.aspx?fy=2020&sch=907&crs=9E-F94%2f920-F87+(MC)&crstitle=CAPABILITIES%2c+TRNG+%26+DOCTRINE+DEVELOPMENT+INT&phase=

Department of the Army. (2019). Common faculty development–developer course (Course 7B-SI7Q/570-SQI2). *Army Training Requirements and Resources System*. Retrieved from https://www.atrrs.army.mil/atrrscc/courseInfo.aspx?fy=2019&sch=907D&crs=7B-SI7Q%2f570-SQI2&crstitle=COMMON+FACULTY+DEVELOPMENT-DEVELOPER&phase=

Department of the Army. (2019). Common faculty development-instructor course (Course 9E-SI5K/920-SQI8). *Army Training Requirements and Resources System*. Retrieved from https://www.atrrs.army.mil/atrrscc/courseInfo.aspx?fy=2019&sch=907D&crs=9E-SI5K%2f920-SQI8&crstitle=COMMON+FACULTY+DEVELOPMENT-INSTRUCTOR+COURSE&phase=

Department of the Army. (2019). Doctrine developers course (Course 9E-F93/920-F86). *Army Training Requirements and Resources System*. Retrieved from https://www.atrrs.army.mil/atrrscc/courseInfo.aspx?fy=2019&sch=907&crs=9E-F93%2f920-F86&crstitle=DOCTRINE+DEVELOPERS&phase=

Department of the Army. (2019). *Force development and documentation consolidated procedures* (Department of the Army Pamphlet 71-32). Washington, DC: Headquarters, Department of the Army.

Department of the Army. (2019). Installation logistics management course (Course 8A-F45/551-F40 (MC)(RF). *Army Training Requirements and Resources System*. Retrieved from https://www.atrrs.army.mil/atrrscc/courseInfo.aspx?fy=2019&sch=907&crs=8A-F45%2f551-F40+(MC)(RF)&crstitle=INSTALLATION+LOGISTICS+MANAGEMENT&phase=

Department of the Army. (2019). Manpower and force management course (Course 7C-F49/500-F74). *Army Training Requirements and Resources System*. Retrieved from https://www.atrrs.army.mil/atrrscc/courseInfo.aspx?fy=2020&sch=907&crs=7C-F49%2f500-F74&crstitle=MANPOWER+AND+FORCE+MANAGEMENT&phase=

Department of the Army. (2019). Senior training and education managers course (Course 7B-F11 [VTT]). *Army Training Requirements and Resources System*. Retrieved from https://www.atrrs.army.mil/atrrscc/courseInfo.aspx?fy=2020&sch=131&crs=7B-F11+(VTT)&crstitle=SENIOR+TRAINING+AND+EDUCATION+MANAGERS&phase=

Department of the Army. (2019). Training & education developer middle manager course (Course 7B-F40/570-F27). *Army Training Requirements and Resources System*. Retrieved from https://www.atrrs.army.mil/atrrscc/courseInfo.aspx?fy=2020&sch=061&crs=7B-F40%2f570-F27&crstitle=TRAINING+%26+EDUCATION+DEVELOPER+MIDDLE+MANAGER&phase=

Nguyen, T. (2015, April 29). Career program 32 (CP-32) technical competency models. *milSuite*. Retrieved from https://www.milsuite.mil/book/docs/DOC-200421

U.S. Army Training and Doctrine Command. (n.d.). Senior training and education manager's course. *U.S. Army*. Retrieved from https://www.tradoc.army.mil/Organizations/TRADOC-Staff/G-3-5-7-Operations-Plans-and-Training/G-3-5-7-Training-Integration-Directorate-TID/STEMC/

Aviation DIGEST

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The *Aviation Digest* Annual Writing Award for 2019 is presented to **1SG Kevin Shoun** for his contribution in penning, **"Why is Suicide so Difficult to Talk About?"** published in Volume 7/Issue 2 (April-June 2019, pp. 36).

Congratulations, 1SG Kevin Shoun!!

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

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Does the article have a purpose?

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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 benefit from professionally or 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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AVIATION AND THE MEGACITY

BY MAJ MATTHEW G. EASLEY

We've all seen it on the big screen; a helicopter chases a car through a maze of high-rises in a city. Or perhaps it was a flight of helicopters conducting clandestine insertions, avoiding radar and the enemy's eyes by flying at high speed below the rooftops of buildings, flying down streets just wider than the diameter of the rotor blade, and sometimes flying underneath bridges. Of course if it's an enemy helicopter, then the good guy is able to destroy it with a car or forcing it to fly into powerlines. We know that Hollywood takes liberties with reality, but the images are powerful and may give people a false sense of what helicopters can do in a city. This begs the question, what can helicopters and Army aviation do inside a megacity?

This question arose in stark contrast for me in April of this year. I had the opportunity to travel with students from the Maneuver Captain's Career Course to New York City. Working with the Asymmetric Warfare Group's Dense Urban Terrain (DUT) Detachment, we used New York City as a lab to explore the impact of megacities on military operations. In 1 week, we covered everything from the littorals to subterranean operations to 100-story skyscrapers.

Although I've experienced combat operations in urban environments ranging from small villages to Kabul, Afghanistan, the sheer size of a city like New York City changes everything. I have to admit, although I have served in aviation units for 15 years and read doctrine over and over, I have never paid much attention to aviation operations in urban terrain, let alone a megacity. This article is an attempt to start acknowledging and addressing the challenges of such an operation.

To start to appreciate the complexity of a megacity, we begin with Intelligence Preparation of the Battlefield (IPB). The first step of IPB is to define the operational environment. According to Joint Publication (JP) 3-06, "Joint Urban Operations," "Urban areas are frequently defined according to size, from villages of fewer than 3,000 inhabitants to large cities with populations of over

A Maine Army National Guard UH-60 Black Hawk flies over the New York City skyline. While in Fort Drum for annual training, Maine aviators from 3rd Battalion, 142nd Aviation Regiment were afforded an up-close, bird's eye view of the city. Photo courtesy of 3/142nd Aviation Regiment

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100,000. Large cities vary enormously in size, ranging in population from 100,000 to over 20,000,000 and in area from several to hundreds of square miles" (Chairman of the Joint Chiefs of Staff, 2013, p. I-2). More specifically, the United Nations states that cities with more than 10 million inhabitants are referred to as megacities. In 2018, 33 cities achieved that distinction (United Nations, 2018, p. 2).

To look at these 33 megacities, or any environment, IPB calls for commanders and staff to "...analyze civil considerations in terms of these characteristics: areas, structures, capabilities, organizations, people, and events (ASCOPE)" (Department of the Army [DA], 2019, p. 3-6). The population of these megacities falls under the people category. In looking at a megacity, the total population, although massive, is just a number. To understand the impact of people upon military operations, it is imperative to look at population density. As Army Techniques Publication (ATP) 3-06, "Urban Operations," remarks, "The density of the population, not its mere presence, is what makes the urban environment unique" (DA, 2017, p. 1-3).

New York City demonstrates the importance of this distinction. New York City's metropolitan population is just over 8 million, with 27,016 per square mile. Looking at the five boroughs of New York City, Queens has a density of 20,533 per square mile, while Manhattan, the densest borough, has 72,033 per square mile. In comparison, Manila, the capital city of the Philippines, is the most densely populated in the world with 107,561 per square mile.

Anyone who has been to New York City knows that there is a big difference between Queens and Manhattan, and population density provides a telling reason. This difference in density means the difference between two- to three-story tenement buildings and 20-plus story highrises. In other megacities, this difference in population density can mean the difference between spacious apartments and slums with families living in one-room shanties.

Little Italy looking north toward midtown Manhattan. Photo By MAJ Matthew G. Easley

This is a significant point to consider when looking at urban terrain. Differences in density lead to differences in the terrain. In New York City, the view from One World Trade Center looking north over Manhattan puts it into stark contrast. Starting with the highrises of lower Manhattan, through the financial district into Chinatown and Little Italy, and continuing through midtown and beyond, the nature of the terrain changes dramatically. The soaring skyscrapers give way to tenement buildings that may or may not be built to a city code. Interspersed are open areas in the way of parks and soccer fields.

Of course, what can't be seen is what lies below the surface level. The subterranean part of a megacity is enormous, encompassing mass-transit, sewage, water, power, parking, and more. Analysis of DUT must look at the differences within the area, as it can change from block to block. Retired Marine General, Charles Krulak, talked about the three-block war in terms of differing operations in each block, but the same could be said of the terrain. It can change dramatically in the course of several blocks. Treating New York City as one monolithic city may make sense looking at a

The view north from One World Observatory at Freedom Tower (New York). Photo by MAJ Matthew G. Easley

map but is laughable when viewing the city itself.

Now that we have started to appreciate the terrain, what does doctrine say about aviation operations? Current doctrine calls for aviation to support ground forces in DUT the same as any other operating environment (OE). It states that "Aviation supports urban operations with lift, attack, and reconnaissance capabilities…down to company level…" (DA, 2017, p. 4-19). AH-64 Apaches provide "…direct fire support to individual platoons or squads. Lift may move entire battalions…or it may move single squads…" (DA, 2017, p. 4-19).

This approach is exactly correct. Aviation should support urban operations as it does all others. Although DUT often appears to be vastly different (indeed, an article from the Army News Service last year was titled, "Warfare in megacities: a new frontier in military operations"), the truth is that although different, it is still simply an OE (Lacdan, 2018).

Army aviation's core competencies do not change based on the OE. In fact Field Manual 3-04, "Army Aviation," demands that "Army Aviation must be able to fight under all conditions and anywhere in the world as a member of the combined arms team" (DA, 2015, p. 1-11). It then lists the urban environment as one of the places aviation must be ready to fight. The question arises, are we ready to fight in DUT?

As a whole, DUT may be more complex than most other environments, and certainly the human dimension is magnified by the sheer population size of DUT, but it is still an environment. Weather may vary from one area to another, landing zones (LZs) may be few and far between, and the terrain may offer little in terms of cover, but that is similar to difficulties operating in the rugged mountains of Afghanistan, the deserts of Iraq, or the marshes of the Suwalki Gap in Poland. Dense urban terrain is simply the next OE Army aviation will likely have to fly and fight in. There are challenges to this environment, and the rest of this article will attempt to highlight some of these.

Starting with attack aviation, current doctrine states "The responsiveness of attack rotary wing aircraft makes them ideally suited for supporting ground forces in an urban environment" (U.S. Army Training and Doctrine Command, 2016, p. 59).[1] On the face of it this is true, assuming we do not want to level city blocks. Attack aviation can deliver precise fires from a multitude of directions and altitudes, allowing for effective fires among highrises to surface or super-surface targets.

The nature of urban terrain makes employment of weapons more challenging. Earlier, the ATP observes "Urban canyons will present challenges for aircrews who employ weapons requiring extended trajectory paths" (U.S. Army Training and Doctrine Command, 2016, p. 39).[2] Trying to fire a Hellfire or Advanced Precision Kill Weapon System at a target 4 kilometers (km) away on the surface would be extremely difficult unless the aircraft could engage along the length of the street, and it was a straight street. Even at minimum range, 0.5 km still covers

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Historic church and office buildings in lower Manhattan. Photo by MAJ Matthew G. Easley

several city blocks with buildings of varying heights.

Doctrine states that running and diving fire is preferred, but these methods of engagement require clear visibility to engage and enough clear space to disengage and break away from the target. The urban canyons dramatically limit the number of possible inbound headings that allow for the required intervisibility with the target. Rotary wing might be more ideal than other maneuver or fire support platforms, but DUT has a negative impact on its effectiveness. It might be better to say it's the least bad option.

Moving from attack to lift aircraft, the difficulties of conducting operations in a dense urban area again compound already complex missions. Army Techniques Publication 3-06.1 notes that, "Open space accounts for about 15% of an average city's area" (U.S. Army Training and Doctrine Command, 2016, p. 12).[3] This may be true as a whole. Central Park in New York City certainly has a lot of open area with gently sloping terrain, but that is the exception for an area like Manhattan. The densest urban areas are also likely to have the least amount of open space. That 15% may be concentrated in one area like Central Park or spread out in numerous small areas that are not actually open enough for a helicopter to land.

The ATP observes a couple of obstacles inherent with DUT: adverse effects on lift due to wind effects from surrounding structures and man-made structures not designed to deal with a helicopter's rotor wash because the builders never envisioned a helicopter landing there (U.S. Army Training and Doctrine Command, 2016, p. 42-43).[4]

However, there are additional issues. Seemingly open areas like Times Square contain numerous obstacles like light poles, small vendor buildings, statues, etc. In Chinatown, a small park with several basketball courts and playgrounds is fenced in by a 6-foot-high or taller wrought iron fence surrounded by trees and five-story buildings. Many other open areas are not really open due to the amount of trees and shrubs planted wherever there is the space. Finding an LZ, especially for more than one helicopter, is extremely challenging in DUT.

Ironically, many skyscrapers have helicopter landing pads on the roof, but this simple solution still raises issues as the load-bearing capacity for the rooftop might not handle a CH-47, and even if you did land personnel or supplies on the roof, you still have to get them where you want to go. All of this isn't to say that it is impossible, just that DUT presents significant challenges. Finding appropriate LZs in the mountains of the Hindu Kush is not that different from finding them in a megacity.

Moving beyond manned aircraft, unmanned aircraft systems (UAS) will play a significant role in DUT. As doctrine observes, "Their longer loiter times, persistent surveillance, ability to downlink directly to maneuver elements, and point targeting capabilities enable increased situational awareness to the com-

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

mander" (Chairman of the Joint Chiefs of Staff, 2013, p. IV-10). However, communications between the unmanned vehicle and the operator faces numerous challenges in a city, from line-of-sight issues to a crowded electromagnetic spectrum.

Currently, if a Raven UAS loses link, it will fly back to the point it is programmed to. In a city, however, that direct route may very well take it into a highrise. Smaller UAS must deal with the airflow in the city as urban canyons create turbulent and unpredictable winds. The future might hold drone swarms or mostly autonomous UAS with only minimal inputs from operators. Until then, the current fleet of Army UAS face many challenges in DUT that we are unfamiliar with.

The challenges doctrine identifies, in addition to the ones I observed, are probably just the tip of the iceberg. We have very limited experience conducting aviation operations in DUT. Consequently, the challenges may be unfamiliar. The terrain may be nothing like what we are accustomed to. However, none of this means we should fear it, rather, we should train for it.

This lack of training is the biggest area I think Army aviation needs to work on. In Afghanistan, my troop was stationed at Bagram, only 30 miles north of Kabul. Unless a mission required it, we avoided Kabul as much as possible. It was located in a separate regional command, but we just did not want to fly there. It was a major city, and we wanted to avoid it. Between JLENS balloons, towers, and wires—not to mention the possibility of an insurgent just waiting for the chance for a high visibility shoot down of an American helicopter—we did not want to fly in the city.

Even before deployment, the training we focused on was nothing like a large city. The urban terrain we trained on prior to deployment was fake cities at Fort Stewart or the National Training Center consisting of 10–15 buildings, none more than three stories. Although appropriate for most of the villages we flew in and around, they were nothing like a large city and certainly nothing like the DUT of a New York City, Manila, or Seoul.

The avoidance of DUT is not just during combat or deployment preparation but in all training. You can simply ask the question to any Army helicopter pilot, when was the last time they flew in Class B or C airspace? When was the last time they tried to fly tactically in that airspace? Probably never.

There are certainly numerous challenges to flying in congested civilian airspace over DUT. Most dense areas have associated airports with a high amount of civilian traffic. We cannot cause delays at major airports to train flying in DUT.

The effect on the civilian population cannot be underestimated either. We do not want to cause confusion or even panic among people who do not understand that we are simply training. However, the difficulties should not prevent us from trying.

Simply walking around a city and looking at it from the perspective of a tactical helicopter pilot is a start. This may call for out-of-the-box thinking such as flying as passengers on one of the numerous helicopter companies flying tours of the major cities. Another idea is working with emergency medical services pilots in major cities. Talk to the pilots who fly in and around DUT every day. They have experience we can draw from.

Ignoring the challenges of DUT is not an option. The military must be prepared to fight in all environments, not just the ones we prefer. As always, there is only a limited time to train, but there are ways to work DUT training into the schedule. We must start somewhere so that the first time we fly inside a megacity it isn't in combat.

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References:

Chairman of the Joint Chiefs of Staff. (2013). *Joint urban operations* (Joint Publication 3-06). Washington, DC: Headquarters, Department of Defense.

Department of the Army. (2015). *Army aviation* (Field Manual 3-04). Washington, DC: Headquarters, Department of the Army.

Department of the Army. (2017). *Urban operations* (Army Techniques Publication 3-06). Washington, DC: Headquarters, Department of the Army.

Department of the Army. (2019). *Intelligence preparation of the battlefield* (Army Techniques Publication 2-01.3). Washington, DC: Headquarters, Department of the Army.

Lacdan, J. (2018, May 24). *Warfare in megacities: a new frontier in military operations. U.S. Army.* Retrieved from https://www.army.mil/article/205817/warfare_in_megacities_a_new_frontier_in_military_operations

United Nations. (2018). *The world's cities in 2018* (Data Booklet). Retrieved from https://www.un.org/en/events/citiesday/assets/pdf/the_worlds_cities_in_2018_data_booklet.pdf

U.S. Army Training and Doctrine Command. (2016). *Aviation urban operations: multi-service tactics, techniques, and procedures for aviation urban operations* (Army Training Publication 3-06.1). Eustis, VA: Joint Base Langley.

ADDITIVE MANUFACTURING:

Enhancing Readiness Through Rapid Prototyping

By CPT Edward Bullard and CW2 Mike Razo

Additive manufacturing (AM) promises to revolutionize logistics and increase readiness by enabling rapid prototyping and reducing the need for a large footprint of on-hand parts and equipment. It can also improve existing part designs by enabling customization and topology optimization saving time, money, and material (Brown, 2018). For the past year, the 4-2 Aviation Reconnaissance Battalion (ARB) utilized AM designs in support of maintenance operations and officially initiated its own organic AM program in July 2019. This article offers an overview of the 4-2's challenges in establishing the 4-2 ARB's AM capabilities, as well as lessons learned.

AM WITHIN THE ARMY:

LTG Piggee, the Deputy G-4 Chief of Staff, names AM as one of the five most promising areas to transform Army sustainment (Piggee, 2018). The Air Force, Navy, and Marines have effectively used AM for years to extend the service life of equipment and reduce the associated costs of doing so. As far back as July 2016, the Navy flew its first safety-critical AM part (Newman, 2017). Only recently has the Army sought to incorporate this technology within the logistics chain. The rapid fabrication via AM on the battlefield (R-FAB) program, an initiative to support sustainment operations with five 3D printers (AFN Pacific Spotlight, 2019), recently completed its year-long operational assessment at Camp Humphreys in Korea.

Additionally, the Army established the Additive Manufacturing Center of Excellence at Rock Island Arsenal (Illinois) set to be fully operational in 2021. Thus far, while other branches of service have made efforts to enable lower echelons to make use of AM, most efforts within the Army remain centralized. This top-down approach limits how far the technology can penetrate and the extent to which Soldiers can begin to utilize it.

Prototype parts are 3D printed in the new Advanced and Additive Manufacturing Center of Excellence to trouble shoot the machines at Rock Island Arsenal - Joint Manufacturing and Technology Center, Rock Island Arsenal, Illinois, May 15. A ribbon cutting ceremony was held May 15 to mark the center reaching initial operating capability. U.S. Army photo by Debralee Best/RIA-JMTC

As the Army drives toward improving readiness today and modernizing future equipment, the Rock Island Arsenal – Joint Manufacturing and Technology Center (RIA-JMTC) is establishing the foundation to scale additive manufacturing throughout the Army. U.S. Army courtesy photo

The 4-2 ARB made extensive use of the R-FAB program during its time on Camp Humphreys. The requirement to ship parts and equipment halfway across the world, coupled with our unique mission set and high operating tempo (OPTEMPO) made AM an attractive option to support the unit's logistics and maintenance needs. With the end of the R-FAB operational assessment, we sought to create a unit-level AM program within the battalion. The battalion achieved greatest success in designing new tools and jigs to save both time and money during maintenance procedures while also, in the case of some of our designs, reducing the risk of damage to aircraft components. While much smaller in both scale and budget than the R-FAB, we assessed that the unit could produce over 90% of the designs that we executed through that program using cheaper, consumer-grade machines.

Though AM technology has existed for several decades, a burgeoning market for consumer-grade machines has recently boosted their availability and capability.

SUCCESSFUL DESIGNS:

Due to Army restrictions around attaching parts and pieces on an aircraft, most of our initial efforts focused on either producing or improving specified locally manufactured tools shown in technical manuals. In 2 months of operation, the AM program processed eleven work order requests. Below are five examples of our most successful designs to date:

- Strap Pack and Damper Support–The previous maintenance procedure called for zip-tying lead/lag dampers to the rotor head. This risked causing out-of-tolerance scratches on rotor head components. The cost of replacing damaged components would total over $20,000 and 12.4 maintenance man-hours per incident. Our design eliminated the potential damage by providing a more secure means of supporting the dampers and strap packs and keeping them separate from the pitch housing. Cost: $3.21.

- Drive Plate Support Pin–A set of these pins saves about two total maintenance man-hours per head bump by eliminating the need to remove rotor head components during the procedure. Cost: $6.76 per set.

- G-axis guide v2–This two-part jig turns a two-man job of reinstalling engine rotors into a one-man job, saving .5 maintenance man-hours per reassembly per engine. Cost: $2.03.

- The "Door-stop"–A custom jig for mounting lead-lag links in the pneumatic press for removal/installation of bushings. It turns a two-man job into a one-man job, saving about 2.5 maintenance man-hours. It also reduces the risk of damaging the link for a potential cost of over $50,000 in parts. Cost: $2.86.

- Rocket Pusher v2–This rocket pusher improves on the standard model in forward arming and refueling point (FARP) kits by integrating a ChemLight holder to allow FARP personnel to signal aircraft. A new rocket pusher costs $372 from within the supply system. Cost: $6.76.

All of these designs came from Soldiers and Noncommissioned officers (NCOs) actively involved in aircraft maintenance. Having an AM capability empowered them to improve their operations while also saving the unit, and by extension the Army, money.

PART APPROVAL:

As a separate effort, we are also working to obtain an Airworthiness Release (AWR) for a 3D-printed protective mask blower mount one of our pilots designed to improve pilots' comfort and mobility in the cockpit.

This is a more involved process requiring coordination with the Aviation Engineering Directorate (AED)–Apache Division and Apache Dev/Mods, but we hope to both set a precedent for the use of AM-produced parts in the regular Army and help streamline the process for future designs.

Currently, there is no defined procedure for approving 3D-printed aircraft parts. Meanwhile, Boeing (who

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uses tens of thousands of AM parts across its fleet) (Brown, 2018), General Electric (who is already producing T700 engine parts through AM) (Stark, 2019), or another manufacturer can print a part, and the Army will buy it. Soldiers do not have a path forward to utilize anything that the unit develops.

One of the reasons that the 4-2 ARB AM program focused mostly on tooling needs is the fact that there is no procedure or specific process within Army aviation, or even the Army as a whole, for securing approval. The U.S. Army Aviation and Missile Command (AMCOM) recognizes the need for a codified procedure rather than a mere blanket denial. The 4-2 ARB is looking to build one by starting dialogue with the AED to develop a variant of the maintenance engineering call (MEC), maintenance engineering order, and AWR approval process for tools that would alter maintenance procedures as outlined in the interactive electronic technical manual.

The Navy provides a useful example in how they aggressively pursued incorporating an AM capability for utilization at all levels. In February 2018, Naval Air Systems Command released two official standard work packages providing design guidance and outlining the approval process for anyone from sailor to engineer to utilize AM in Naval aviation. These standards are already informing industry practice in qualifying civilian AM parts, in addition to streamlining the process for service members (Newman, 2018).

With the exception of the R-FAB assessment, few Army efforts attempt to take advantage of currently existing technology at the tactical level. However, several agencies within the Army are researching new materials, AM processes, and part designs optimized for AM (Stark, 2019) to assess their potential utility within future Army logistics. Much of the effort in establishing our unit-level AM program involved generating the printer operations and maintenance

Sailors from NSWC PHD observe the printing phase of the LulzBot TAZ 6 3D Printing Machine during the Fleet Outreach Additive Manufacturing Course, July 16. U.S. Navy photo courtesy of Robert Palomares, Naval Surface Warfare Center, Port Hueneme Division

standard operating procedures, local design approval procedures, and printed part testing and evaluation criteria since these products simply did not exist.

To address this lack of pre-existing policy, the 4-2 ARB AM program adopted techniques that include: purposefully limiting the program to tools and modifications to avoid legal restrictions on duplicating original equipment manufacturer parts, testing load-bearing designs to destruction before authorizing their use, and mandating the return of all parts that break or that the requestor deems unusable for reassessment.

Printing replacement aircraft parts remains an eventual goal, but the implementation and evaluation of AM process is still in its infancy in the Army. Ideally, there would be common standards for printing and adequate material test data on hand to inform MEC authorization, as well as a curated database of tested and approved designs. Additionally, AMCOM and its governing entities would need to delegate temporary part approval authority to unit commanders or local representatives in time-critical scenarios such as downed aircraft recovery to fully take advantage of AM capabilities.

THE MACHINES:

For the sake of the limited scope of our program, we only explored consumer-grade fused deposition modeling (FDM) machines capable of producing parts in plastic. Additive manufacturing technologies also include other methods that produce functional metal or ceramic parts, from cold spraying and laser sintering to binder jetting. However, the learning curve and the expense of these methods would exceed both the unit's capability and the scope of our nascent program.

We assessed that a sustainable program required a minimum of two 3D printers. This way, the program could continue to serve the unit if one machine broke. In addition, the working machine could print many replacement parts to promptly return a broken machine to service.

With an initial target budget of under $10,000 for the whole program in keeping with LTG Piggee's recommendation (Piggee, 2019), only one model of FDM 3D printer, a 2016 model, existed in the logistics system at a price point that would allow the battalion to purchase two printers and all associated spare parts and consumables. The R-FAB program had also used this same model in conjunction with their industrial grade machines, so 4-2 ARB personnel had some familiarity on its capabilities and limitations. The other option would have been to purchase printers via the government purchase card (GPC) program using the Grainger® catalog, General Services Administration Advantage!®, or the wider civilian market. At the time, we assessed that to be an inferior option as the GPC program would have added additional restrictions and limited funds further. For future AM programs, however, the civilian market may provide more modern and capable machines for less money owing to the rapid evolution of AM technology.

Having decided to order printers through the supply system, we faced further challenges in attempting to list the Army as an authorized purchaser of the printer. The compromise we eventually reached with the help of a proactive unit logistics assistance representative (LAR) involved securing purchase authorization for the unit Department of Defense Activity Address Code only. Through coordination with the U. S. Army Logistics Data Analysis Center, the D/4-2 ARB, in effect, became the sole authorized purchaser in the entire Army. Even then, the unit only managed to secure one machine as the Defense Logistics Agency (DLA) could not restock to supply the second.

SUSTAINING THE PROGRAM:

An AM program is not just a printer. Keeping up with the demand for filament feedstock continues to prove a challenge. Similar to the printer itself, there are not any filaments that we can currently access within the supply system. While the unit could justify the effort and approval-seeking process to obtain the printer, doing so every few months for filament is not realistic. The nature of AM lends itself to one-off prototypes; designs require different amounts of plastic and different types of plastic with different mechanical properties. This makes future needs inherently difficult to forecast. The D/4-2 ARB used a GPC purchase to acquire an estimated initial outlay, but we are now working with DLA Aviation to establish AM program support and to develop a logistical pipeline for sustainment of AM programs.

The importance of developing procedures for obtaining filament, printer parts, and consumables is equaled by the need to sustain the knowledge and skillsets to make use of them. One of the major benefits of the R-FAB was having computer aided design (CAD) support integrated into the program. This allowed Soldiers to submit parts requests using hand sketches of new designs rather than having to learn how to use the CAD program. Fortunately, after the end of the R-FAB assessment, the D/4-2 ARB had a few individuals with CAD experience to model Soldiers' designs in support of the 4-2 ARB AM program. Even so, once one acquires the skills to turn a design idea into a digital model, there still remains a learning curve for optimizing models for 3D printing and for setting the parameters and tool paths for the printer to execute.

There is no formal training program for these skills within the Army, and AM-specific skills do not cleanly overlap with any military occupational specialty (AFN Pacific Spotlight, 2019). The closest analogue would most likely be 91E Allied Trades Specialists due to their familiarity with machining parts to tolerance and interpreting technical drawings. The aviation support battalion modified table of organization and equipment already includes them, along with the majority of the combat aviation brigade's fabrication capability. Looking ahead, an increasing number of primary and secondary education programs now include CAD, coding, and printing in their curricula (Kidd, Quinn, & Munera, 2018).

Within the next decade, the Army may see an influx of new recruits that possess familiarity with the relevant skills. In the meantime, the D/4-2 ARB's path forward is to designate operators trained in basic printer use tasks—such as how to swap filament spools, load files, and run calibration routines—before gradually building their skillsets in the more technical areas—such as drafting, modeling, and slicing. We refer to involvement in the AM program as a professional hobby rather than just an additional duty for this reason.

CONCLUSION:

In the end, the 4-2 ARB's efforts in AM hinged upon the confluence of several factors, including having individuals with experience in 3D printing and design, expert aviation maintenance technicians (151) and proactive LARs with connections within the logistics bureaucracy, senior leaders fostering a command climate that aggressively promotes innovation—"innovation" is the 4-2 ARB's number two line of effort; "make it better" is one of the 2 Infantry Division's five priorities—and most importantly, capable Soldiers and NCOs thinking critically about what they do, why they do it, and how they can do it better. The AM program continues to prove to be a valuable tool to increase the D/4-2 ARB's efficiency. Its current success, however, remains contingent upon proactive Soldiers, and its future success will depend on our coordination with AMCOM to develop a clear bureaucratic process to integrate AM within Army logistics.

Much work remains before AM can achieve its promise as a transformational technology in the Army. The potential gains from the widespread adoption of AM are enormous. The

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technology promises to reduce the storage footprint, reduce lead times, and enable rapid prototyping of new designs, saving the enterprise both time and money (Brown, 2018). The Army must establish clear-cut systems for design authorization, more flexible procurement contracting that permits unit-level optimizations, and procedures for sharing knowledge in order to keep pace with the technology and our sister branches. An AM program is not just a printer, and innovative logistics is not just an AM program.

Additive manufactured parts, built and tested at RIA-JMTC, are displayed during a Commanders' Summit with leaders from 23 facilities, making up the Army Materiel Command-managed Organic Industrial Base Oct. 17 to 19 at Rock Island Arsenal, Illinois. U.S. Army photo by Debralee Best/RIA-JMTC

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References:

AFN Pacific Spotlight. (2019, January 10). AFN Humphreys-Pacific Spotlight: CW3 Dewey Adams [YouTube File]. Retrieved from https://www.bing.com/videos/search?q=CW3+Dewey+Adams+AFN+Humphreys-Pacific+Spotlight&&view=detail&mid=953173DE5C6BAE7D3BA7953173DE5C6BAE7D3BA7&&FORM=VRDGAR

Brown, A. (2018). Chain reaction: why additive manufacturing is about to transform the supply chain. *Mechanical Engineering, 140*(10), 30–35. doi: https://doi.org/10/1115/1.2018-OCT1

Kidd, M., Quinn, A., & Munera, A. (2018). Additive manufacturing: shaping the sustainment battlespace. *Joint Force Quarterly, 4th Quarter 2018*(91), 40–46. Retrieved from https://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-91/jfq-91.pdf

Newman, J. (2017). Hitting print: Navy on board with additive manufacturing. *Naval Aviation News, 99*(2), 30–35. Retrieved from https://navalaviationnews.navylive.dodlive.mil/files/2017/06/NAN_Spring2017_web2.pdf

Newman, J. (2018). Making additive standard: 3-D printing becoming a regular part of business. *Naval Aviation News, 100*(1), 32–35. Retrieved from https://navalaviationnews.navylive.dodlive.mil/files/2018/05/NAN-Winter2018.pdf

Piggee, A. F. (2018, September–October). The Army's new start-up. *Army Sustainment*, 3–4. Retrieved from https://alu.army.mil/alog/2018/SEPOCT18/PDF/SEPOCT2018.pdf

Piggee, A. G. (2019, April–June). How do we win the battle to be more agile? *Army Sustainment*, 3–5. Retrieved from https://alu.army.mil/alog/archive/PB700201902FULL.pdf

Stark, S. (2019, January–March). Thinking in volumes. *Army AL&T Magazine*, 84–86. Retrieved from https://asc.army.mil/web/wp-content/uploads/2018/12/Jan-Mar2019_ArmyALT.pdf

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FIGHTING IN THE HYBRID ENVIRONMENT:

Lessons Learned From the Front Lines in Iraq and Syria

By CPT Hanson Causbie

Hybrid warfare is the fight of the future. Changing forces in the geopolitical landscape, the advancement and subsequent dissemination of warfighting technology, and increased collaboration between state and non-state actors has redefined how the United States will fight and win future conflicts. This is not a new phenomenon; in 2012, the Army began restructuring training guidance at the three Combat Training Centers (CTCs) in order to challenge rotational units with guerilla forces, criminal elements, and "near-peer" conventional forces that define the hybrid threat. Forces now incorporate the Decisive Action Training Environment (DATE) into home station training to prepare for CTC rotations while sustaining force readiness (Lopez, 2012).

Nowhere is the hybrid threat more visible than during combat operations in support of Operation Inherent Resolve. The plethora of state and non-state actors, abundance of technology possessed by multiple echelons of enemy forces, and blurred lines of command and control challenge every element of the American fighting formation. As expected, Army aviation plays a key role in supporting ground force commanders in Iraq and Syria. The fight, however, is drastically different than the counterinsurgency (COIN) fight, which has defined aviation deployments to Afghanistan and Iraq. Many aviation leaders view training as a COIN vs. DATE decision, and that combat operations will fall neatly into one of these two seemingly distinct categories. In actuality, the hybrid threat is better viewed as a continuum between purely conventional and purely COIN tactics and techniques (Swinney, 2013, p. 49). Army aviation, and in particular the attack community, should embrace the complexity of the hybrid threat and blend tactics and techniques accordingly. Recent operations in support of Operation Inherent Resolve support the necessity of this new mindset.

This article attempts to convey some of the lessons learned during a combat deployment in support of Operation Inherent Resolve in direct support of the "Defeat ISIS" campaign in Iraq and Syria. Particular attention is paid to four areas of critical importance: the development of tactics and techniques dependent upon threat and enemy composition/disposition, the importance of fires synchronization and employment, joint asset integration and

A CH-47 Chinook helicopter from the B Company, 2-149th General Support Aviation Battalion, Task Force Saber, undergoes maintenance and inspections at Erbil, Iraq, July 10, 2017. The CH-47 Chinook provides a vital lift capability to Task Force Saber, which increases the capability and mobility of Combined Joint Task Force – Operation Inherent Resolve. CJTF-OIR is the Coalition to defeat ISIS in Iraq and Syria. U.S. Army photo by CPT Stephen James

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use of manned-unmanned teaming (MUM-T) and video data link (VDL) capabilities, and the critical role of educating the ground force on attack aviation employment in hybrid warfare.

THE HYBRID THREAT DEFINED

Training Circular (TC) 7-100, the Army's TC on hybrid threats, defines a hybrid threat as "...**the diverse and dynamic combination of regular forces, irregular forces, and/or criminal elements all unified to achieve mutually benefitting effects**" (Department of the Army [DA], 2010, p.1-1). The hybrid threat is not an original concept in warfare. The combination of regular and irregular forces during the Peninsula War in 1814 to prevent France from controlling the Iberian Peninsula represents an early example of hybrid warfare. Later examples include the combining of regular and irregular forces by the Viet Cong and the People's Army of Vietnam against U.S. and French forces and the successful employment of conventional capabilities and irregular tactics by Hezbollah while fighting Israel in 2006 (DA, 2010, p. 1-1). Finally, U.S. Forces faced a hybrid threat in the early days of Operation Iraqi Freedom as conventional Iraqi army forces blended with non-conventional militia and insurgent forces during the fall of the Saddam regime (Swinney, 2013, p. 5).

All of these examples demonstrate how the hybrid threat can combine the capabilities and tactics of conventional forces such as sophisticated weapons, command and control, and combined arms tactics, with traits usually aligned with insurgent and criminal organizations (DA, 2010, p. v). This combination of factors is challenging and can be fatal for a unit commander and staff who view warfare solely through the lens of traditional, irregular, or compound options (Reilly, 2017, p. 87). Indeed, concepts associated with conventional and unconventional war, as well as "traditional" and "adaptive" methods can be detrimental to fully understanding hybrid warfare. As stated in TC 7-100 "These concepts do not have meaning to a hybrid threat beyond their ability to be used against its opponents. Hybrid threats see war holistically and do not try to break it up into convenient pieces" (DA, 2010, p. 1-3). Furthermore, victory in hybrid warfare is often ill-defined. Time favors the enemy and does not require them to win battles or campaigns. Instead, the enemy must simply not lose the war (DA, 2010, p. 1-2).

The conflict in Iraq and Syria can clearly be defined as a hybrid threat (Jasper & Moreland, 2016). In addition to ISIS/ISIL, various state actors and their conventional military forces partner with non-state actors, often in the form of militias, and supply them with weapons and technology frequently associated with a "near peer" threat. Tactics are employed from across the regular-irregular spectrum as enemy forces readily adapted to coalition efforts (Jasper & Moreland, 2016). Command and control is often fluid, and relationships between various organizations may be difficult to define. Furthermore, criminal elements throughout both countries cooperate with various actors to facilitate commerce and move key personnel and equipment throughout the battlefield (Jasper & Moreland, 2016). The combination of these elements provides coalition forces with multiple dilemmas across the gamut of political, military, economic, social, information, infrastructure, physical terrain, and time.

HYBRID TACTICS

Attack aviation often views tactics and flight profiles in a binary manner. The COIN fight is characterized by aircraft operating under the Air Weapons Team (AWT) model with teams of two aircraft operating at a more predictable cruising altitude above ground level (AGL) in circular or racetrack patterns. During engagements, aircraft employ the high attack technique and return to the overhead after munitions release (DA, 2016, p. 2-14). Threats from conventional anti-air systems are often negligible and are outweighed by the need to maintain standoff and consistent contact with the area of interest or maneuvering ground force. Conversely, the conventional fight is characterized by terrain flight at speeds often below effective translational lift in order to mask aircraft from conventional air defense artillery (ADA) and associated radar threats. Engagements are characterized by utilization of the low-level or bump attack from a battle position (BP) or attack by fire (ABF) position (DA, 2016, p. 2-13). Aircrews may deploy as a platoon or company element and may or may not support a ground maneuver element. Additionally, deliberate coordination with a Joint Terminal Air Controller may be dependent upon the assigned offensive task (DA, 2016, p. 2-3).

Tactics and techniques for the hybrid fight are oftentimes associated with those of the conventional fight. I've heard from multiple aviation leaders that the COIN fight is "easy," and training for the conventional fight will prepare aircrews for both hybrid warfare and COIN operations. This view overly simplifies the rigor and dynamism of hybrid

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warfare. Aircrews must train for the fight on the battlefield and appreciate that tactics for the hybrid fight will require employment of techniques from both the conventional and COIN models. The tactics employed will depend on the needs of the ground force, threat to aircrews, and type of operation along the hybrid warfare continuum (DA, 2010, p. 3-2).

For example, early stages of the hybrid fight may indeed require the employed of the deep attack, such as the one employed by both the 11th Attack Helicopter Regiment and the 101st Combat Aviation Brigade in 2003 during the initial stages of Operation Iraqi Freedom (Swinney, 2013, p. 64). During this phase, the ground force commander may use attack aviation to shape the fight against a largely conventional force. Additionally, the threat to aircrews may be such that flying low to avoid radar detection and conventional ADA capabilities is necessary.

Later stages of the hybrid fight, such as the ones experienced in Iraq and Syria, may require different tactics dependent upon threat and the needs of the ground force. The involvement of different state and non-state actors may increase the prevalence of conventional anti-aircraft weapons systems but decrease the probability of these weapons systems actively being employed. Indeed, the presence of some of these weapons systems may be for strategic purposes only but still require consideration during planning. Simultaneously, a decrease in the amount of territory held by the enemy may result in a concentration of enemy weapons systems in a small area of operation. A mix of anti-aircraft weapons systems may be organized in a decentralized air defense system comprised of ambush teams using either surface-to-air missiles or heavy machine guns to target aircraft (Swinney, 2013, p. 78). The ground force may wish to employ attack aviation assets in a modified search and attack mission set due to the disposition of the enemy in small, decentralized teams with little intelligence on their exact whereabouts (DA, 2016, p. 2-5). Furthermore, the ground force may wish to employ attack aviation in conjunction with indirect fires and close air support as part of the greater combined arms fight.

When not flying missions, aircrews with Company B, 3rd Battalion, 25th Aviation Regiment GSAB, and Company C, 6th Battalion, 101st Combat Aviation Brigade, 101st Airborne Division (Air Assault) assigned to 5th Bn, Task Force Eagle Assault, 101st CAB, 101st Abn. Div., simultaneously train at Camp Dahlke, Afghanistan, Dec. 27, 2018. Training builds readiness; readiness equates to lethality. U.S. Army photo by CPT Kristoffer Sibbaluca

Attack aviation employment during this phase may vary. Unit leaders and aircrews must access the most likely threat and how to best employ the aircraft. In this type of environment, it is imperative that aircrews understand the capabilities and limitations of the different threats on the battlefield and how to minimize risk while effectively employing the aircraft in support of ground forces. Based upon the weapon engagement zones and the likelihood of weapons employment, aircrews may need to fly low en route to the objective and then climb to an altitude placing them outside the threat envelope while operating on the objective (DA, 2016, p. F-4). This may require varying altitudes from nap-of-the-earth altitude up to higher than usual altitude, and at a variety of airspeeds. Aircrews must be proficient at flying and engaging in all possible flight profiles; firing a Hellfire missile from 100 feet obviously requires a different skill set than from 6,000 feet. As can be seen, tactics during this phase of operations may span the entire spectrum of conventional vs. COIN-type tactics.

A final phase may require a transition back to the COIN-style tactics successfully employed in Afghanistan. With a dispersed enemy holding limited or no territory and a corresponding decentralization of anti-air assets, aircrews may return to operating at 1,000 feet to 1,500 feet AGL in order to mitigate the threat of small arms while supporting a maneuvering ground force.

THE LOST ART OF FIRES SYNCHRONIZATION

Hybrid warfare can only be won through the use of combined arms. In the hybrid fight, ground force commanders appreciate the necessity of synchronization, or the utilization of various assets to maximize combat power at a decisive time and place (DA, 2017, p. 3-13). As such, ground force commanders will liberally employ indirect fires due to the destructive capabilities of artillery on enemy forces in both the physical and psychological realms. Furthermore, the ground force commander is most likely more familiar with the capabilities and limitation of indirect fires when compared to attack aviation thanks to its empha-

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An AH-64 Apache helicopter from 3rd Squadron, 6th Cavalry Regiment, Combat Aviation Brigade, 1st Armored Division conducts a raid over a training village during a manned-unmanned teaming (MUM-T) exercise dubbed Operation Heavy Shadow that coupled 3-6's Apaches with its RQ-7B Shadow unmanned aircraft systems at Fort Bliss, Texas, April 22, 2015. This was the first ever operational exercise by an Army heavy cavalry unit to organically pair the Shadow version 2 and Apache. U.S. Army photo by SGT Alexander K. Neely, Combat Aviation Brigade Public Affairs, 1st Armored Division

sis during maneuver officer training and the presence of a fire support representative in every maneuver company and above. Therefore, attack aviation must integrate with this utilization of indirect fires in order to meet the ground force commander's intent of maximizing effects on the enemy.

This synchronization requires two capabilities from aviation leaders and aircrews. The first is an appreciation for fires synchronization and its preference to fires deconfliction. The fight in Afghanistan has allowed aviation assets free reign over much of the country with the occasional restricted operations zone and fire mission deterring their unlimited use of airspace. A failure to control the location of aircraft in time and space has drastically increased the time required to complete even a simple fire mission as operations centers are required to use precious time to deconflict airspace. Aviation leaders and aircrews must strive for synchronization in the hybrid fight. This means the proper enforcement of airspace control, timely and accurate battlefield tracking, and constant communication with indirect fires assets in order to maximize aviation freedom of maneuver while facilitating the simultaneous employment of direct, indirect, and joint fires (DA, 2017, p. 4-2). A failure to do so under the misguided notion that aviation always has the right-of-way is detrimental to the combined arms fight and the relationship with the ground force commander.

Proper synchronization of fires requires fires education. Aviation leaders and aircrews must understand the tactical employment of indirect fires and be ready and able to execute call for fire missions to include adjusting fire. Prior to deployment, the fires cell in the attack aviation formation must educate aviators on proper indirect fires employment and how such a capability is understood by the ground force. Furthermore, aviators must practice call for fire and indirect fire adjustments prior to deployment. Our aircrews deployed to combat with a limited understanding of indirect fires and quickly realized the gap in our knowledge base. Utilizing the framework of NORMA, or nature of the target, obstacles, range to target, multiple firing positions/lanes, and area to maneuver in conjunction with the multiple gun target lines utilized by indirect fires, we developed a synchronization plan that allowed us to occupy BPs and ABFs, allowing the ground force to simultaneously employ attack aviation, indirect fires, and close air support (DA, 2016, pp. 2-11 to 2-12). While this plan oftentimes limited our freedom of maneuver, it succeeded in maximizing the utilization of multiple assets, ultimately leading to meeting the ground force commander's intent. This synchronization was also imperative to the increased use of attack aviation throughout the area of battle.

VDL AND MUM-T AS FORCE MULTIPLIERS

Perhaps the greatest contribution to modern warfare by the War on Terror is the development of unmanned aircraft systems (UAS). Unmanned aircraft systems dominate the battlefield with capabilities ranging from the fire team to strategic level. Ground force commanders are now able to utilize UAS to facilitate the maneuver, intelligence, fires, and mission command warfighting functions while also minimizing the number of forces placed in harm's way.

Manned-unmanned teaming is now an integral part of the Army aviation lexicon. The AH-64D and AH-64E Apaches are outfitted with MUM-T and VDL capabilities that allow them to receive sensor data directly from an unmanned system, in addition to transmitting video and aircraft sensor data to other aircraft and ground forces. Indeed, MUM-T provides aircrews with reliable and timely information collection, enhanced situation awareness, and the ability to engage targets at far longer ranges through the utilization of remote targeting (DA, 2016, p. G-1). Furthermore, the ground force's ability to pull video from attack aviation assets facilitates greater target identification, mission command, and overall better synchronization between the ground force and aircrews.

Functional MUM-T and VDL capabil-

ity is no longer a luxury; it is a capability expected by the ground force and essential to the hybrid fight. Thanks to advances in this technology, the ground force commander expects the increased situation awareness and target confirmation provided by these systems. Without operational MUM-T and VDL, aircrews must rely on radio transmissions for target identification and clearance of fires. Although effectively utilized in the past, this means of communication can be far slower than the quick confirmation and clearance provided by video link. Additionally, the loss of ability to receive video target handovers from UAS significantly decreases the situational awareness of aircrews and the possibility of effective MUM-T utilization.

Technical difficulties with our aircraft rendered our MUM-T and VDL systems inoperable for the majority of our deployment. As a result, the ground force commander consistently passed many of our taskings to assets with operable MUM-T and VDL. Our number of possible engagements decreased by roughly 30%, and the absence of MUM-T and VDL capabilities often removed attack aviation from involvement in critical operations. Furthermore, aircrews suffered from significantly diminished situational awareness of the battlefield to include the composition of enemy and friendly forces. While operating in the hybrid fight, the loss of situational awareness or utilization of a key asset such as attack aviation can be the delineation between an easy fight and a hard battle.

SUPPORTED UNIT EDUCATION: ESSENTIAL TO ANY SUCCESSFUL AVIATION OPERATION

In his thesis titled "The Need for Balance in Attack Aviation Employment Against Hybrid Threats," LTC Joseph D. Swinney remarks that "Adaptability and versatility are the greatest strength of army aviation" (Swinney, 2013, p. 113). Aviation's ability to be the asset requested by the ground force requires a close professional relationship with the supported unit. The two tenets of a successful relationship are an educated ground force and integration into the ground force concept of operations. The former is especially important in the hybrid fight. Ground force commanders have become accustomed to the AWT-centric support, which has defined the conflicts in Afghanistan and Iraq. For many commanders, threats to aviation assets do not factor into operational planning and execution. Additionally, the unique capabilities of attack aviation in the hybrid fight and its ability to perform beyond the scope of an AWT may not be readily apparent to maneuver formations. It is the responsibility of aviation leaders to educate the ground force on the capabilities and limitations of attack aviation in the hybrid fight

SGT Zachary Howard, Co. B., 4th Battalion, 17th Infantry Regiment, attached to 2nd Armored Brigade Combat Team, 1st Armored Division, operates a PD-150 Soldier-borne sensor during Network Integration Evaluation 16.1, Oct. 1, 2015, on Fort Bliss, Texas. The demonstration was run by 4/17 to distinguished visitors on the capabilities of manned-unmanned teaming systems. U.S. Army photo by SPC Aura E. Sklenicka, 2/1 ABCT PAO

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and its distinct differences from purely COIN operations. Finally, aviation leaders may have to reintroduce to ground force commanders aviation capabilities normally executed at the conventional end of the spectrum, and the concept of attack aviation as a maneuver element as opposed to simply a fires asset. A comprehensive understanding by the ground force of attack aviation will ensure maximum employment of attack aviation while simultaneously reducing unnecessary risk to aircrews.

Integration into the maneuver commander's planning and concept of operation changes the perception of attack aviation from an available asset to an integral member of the combined arms team. While deployed, our team made an effort to attend every planning conference held by our supported unit and provided a strong liaison officer to answer questions for the ground force and raise issues during planning and execution of operations. Further integration can be accomplished through air ground operations briefs in order to educate individual maneuver units on the contribution attack aviation makes to the fight. Our greatest tactical successes while engaged in the hybrid fight were in support of maneuver units with whom we developed a strong professional relationship centered on trust, communication, and a mutual understanding of our collective mission and end state.

CONCLUSION

The rise of the hybrid fight has brought about new and exciting opportunities for attack aviation and Army aviation as whole. With these new opportunities comes a responsibility to learn from the experiences of others and apply these lessons to maximize the combat effectiveness of our community. An embrace of the complexities of hybrid warfare, and the spectrum of support and depth of knowledge required by aviation leaders and their aircrews will ensure attack aviation's employment as ground force commander's asset of choice for many years to come.

The 1st Armored Brigade Combat Team, 3rd Infantry Division, kicked off their Decisive Action Rotation at the National Training Center at Fort Irwin, California, on April 1, 2017. Decisive Action is a reflection of the complexities of potential adversaries our nation could face and include: guerilla, insurgent, criminal, and near-peer conventional forces woven into one dynamic environment. U.S. Army photo by SSGT Antonio Vincent

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References:

Department of the Army. (2010). *Hybrid threat* (Training Circular 7-100). Washington, DC: Headquarters, Department of the Army.

Department of the Army. (2016). *Aviation tactical employment* (Army Training Publication 3-04.1). Washington, DC: Headquarters, Department of the Army.

Department of the Army. (2017). *Operations* (Army Doctrine Reference Publication 3-0). Washington, DC: Headquarters, Department of the Army.

Jasper, S. & Moreland, S. (2016). ISIS: an adaptive hybrid threat in transition. *Small Wars Journal*. Retrieved from https://smallwarsjournal.com/jrnl/art/isis-an-adaptive-hybrid-threat-in-transition

Lopez, C. T. (2012, November 14). Army training for DATE with hybrid threats. *U.S. Army*. Retrieved from https://www.army.mil/article/91010/army_training_for_date_with_hybrid_threats

Reilly, M. D. (2017, January 26). Hybrid threat center of gravity analysis: taking a fresh look at ISIL. *Joint Force Quarterly*, (84), 86–92. Retrieved from https://ndupress.ndu.edu/Media/News/Article/1038835/hybrid-threat-center-of-gravity-analysis-taking-a-fresh-look-at-isil/

Swinney, J. D. (2013). *The need for balance in attack aviation employment against hybrid threats* (master's thesis). Retrieved from Defense Technical Information System (Accession Number ADA611703)

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The Last of the Army's Biplane Fighters

By CW5 Christopher J. Braund

Figure 1. Formation of Army P-12 pursuit planes, undated. Photo courtesy of Boeing

The "Golden Age of Aviation" is a glowing moniker given to the developments in aviation during the interwar period (1918–1941). It was a period defined by glamorously painted aircraft and aviation experimentation, and it was a period that produced aviation icons such as Amelia Earhart, Charles Lindbergh, and James "Jimmy" Doolittle. Moreover, it was a period that defined and cemented military aviation as a viable arm of the developing American military power. Rapid developments in engine technology, aircraft instrumentation, and airframes drove thousands of young, impressionable men and women into the field of aviation. On the cusp of this aviation technology was the United States Army Air Corps. A section within the United States Army that blossomed out of the Signal Corps in its infancy, the United States Army Air Corps fought tooth and nail to remain at the forefront of aviation technology. One such airframe at the cusp of this technology was the Boeing Model 83. What started out as a venture for the United States Navy as the F4B, Boeing quickly impressed the Army Air Corps with their sleek, fast biplane design that the Army Air Corps quickly sought and adopted as the P-12, ushering in the premier pursuit (fighter) plane that took the United States Army Air Corps through the end of the biplane era (Figure 1).

Pulling from their own pockets, Boeing took a chance to enhance their brand within the United States military. Curtiss aircraft dominated the military aircraft industry post-World War I, and Boeing was looking to make a name for itself. Boeing presented the prototype Model 83 to the United States Navy. The Model 83 was specifically designed for the Navy, built with the structural requirements for aircraft carrier landings. The Model 83 rolled off the assembly line with the same powerful Pratt & Whitney R-1340B "Wasp" engine of the modern aircraft of its day, but it was smaller and lighter due to its bolted aluminum tubing, shifting from the standard welded steel tubing present in aircraft of the day (Boeing, n.d.). This new production modification allowed Boeing's new aircraft to be lighter, faster, and more nimble than any other plane in the military's inventory (Dwyer, 2013). Moreover, because of the outstanding performance testing the Model 83 demonstrated, the United States Army Air Corps ordered their own test model, the Model 89. Stripping away the Navy-specific modifications, the Model 89 outperformed anything the Army had to-date. The Army ordered the aircraft into production as their new pursuit aircraft, now designated the P-12.

The Army Air Corps took delivery of their first P-12 on February 26, 1929. The acceptance pilot was Captain Ira C. Eaker, future commander of the famous Eighth Army Air Force (Figure 2). The P-12 could function both as a front-line fighter and a close air support platform. Its Army Air Corps-specific armament consisted of a centerline bomb rack capable of carrying a 500-pound general purpose bomb, two fixed forward-facing 0.30 caliber Browning M1919 machine guns, or a combination of one 0.30 caliber and one 0.50 caliber Browning machine gun (Staff Writer, 2018). The P-12 went through a series of design models during its lifespan. From the baseline P-12, the aircraft went through five design upgrades, each improving on the previous. Moreover, the P-12 became the design icon and lifesaver of the Boeing Aircraft Company, as sales of the P-12 (and Navy version, F4B) helped ensure Boeing survived the crippling years of the Great Depression (Staff Writer, 2018).

The P-12 served in the United States Army Air Corps from its delivery flight in 1928 until its final retirement as training aircraft in 1941. The P-12

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saw service in numerous stateside and overseas assignments. One of its notable assignments was to the 17th Pursuit Group's 95th Pursuit Squadron, the "Kicking Mules" (Figure 3). It was one of the last pursuit planes to carry the "Kicking Mule" insignia (which dated back to World War I) before the 17th Pursuit Group reflagged to the 17th Bombardment Group, and the 95th Bombardment Squadron then becoming famous as part of the unit LTC James H. "Jimmy" Doolittle selected on his Tokyo Raid during World War II.

The P-12 symbolized the iconic romantic notion of the interwar years of aviation. Movies, media, and newsreels (intentionally or not) came to make the P-12 the most famous military aircraft of the interwar years. However, though a revolution in design, it too succumbed to the rapidly advancing aviation technology. Specially, it is famous for being the last biplane style pursuit aircraft in the United States Army Air Corps. However, and more importantly, the P-12 placed Boeing on solid footing with the Army Air Corps by paving the way for some of the most famous aircraft to grace the blue skies.

Figure 2. Boeing P-12 with CPT Ira Eaker. Photo courtesy of USAF museum photo archives

Figure 3. Undated photo of a restored P-12. Note the "Kicking Mule" markings. Photo credited to the Davis-Monthan Aviation Field Register

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References:

Boeing. (n.d.). P-12/F4B fighter. Historical snapshot. *Boeing*. Retrieved from http://www.boeing.com/history/products/p-12-f4b-fighter.page

Dwyer, L. (2013, October 13). Boeing P-12. *The Aviation History Online Museum*. Retrieved from http://www.aviation-history.com/boeing/p12.htm

Staff Writer. (2018, May 15). Boeing F4B/P-12 carrier-borne pursuit fighter. *Military Factory*. Retrieved from https://www.militaryfactory.com/aircraft/detail.asp?aircraft_id=208

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Maintenance Situational "UNAWARENESS"

By MAJ Jeff Warren (Ret.)

Maintenance is an essential task the Army must conduct to be able to execute its mission in peace and war. Maintenance is an intensive effort, especially Army aviation maintenance. Without it, our aircraft and their supporting role in combined arms maneuver will be essentially null and void.

SITUATIONAL UNAWARENESS

The Federal Aviation Administration (FAA) describes situational awareness as..."the accurate perception and understanding of all the factors and conditions within the four fundamental risk elements that affect safety before, during, and after the flight" (FAA, n.d.). Meanwhile, unawareness fits the definition as complacent based on Webster's dictionary definition as a feeling of "Self-satisfaction especially when accompanied by unawareness of actual dangers or deficiencies; an instance of usually unaware or uninformed self-satisfaction" (Merriam-Webster, 2019).

So, what exactly is maintenance situational unawareness? This is when leadership from the lowest levels to the highest seem to be unaware of or have lost the experience and training to understand what is going on with their maintainers and their maintenance programs. They have,

U.S. Army Soldiers with the Missouri, Georgia, and Illinois National Guard stage CH-47 Chinook helicopters in Kuwait, Dec. 29, 2018. U.S. Army National Guard photo by SGT Emily Finn

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in effect, become complacent and no longer see the errors, or they don't have the experience to know what the errors are. The results of maintenance situational unawareness result in aviation units failing to maintain their equipment to standard and promulgate the next accident.

HOW DID WE GET HERE?

The road to complacency is rather long, and there are several detours along the way. As units spun up after 9/11, the Army prepared and headed off to war. Combat in multiple theaters and the boots on the ground limitations are where the trip started. As the Army continued, combat operations over numerous years and the leadership still had to overcome personnel limitations within theaters, the detours began. As commanders faced reduced "seats" for green suiters, they had to make decisions and come up with options to deploy without the full complement of aviation Soldiers and still execute their aviation missions, so they had to utilize contract maintainers to make up for shortages.

While technically, the use of contract maintainers filled the necessary slots for conducting unit and higher level maintenance in theater, it precipitated a lack of experience and knowledge across Army aviation maintenance units. No longer were aviation maintainers turning wrenches on aircraft, noncommissioned officers (NCO) supervising maintainers, or NCOs conducting quality control operations. Additionally, while the parent units were deployed, these maintainers lost their chain of commands and senior supervisors who are directly counted on within the Army to train and supervise, counsel, and mentor young officers, NCOs, and Soldiers.

IMPACTS OF UNAWARENESS

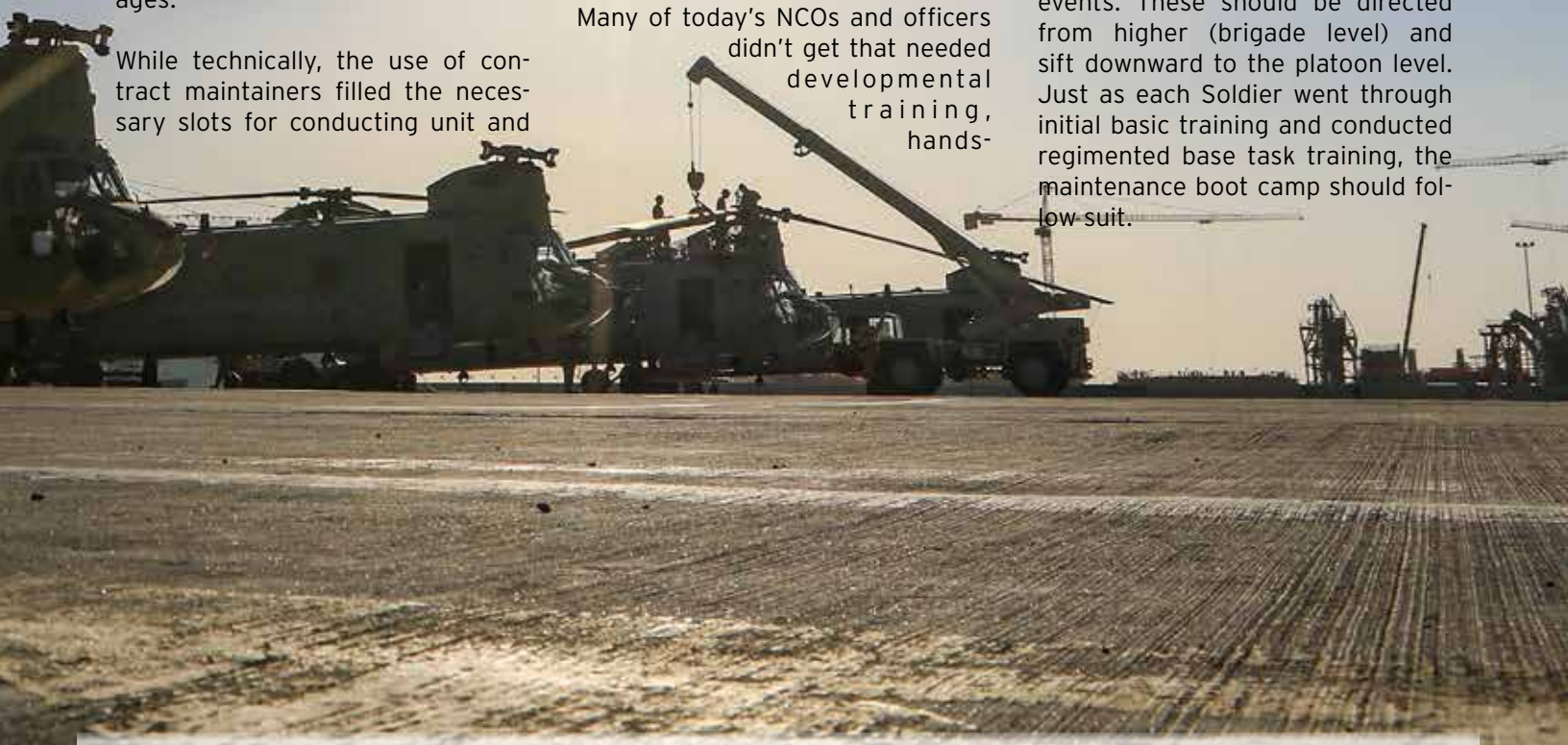
Situational unawareness or complacency, given time, is a mission and personnel killer. As we look at units and their maintenance posture, the Army shouldn't be surprised at the status of maintenance and the complacency of leaders and Soldiers. Due, in fact, to the multiple aforementioned detours, there has been a void over the years of supervisory and hands-on experience.

Many of today's NCOs and officers didn't get that needed developmental training, hands-on training, and mentoring early on in their careers. So now we have mid-level and upper-level Soldiers who are supposed to have learned the initial and intermediate maintenance skills and acquired the knowledge and experience, but they actually don't have it. So with this void in tacit and explicit knowledge of maintenance comes the situational unawareness of just how poorly maintenance is being conducted.

HOW DO WE FIX IT?

To overcome the situational unawareness of our aviation maintenance operations requires a retooling of our junior and mid-level leadership. This isn't an easy task with our high operations tempo yet, it is a task that must be taken on if we are to be prepared to execute cross-domain maneuver during combat operations against a peer or near-peer enemy.

Retooling our junior and mid-level officers and NCOs in maintenance to standard may require units to execute maintenance boot camps or maintenance-specific training events. These should be directed from higher (brigade level) and sift downward to the platoon level. Just as each Soldier went through initial basic training and conducted regimented base task training, the maintenance boot camp should follow suit.



U.S. Army Soldiers with the Missouri, Georgia, and Illinois National Guard stage CH-47 Chinook helicopters in Kuwait, Dec. 29, 2018. The U.S. Air Force brought in the helicopters and the crew began maintenance, preparing them to support ongoing aviation operations in Iraq. These units support the Coalition Aviation Advisory and Training Team, enhancing the Iraqi Security Force's aviation capabilities. U.S. Army National Guard photo by SGT Emily Finn

The boot camp can be a 2-week intense course or once weekly meeting for intense training sessions with hands-on actions and counseling/mentoring sessions from senior maintainers on what they should be doing, how to do it, and techniques that can be used to maximize the utilization of their limited maintainer resources. Training events should be directed to those specific skill level tasks of the Soldiers. An example would be dedicating several hours a day to train Soldiers and leaders while teams are conducting phase maintenance. This provides integration of training and maintenance mission execution. Think sergeant's time training for maintainers and leaders who didn't get that base training due to deployments over the course of almost 20 years.

The guide on how to execute Army aviation maintenance is just that, Army Training Publication (ATP) 3-04.7, "Army Aviation Maintenance" (Department of the Army [DA], 2017). This is the maintenance system bible for maintainers, maintenance NCOs and officers, and commanders at all levels. But to learn and use it to accomplish the aviation mission, you have to read it! This ATP has all the necessary information and references to build your program, train and manage training, and standardize aviation maintenance across the force. As the ATP states, "This ATP ties regulatory guidance to practice, and serves as the primary reference for effectively managing aviation maintenance" (DA, 2017). As an Army aviation commander, leader, technician, and maintainer, this ATP is mandatory reading.

Key topics must include production control, quality control, and technical supply. Without an understanding of how all these pieces fit together to make maintenance run efficiently and safely, the personnel being trained will not be able to manage the corporate process, nor be situationally aware of maintenance as they take on greater levels of responsibility.

CONCLUSION

Situational unawareness or complacency in maintenance can be overcome. It requires direct leadership by the upper command to make sure it is designed, programmed into the training calendar, and executed to standard. This training, whether in the form of a maintenance boot camp, sergeant's time, or other training mechanism, can bring our junior and mid-level officers and NCOs up to speed and give them the situational awareness they require to conduct operations currently and in the future at higher levels of responsibility. Success in your maintenance program requires that the maintenance team members read ATP 3-04.7 and use it as the primary reference for your aviation maintenance program.

The Army depends on Army aviation as a combat multiplier, and Army aviation depends on its maintainers to provide safe and fully mission-capable aircraft. It's time we get complacency out of maintenance and bring our maintainers to the fully mission-capable status.

Jeff is a retired Army Master aviator with over 20 years of service. He conducted operations as a maintenance test pilot, maintenance manager, and instructor pilot in the UH-60. He served in air cavalry, assault helicopter, and MEDEVAC units throughout his career. He served division assignments with the 7th ID (LIGHT), 2ND ID, the 101st Airborne Division (AIR ASSAULT), and the Aeromedical Research Laboratory. He has worked with the Directorate of Training and Doctrine producing doctrinal publications, producing tactical classified manuals, MEDEVAC proponency as a subject matter expert, and the Combat Readiness Center as an aviation technical writer. Additionally, Jeff holds a master's degree in management.

References:

Department of the Army. (2017). *Army aviation maintenance* (Army Techniques Publication 3-04.7). Washington, DC: Headquarters, Department of the Army.

Federal Aviation Administration. (n.d.). Activities, courses, seminars & webinars: ALC_content (situational awareness definition). *Federal Aviation Administration*. Retrieved from https://www.faasafety.gov/gslac/ALC/course_content.aspx?cID=408&sID=649&preview=true

Merriam-Webster. (2019). Dictionary. *Merriam-Webster*. Retrieved from https://www.merriam-webster.com/dictionary/complacency

SGT Johnathan Kessel, an aviation component repairer (right) and SPC James Chaffins, an aviation electrician both with the Kentucky Army National Guard's 2nd Battalion, 147th Aviation Regiment, currently assigned to D Company, 8th Battalion, 229th Aviation Regiment, 244th Combat Aviation Brigade, troubleshoot a suspected malfunctioning UH-60 Black Hawk helicopter warning light, June 26, 2019, at Camp Buehring, Kuwait. U.S. Army photo by SSG Luis Delgadillo

ELIMINATING AEROMEDICAL EVACUATION COMPANIES IN DIVISIONAL COMBAT AVIATION BRIGADES

By Mr. George Johnson

An HH-60 Pave Hawk helicopter lands as an Army UH-60 Black Hawk prepares to pick up a MEDEVAC patient June 13. The 33rd Expeditionary Rescue Squadron is the first squadron to have a combat-search-and-rescue mission and a MEDEVAC mission, and is based at Kandahar, Afghanistan. U.S. Air Force photo/Senior Airman Brian Ferguson

Potential peer/near-peer adversaries have studied the way the U.S. has conducted war for more than 2 decades. The strengths the U.S. Army has in technology and capabilities far exceed the enemy in the post-9/11 conflicts. These peer/near-peer competitors have learned that anti-access/area denial (A2AD) restricts current American ways of war. The Army needs to adjust its posture to account for these changes in the aviation and the aeromedical evacuation communities. The Army can increase both tactical flexibility and the number of casualties it can handle by simply eliminating the medical evacuation (MEDEVAC) companies from divisional combat aviation brigades (CABs) and reallocate the 15 aircraft into assault battalions.

U.S. Army aeromedical evacuation (AE)/MEDEVAC boasts a storied tradition and history dating back to World War II (WWII) and the Korean War. Few writers of WWII ever discuss how the military was unprepared for operations in the jungles, and from necessity, had to come up with pioneering solutions to stay alive. Rescues became the order of the day, and helicopters made the missions successful (Daugherty, 2014, p. 202). In reality, these long-standing beliefs are only partially correct: the first U.S. Army Helicopter Ambulance units did not exist until 1952 with the 49th, 50th, and 52nd Medical Detachments, helicopter ambulance, standing up in August of that year. The U.S. Air Force has a better claim to the first helicopter evacuation mission when the 1st Air Commando Group dispatched an R-4 in Burma during WWII to rescue three British soldiers. A point of contention remains since Soldiers argue they belonged to the Army then, but the fact remains that the U.S. Army Air Forces acted as a de facto independent branch by that point in the war. The history of helicopter use spans across all branches of the military. This is especially true for the U.S. Army and Air Force because of the separation into the distinct branches in 1947, leading to the U.S. Army as the primary user of the helicopter today. The Army's "Hump" missions in the China-Burma-India theater gave the first glimpse into the current methods used in the MEDEVAC and search and rescue communities (Green, 2001, p. 16). These missions also paved the way for present-day air assault operations, a tactic that requires the use of helicopters (Stockfisch, 1994, p. 7).

During the Korean War, the Army employed the majority of helicopters in service, yet even these storied missions were not MEDEVAC missions by the accepted definition of the term. The first recorded MEDEVAC mission was actually by a U.S. Air Force H-5 on 5 August 1950 (Whitcomb, 2011, p.12). These missions were casualty evacuation (CASEVAC) because there was no medical treatment en route to the next level of care, except in isolated circumstances. In fact, the first medical unit with helicopters used as ambulances was commanded by an artillery branch officer, John W.

160th SOAR example of in-flight medical care during CASEVAC scenario. Note the flight medic, medical equipment, and litter patient arrangement. U.S. Army photo by 160th SOAR, ROAE

Hammett. True combat MEDEVACs, en masse, began in the Vietnam War.

In a 2013 article for the American Legion, Major General Patrick Brady, (Ret.) Medal of Honor recipient, described the methods used by the first DUSTOFF units and how the focus was on patients. He also described how other, more senior officers, repeatedly attempted to repurpose or eliminate MEDEVAC aircraft. Major Charles Kelly, the commander of the 57th Medical Detachment and deified progenitor of DUSTOFF, presented Brigadier General Joseph Stilwell with a plaque listing aircraft tail numbers as he departed Vietnam stating, "Here, General,...you wanted my helicopters so damn bad, take them" (Brady, 2013). There was a need to fill in the Vietnam conflict, and that need endures in the more static conflicts of today.

The Aviation Transformation Initiative, early in the post 9/11 timeframe, informed the decision to move AE companies from evacuation battalions into divisional general support aviation battalions (GSABs) under the command of CABs (Whitcomb, 2011, p.303–306). Combat aviation brigade MEDEVAC companies currently account for 28% of all UH-60 assets in the active component combat aviation brigades and a similar number in the deployable Reserve and National Guard organizations. Based on these modern and emerging threats and limitations of the present design, three problems have or potentially will occur: improved adversary lethality, increased decision cycle times, and force structure disparity.

The current threat outlook, technological developments, and adjusted tactics require an updated aeromedical vision for saving lives on the future battlefield. The Army, as the Defense Department's proponent for intratheater AE, needs a plan to ensure Service members receive the appropriate care and transport of sick or wounded (Department of Defense, 2010, p. 30). This plan should not state that the aircraft must remain unprotected, wear the International Red Cross symbol, or be commanded and crewed by AE crews. The range of existing and emerging anti-access, area denial and integrated air defense technologies make it impossible to identify Geneva Convention-mandated medical insignia. The increased range and lethality of anti-aircraft weapons in the multi-domain operational environment makes it more dangerous for forward MEDEVAC aircraft due to the inability of adversaries to distinguish them from other helicopter mission types. Additionally, the Geneva Convention requirements of, "...flying at heights, times, and on

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routes specifically agreed upon between the belligerents concerned," are untenable because nations often try to conduct operations below the level of declared or understood conflict (Department of the Army, 2019, p. A-2).

Eliminating Army evacuation battalions and incorporating MEDEVAC companies into the GSABs increased the decision cycle and workload requirements for aviation commanders at all levels. The possibility of mismanagement of this low-density mission set is highlighted in doctrine (Army, 2019, p. 2-1). To further underscore the importance of timeliness, this particular issue had to be addressed in 2009 by the Secretary of Defense, Robert Gates, where he mandated use of the "Golden Hour" evacuation standard. This standard, while generally accepted in the medical community, actually exceeded the North Atlantic Treaty Organization MEDEVAC standard of 2 hours for urgent and urgent-surgical patients.

Active component CABs have been reduced from 13 to 10, decreasing total lift capacity, while the addition of a third maneuver battalion to each infantry brigade combat team has increased the number of Soldiers and equipment that must be moved by air as part of their missions.

Simply eliminating the MEDEVAC companies from divisional CABs and reallocating the 15 aircraft into assault battalions will increase both tactical flexibility and the number of casualties the aviation unit can handle. The reallocation of assets and adding an elimination of divisional CAB MEDEVAC aircraft will provide the CABs with additional lift capabilities while enhancing the existing CASEVAC competencies with critical care flight paramedics (CCFP). Combat aviation brigade commanders retain an assigned mission, performing the same stand-by duty currently performed by MEDEVAC companies, but not restricted from using any aircraft available for other missions. Casualty evacuation operations already exist in the assault battalion mission essential task list (METL) as Task Number 01-BN-5154, Conduct Aerial Casualty Evacuation (CASEVAC) Missions. This requires only minimal adjustment, specifically assigning CCFPs to dedicated or designated CASEVAC crews and aircraft.

A sample updated task would read (updates in red):

CONDITIONS: The unit is supporting assigned operations in a dynamic and complex operational environment against a hybrid threat and receives a mission order, along with the higher headquarters commander's guidance directing the unit to conduct CASEVAC missions. The command post is established, and the unit has the qualified personnel and operational equipment available, including trained 68W CCFPs as required, to conduct the mission(s). Communications and digital connectivity are established with higher headquarters, supported, adjacent, and subordinate units, and the unit is passing information according to higher headquarters' requirements. The mission order provides graphics and the scheme of maneuver to the aviation liaison officer(s) and supported and subordinate units. Additionally, close coordination with divisional medical planners to know locations and capabilities of medical facilities will be paramount. Some iterations of this task should be performed in mission oriented protective posture level 4.

STANDARDS: The unit conducts CASEVAC missions according to the mission order, published directives and regulations, the unit's tactical standard operating procedures, and the commander's intent. The unit passes and receives situational updates to/from mission aircraft and monitors arrival at the pickup zone within the time constraints specified in the mission order. All casualties and associated equipment and supplies are transported according to the commander's intent and guidance.

Assault battalions will add the perform hoist operations task to their METLs and treat that training in the same manner and to the same standard as MEDEVAC companies. Medical operations officers remain in staff positions in the assault battalion and/or CAB headquarters for planning, and retain flight status in the assault company or in one of the two echelons above division CABs' MEDEVAC companies where evacuation outside of adversary short/medium range indirect fire occurs. The en route care given by the CCFP remains in the assault battalion. This would allow the CAB commander to allocate forces to meet the needs of the situation.

A proof of principle occurred in Regional Command (South), Kandahar, Afghanistan from 2008–2009. The Army could not field enough MEDEVAC units to maintain the "Golden Hour" mandate, so Air Force HH-60G Pave Hawks were brought in to make up the MEDEVAC shortfall. These aircraft were crewed by Air Force combat search and rescue pilots and crewmen, with the addition of pararescue airmen for medical care, and were tasked with MEDEVAC of personnel. Additionally, the Special Operations Aviation Regiment conducts CASEVAC with a flight medic on board for their missions. Neither of these organizations have special medical protections under the Geneva Conventions nor the Law of Armed Conflict, yet they still accomplish the mission while being armed with more than personal defensive weapons.

The Army should empower CAB commanders to utilize aircraft within the orders and guidance of the division commander, including CASEVAC. Additionally, the Army and its leaders should build MEDEVAC companies into theater enabling CABs to perform MEDEVAC missions outside of, or within only limited, air defense and indirect fire ranges, and continue the CCFP training program and integration into the flight companies as flight crewmembers.

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This article should in no way be mistaken as an attack on MEDEVAC units, crewmembers, or planning personnel. The article should be considered a primer for conversation, interaction, and assessment as devoid as possible from emotional attachments to the past. As a historian and former AE officer, I am proud of what was accomplished before, during, and after my service. However, near-peer competitors, an Army-wide shift to multi-domain operations, and limitations of resources should be considered dispassionately regarding unit histories and heritages. Army leaders should not hold onto legacy concepts based on feelings or hubris. The American ways of war are changing, and our formations and equipment must change to meet them. Our Soldiers deserve nothing less.

Mr. George M. Johnson is a retired Commissioned Officer. He served as a ground Medical Service Corps Officer (70B), a Medical Service Corps Aviator (67J-Army MEDEVAC), and an Army Aviation Officer (15B) with Europe, OEF, OIF, and CONUS experience. His previous assignments include Germany, Yakima Training Center, and Fort Rucker.

U.S. Army Soldiers assigned to C. Company, 2nd Battalion, 211th General Support Aviation Battalion, Minnesota Army National Guard, hoist a basket into a UH-60L Black Hawk helicopter aboard the Landing Craft, Utility 2027, USAV Mechanicsville, in the Arabian Gulf near the Kuwait Naval Base, Feb. 20, 2019. C. Company conducted aeromedical evacuation hoists from LCU 2027's weather deck to familiarize crew members with hoist procedures over an anchored and moving vessel. U.S. Army National Guard photo by SGT Emily Finn

References:

Brady, P. H. (2013, June 20). The decline of Dustoff. *The American Legion*. Retrieved from https://www.legion.org/magazine/216261/decline-dustoff

Daugherty, L. J., III (2014). *The allied resupply effort in the China-Burma-India theater during World War II*. Jefferson, NC: McFarland & Company, Inc.

Department of the Army. (2019). *Medical evacuation* (Army Techniques Publication 4-02.2). Washington, DC: Headquarters, Department of the Army.

Department of Defense. (2010). *Functions of the Department of Defense and its major components* (Department of Defense Directive Number 5100.01). Washington, DC: Headquarters, Department of Defense.

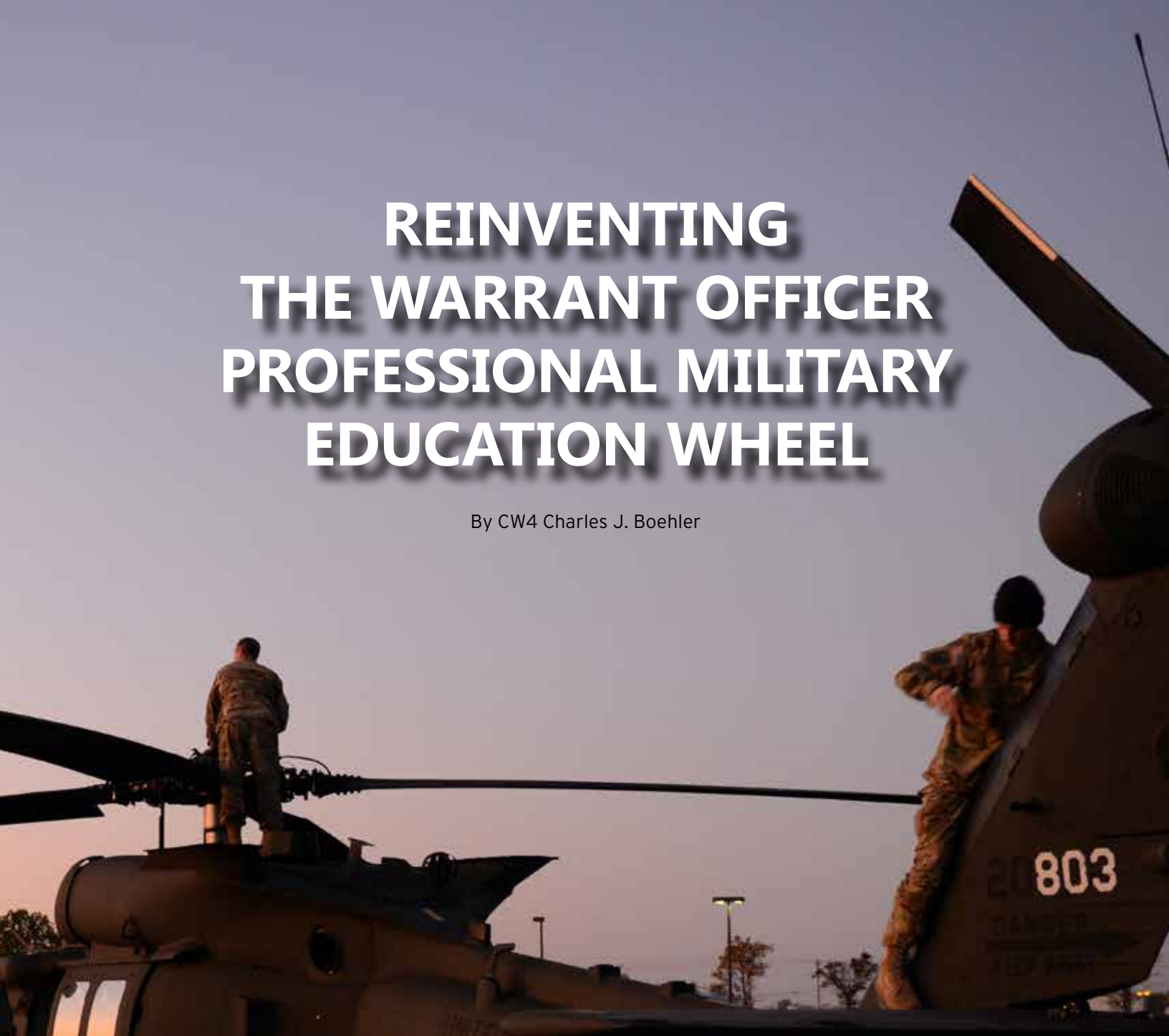
Green, B. (2001). Challenges of aeromedical evacuation in the post-Cold-War era. *The Aerospace Power Journal, 15*, 14–26.

Stockfisch, J.A. (1994, July 29). *The 1962 Howze Board and Army combat developments*. Santa Monica, CA: RAND, 7. Retrieved from https://apps.dtic.mil/dtic/tr/fulltext/u2/1070942.pdf

Whitcomb, Darrel. (2011). *Call sign dust off: a history of U.S. Army aeromedical evacuation from conception to hurricane katrina*. Frederick, MD: Department of Defense, Department of the Army, Army Surgeon General Office, and The Borden Institute.

REINVENTING THE WARRANT OFFICER PROFESSIONAL MILITARY EDUCATION WHEEL

By CW4 Charles J. Boehler



I think most involved would agree that the current professional military education (PME) system is not tailored to the needs of warrant officers in general and aviators in particular. By patterning the current PME courses after O-grade courses, the Army is not putting its aviators in a position to succeed and grow in their profession. To be clear, I'm not suggesting that the current courses are worthless but rather, that they should be laser-focused in relevant terms to the students. It's apparent that there are moves in the right direction, but a larger shift away from the way courses have been structured in the past are needed. We need to reinvent this wheel.

Indiana National Guard Chief Warrant Officer 3 Nick Cassin and Chief Warrant Officer 2 Chris Fuhs, UH-60M Black Hawk helicopter pilots with the 137th Assault Helicopter Battalion, check each propeller in preparation for a rappel mission Saturday, Nov. 2, 2019 in Shelbyville, Indiana. U.S. Army photo by SGT Aimee Shatto

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U.S. Army Chief Warrant Officer 3 John Marsh and Captain Nicholas Bruno, assigned to the 3rd Combat Aviation Brigade, 3rd Infantry Division, taxi their UH-60 Black Hawk helicopter, on Chièvres Air Base, Belgium, Oct. 23, 2019. U.S. Army photo by Pierre-Etienne Courtejoie

In Army aviation there is a clear need to have continuing education for aviators–aviator training–not battalion commander training. There are no true post-graduate Army aviator courses in existence today. This fact alone should concern us all. Units are required to provide continuing education, but that's a difficult task. With varying levels of pilot skill and knowledge, along with a somewhat revolving door of personnel, standardization pilots (SPs) and other senior trainers are stuck in an endless cycle of just trying to maintain training requirements in many cases. In addition, many trainers simply do not have the knowledge base to provide advanced training. Many of the pilot training classes I've seen, active and reserve component, are just a regurgitation of flight school material. We need a clear succession of aviation education. Tactics training is an area sorely lacking in Army aviation. A revised PME concept would provide an avenue to incorporate that education in a much more focused way.

One of the key components to my proposal is a restructuring of the Aviation Mission Survivability Officer (AMSO) course. The AMSO course has evolved to a point where it should be advanced (discussed further later in this article). As a replacement for the AMSO at the unit level, I propose a reversion back to the Tactical Operations (TACOPS) course. With the change to the AMSO course, there have already been negative impacts to units in the field regarding the knowledge and abilities relating to duties, such as Aviation Mission Planning Software administration and personnel recovery.

For advancing CW2s to be where they need to be as pilots, the training should revolve around what takes place after becoming a pilot in command (PC). Luckily, these courses are already in place via the following tracks: instructor pilot (IP), maintenance test pilot, aviation safety officer (ASO), and the re-creation of TACOPS. Adding about a week of "common core" material at the beginning of each tracked course focusing on airmanship, cockpit leadership, and air mission commander (AMC) training through academics and simulator scenarios, would provide a springboard for our aviators to grow from while replacing the need for the Aviation Warrant Officer Advanced Course.

The problem with this scenario is what to do with pilots who are not PCs yet. We should not have a culture where commanders and SPs are feeling pressured to make someone a PC before they're ready simply because a promotion depends on it. This is particularly true in the reserve component where perhaps a part-time aviator simply hasn't had enough experience to merit selection as a PC. My recommendation would be to track them as ASO or TACOPS and remove the PC requirement for those courses. The requirement to have tracked warrant officers as PCs is spelled out in Training Circular 3-04.11, "Commander's Aviation Training and Standardization Program;" however, that requirement should be changed for these two courses (Department of the Army, 2018). At the company level, there is no practical reason to require PC for those tracks. This should not be construed as downplaying the importance of both of these tracks, as they are both critical to the success of any unit. However, there has to be some throughput for aviators who haven't made PC yet to succeed. These courses, along with the incorporation of the first-week common core material, would help push these aviators toward PC status. Perhaps giving them 2 years upon completion of the course to attain PC status would be a reasonable compromise.

For the CW3 to CW4 timeframe (or slightly before), I recommend a group of Army aviation community-based courses patterned after the Air Cavalry Leader's Course (ACLC). Air Cavalry Leader's Course students are trained in the use of aerial reconnaissance assets through academics, multiple practical exercise, and simulations. The medical evacuation (MEDEVAC) community has the MEDEVAC Doctrine Course, which could be reshaped to provide a similar type of structure to the ACLC. Courses that would need to be developed are assault/lift, attack, and cargo. Aviators who change communities would also have a means to learn their new community in a professional setting.

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For CW4 to CW5 status, a multifaceted approach is needed. The first part of the approach is ***civilian education*** in the form of a bachelor's degree. Communication skills, both written and verbal, are needed as an officer, and what better way than through a degree program? As aviators would ostensibly be working on their degree to meet this timeframe earlier in their career, development of communication and critical thinking skills should happen around the CW3 mark. Civilian education has many benefits and also plays into the broadening context used so often to explain why PME courses are structured the way they are.

The second part of the approach would be the ***Joint Firepower Course*** (JFC). The JFC is completely relevant in this context because it teaches students the capabilities and limitations of a range of joint fires and the use of unmanned aircraft systems (UASs) on the battlefield. Imagine scenarios where a MEDEVAC pilot is able to call for fire, an air assault AMC knows how to call for a 9-line close air support request, or a cargo pilot directs UAS operators to an area of interest. For awhile now, we've been talking about every Soldier being a sensor. Let's take that a step further and expand the knowledge and skills of all our pilots so that we can maximize our effects on the battlefield.

The last part would be the ***Joint Air Operations Command & Control Course***. This course teaches students how to integrate joint air assets into the ground fight. In addition, graduates would know how to produce an air tasking order and an airspace control order. The course is intended for those assigned to brigade level and above and fits into the glide slope of education for senior aviators.

Not in this chain of PME, but certainly in the domain of developing the best aviators possible, is the need for a "Jedi Master" course (I'll hereafter refer to this as JMC, just because no military article is complete without the overuse of acronyms or the creation of new ones). The template is already there through the Navy's TOPGUN school (or "Navy Strike Fighter Tactics Instructor" school), the U.S. Air Force's Weapons School, and the U.S. Marine Corps' Weapons and Tactics Instructors (WTI) course. No particular track should be a prerequisite for this course; rather, it should require application submission and a rigorous screening process. The JMC is the natural evolution of the existing AMSO course but elevates things to a new level and resolves some problems regarding training and evaluating tactics and maneuvers of the non-IP. The JMC should focus on making the best warfighting aviators and teachers possible by concentrating on tactics and then

Warrant Officer Candidate Nathan Haas, of Akron, Ohio, and Chief Warrant Officer 2 Elisha Williams, of Rhinelander, Wisconsin, assist Warrant Officer Candidate Roger Vance scale a wall on the leadership reaction course at Camp Atterbury during Phase 3 of Warrant Officer Candidate School. U.S. Army photo by SFC David Bruce

Soldiers from the 1st Air Cavalry Brigade, 1st Cavalry Division, stand at the position of attention as they recite The Soldier's Creed during a graduation ceremony for the Aviation Warrant Officer Advanced Course, Sept. 14. U.S. Army photo by SFC Joe Armas

sending those aviators back out to the field to spread their knowledge. Each community should have its own JMC, and these must be flying courses replete with simulations of every threat possible (small arms, man-portable air defense systems, anti-aircraft artillery, surface-to-air missiles, fixed- and rotary-wing air-to-air, electronic warfare, etc.). As a true post-graduate aviator course, students would come away with instructing skills far above those taught at the IP course. Similar to WTI and TOPGUN, graduates of the JMC should be given the honor of wearing a unique patch on the top of their left shoulder for the remainder of their careers. These "patch wearers" would then have a responsibility to teach and further standardize tactics, techniques, and procedures throughout every Army aviation community, as well as giving commanders another resource from which to draw upon.

Talent management is a term currently in vogue in the U.S. military. Among other things, this means putting the right people in the right jobs and retaining the high performers. This PME system better enables talent management by providing a path for growth, as well as an outlet for the very best to succeed and separate themselves from the pack. The model of individual passion, talent, and personality should be the prime determiners in selection for a track and the JMC. Unit needs always play a large part in this as well but should not be the primary driving force as inevitably, aviators will be put into jobs unsuited to their talents and personalities.

No discussion of PME would be complete without at least mentioning the evaluation and promotion process. In many ways, current officer evaluation reports (OERs) are insufficient in dealing with a talent management system. We need a schooling system that allows for excellence. An OER system that can recognize that and take in other factors is a logical next step. Professional military education student evaluations should be incorporated into OERs. How many commanders and leaders out there don't have knowledge about how their Soldiers performed at their PME courses? In my experience, that number is likely very high and speaks poorly about how we think of training and education, much less leadership.

Pilot retention is also a problem in Army aviation. Like every other Soldier, pilots want to do their job. When offered a continuing education cycle that revolves around their primary duties, aviators are likely to seek out these courses rather than avoid them. For those with commensurate skills and abilities, the JMC would be an attractive opportunity. Broadening certainly has many benefits; however, in my opinion, the current PME courses don't adequately prepare warrant officers for positions at upper echelons outside of aviation anyway. Instead, PME should be focused on making us the best aviators and tacticians possible.

Some counterarguments to these proposed changes would be cost and lack of leadership training. Other than the JMC, additional costs incurred would be relatively minimal, as many of these courses already exist. For the courses that don't exist, such as an Air Assault Leader's course, the infrastructure is already in place (classrooms and simulators are at Fort Rucker, Alabama, and would only need an expansion of the cadre). As far as leadership training goes, there would certainly be leadership taught from the perspective of the cockpit, program management of the tracked programs, and tactics. Student-led planning and briefings could be incorporated into all of the courses previously listed that don't already have them.

We in the Army aviation community tend to look for hardware solutions to our problems. However, no matter how impressive future vertical lift or any other aircraft we have is, it won't matter if we can't effectively employ them. Effective employment means tested and standardized tactics, maximized training across the force, and full utilization of what we already have. The AMSO course is on the right track but needs to take the next step. By growing AMSO to JMC, we have an opportunity to move in a direction proven to work by all other branches of the military. Professional military education should consist of subject matter that makes us better warfighters. Everything else is irrelevant.

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Reference:

Department of the Army. (2018). *Commander's aviation training and standardization program* (Training Circular 3-04.11). Washington, DC: Headquarters, Department of the Army.

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SO, YOU'RE A SIMULATIONS OFFICER... WHAT EXACTLY WOULD YOU SAY YOU DO?:

UTILIZATION OF THE FA 57 IN THE COMBAT AVIATION BRIGADE

By MAJ Fred E. Martin Jr., U.S. Army

"MR. SALOMON, I HANDED YOU A TRICK QUESTION. THE PRACTICAL REASON FOR CONTINUING OUR SYSTEM IS THE SAME AS THE PRACTICAL REASON FOR CONTINUING ANYTHING: IT WORKS SATISFACTORILY."
MAJOR REID
(HEINLEIN'S STARSHIP TROOPERS, 1987, P. 181)

1st Squadron, 17th Cavalry Regiment, 82nd Combat Aviation Brigade receives their initial fielding of the new Echo Model Apache, replacing the previous generation's Delta Apache helicopter. While not the first in the Army, they are the first on Fort Bragg to receive these new aircraft. U.S. Army photo by SSG Sharon Matthias

Simulation operations officers assigned to combat aviation brigades (CABs) should be utilized as chiefs of plans to maximize their impact as staff members. Unlike a brigade executive officer (XO), operations officer (S-3), or fire support officer (FSO), O-4 FA 57 simulation operations officers assigned to CABs do not have a clearly defined role. The simulation operations branch provides the Army with "...operationally seasoned officers..." (Department of the Army [DA], 2014, p. 321) who specialize in "...M&S [modeling and simulation], mission command systems integration and operational knowledge management [KM]" (DA, 2014, p. 320). Some FA 57s may serve as chiefs of operations, managing the daily functions of the brigade operations center; some may only coordinate with the local mission training complex; and some may be asked only to maintain SharePoint. However, during my time in the 82nd CAB, I served as the non-modified table of organization and equipment (MTOE'd) chief of plans, operationalizing the core competencies of the simulations branch: M&S, KM, and mission command system integration (DA, 2014, p. 320). This approach provided the commander maximum output from all assigned field-grade officers, streamlined the CAB's long-range planning, and contributed to effective 82nd CAB employment during Warfighter Exercise 19-03.

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The purpose of this article is to detail my experience serving as a chief of plans in order to provide CAB commanders and staff officers "a way" to best utilize their assigned FA 57 and/or advocate for a fill of a vacant billet. The following sections detail FA 57 education and responsibilities, an example of the effective CAB S-3 shop organization, and how an FA 57 can integrate his branch's core competencies at the CAB level. I'll also address the "most likely" counterargument, which asserts that the CAB FA 57 should serve as the chief of operations.

A BRIEF FA 57 INTRODUCTION.

FA 57s transition to the simulations branch through the voluntary transfer incentive program board process typically having completed a key developmental assignment as a captain in their respective basic branch (DA, 2014, p. 321). All FA 57s complete the 8-week simulation operations course where they receive detailed instruction on the branch's core competencies; M&S operations, operational KM, and mission command system integration. Modeling and simulation operations provide a capability that involves translating a commander's training requirements "…into technical solutions by integrating live, virtual, constructive and gaming capabilities…" (DA, 2014, p. 320). The focus of operational KM is integrating "…knowledge management principles with mission command systems and staff standard operating procedures to provide the commander with the right information in the right format at the right time to drive decision-making" (DA, 2014, p. 320). It is important to note that FA 57s will most likely have earned the 1E (KM) skill identifier before arriving to their first FA 57 assignment. Mission command system integration seeks to weaponize Army mission command information systems (MCIS), through their integration and massing, "…to achieve informational dominance and situational understanding for the commander and staff" (DA, 2014, p. 320).

S-3 SHOP ORGANIZATION WITH AN FA 57 CHIEF OF PLANS.

The organization of a CAB S-3 shop's duties and responsibilities can either maximize or minimize an FA 57's ability to best support operations. An effective method employed in the 82nd CAB was to split the operations section into two subsections: a current operations (CUOPS) cell and a future operations/plans (FUOPS) cell. The S-3 designated the O-4 FSO as the CUOPS chief. The FSO led a team of aviation, fires, and cyberspace electromagnetic activities captains; noncommissioned officers (NCOs); and troopers responsible for daily reporting requirements, Flying Hour Program and monthly aviation readiness review product development, weekly taskings dissemination and tracking, and air movement request management. Schools, defense travel system, and digital management training system functions also resided in the CUOPS section.

The S-3 designated the O-4 FA 57 as the chief of plans. The FA 57 was responsible for major planning efforts, and associated operations order development, developing, resourcing, and synchronizing future operations and maintaining the CAB long range training calendar (LRTC). This maintenance included battalion inputs to brigade and brigade inputs to division. The FUOPS cell was comprised of the MTOE'd assistant S-3 captain; medical operations officer (67J); unmanned aerial systems operations officer; chemical, biological, radiological, and nuclear officer; and captains transitioning into and out of the brigade. The FUOPS cell also retained oversight of the CAB's air defense airspace management (ADAM) cell. While in garrison, the ADAM cell managed the brigade LRTC and land management processes, while its officers often served as project leads for key responsibilities/projects (e.g., serving as the brigade global response force coordinator and planning brigade social functions). It is also important to highlight that the FUOPS cell relied heavily upon inputs from the brigade master gunner and aviation mission survivability officer during planning efforts.

INTEGRATING FA 57 CORE COMPETENCIES INTO CAB DAILY OPERATIONS.

MODELING AND SIMULATION OPERATIONS:

As chief of plans, the FA 57 can support the commander's training objectives by liaising for resources, conducting exercise/scenario design, and developing command post exercise (CPX) plans. Because the FUOPS cell owned the LRTC, land management, and the development of operations orders, resourcing questions naturally followed. In the chief of plans role, the FA 57 was well situated to respond to resourcing questions and coordinate for training resources based on access and familiarity with upcoming training events across the brigade. This familiarity with commanders' training objectives allowed the FA 57 to work closely with both the brigade S-3 and battalion representatives to develop training requirements and offer potential resource solutions; including solutions provided by the local mission training complex, training support center, and/or other entities. For example, knowing our heavy attack reconnaissance squadron was planning a culminating training exercise following an extensive training cycle, we at the brigade level reserved multiple "Tank in a Bag" systems to provide an option for the squadron. Close and frequent proximity to the LRTC and battalion S-3's also enabled effective scenario design/development.

Familiarity with the CAB's long-term training plan also enables the FA 57 to leverage exercise design and development skills to craft training scenarios that best support the commander's training objectives. All FA 57s receive scenario design and development training during the simulation operations course and, if selected to attend, at the Command and General Staff

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College at Fort Leavenworth. As a result, FA 57s understand "Road to War" development, storyline development, master scenario events lists, and other products/topics that support the achievement of a commander's training objectives. As the chief of plans, the FA 57 can effectively execute operational planning team events across staff sections to develop training scenarios and the corresponding operations orders required to drive training. For instance, in support of our brigade's Directorate of Evaluation and Standardization inspection, our commander's guidance was to conduct a brigade-level tactical exercise rather than simply conducting individual flights to meet inspection requirements. In response, the staff (with the FA 57 chief of plans serving as the lead planner) developed a training scenario; the corresponding operational environment; and brigade order complete with opposing force construct, intelligence reports, and logistical constraints to drive subordinate unit planning. Although not an aviation, intelligence, or logistics officer, the FA 57's formal training in scenario design and development enabled the effective synchronization of inputs from across the staff to achieve the commander's desired endstate.[1]

Understanding the long-term training plan also enables the FA 57 to develop CPX training plans which support a "crawl, walk, run" conceptual arc in line with the staff's needs and the commander's objectives. Since CABs deploy mission-tailored multi-functional aviation task forces to combat training centers, CAB staffs typically lack operational employment unless they are actually deployed. As a result, culminating staff validation exercises, such as warfighter exercises, serve as the "mark on the wall" for CAB staffs to train and prepare for. The FA 57 can operationalize the mission command training tables found in Training Circular 6-0, "Training the Mission Command Warfighting Function," to develop a tiered training approach to ensure staff proficiency (DA, 2017). Serving as the chief of plans empowers the FA 57 to develop and schedule CPX training plans that flow logically by nesting them with the LRTC, thus ensuring that the CAB staff is ready to "run" when required.

OPERATIONAL KNOWLEDGE MANAGEMENT:

The chief of plans position affords the FA 57 a long-term perspective, allowing the maintenance of garrison KM systems and enabling deliberate planning in support of tactical planning cycles. When a brigade staff prepares for a large-scale tactical exercise, it likely designates blocks of time to conduct the military decisionmaking process (MDMP). The FA 57, who also serves as the brigade's KM officer, enables planning efforts by ensuring the KM system for saving and consolidating MDMP products, annexes, and orders is established and understood by the staff prior to the beginning of planning. Although the tactical KM plan should mirror the daily garrison KM plan, the reality is that there will likely be some differences required to meet the commander's intent. By working with the XO and S-3, the FA 57 can operationalize the commander's intent by providing oversight to the designated technical-system expert (e.g., SharePoint), enabling the development of the proper technical solution. Furthermore, during planning cycles, the FA 57 will work closely with the S-6 to develop the KM annex (annex Q) of the operations order, freeing the S-6 to focus on tactical communications. In the 82nd CAB, the FA 57 also led efforts to develop and codify the unit's KM and mission command SOP. Standard operating procedure development oversight by the FA 57 was strongly facilitated by the proximity to and indepth understanding of the brigade's planning processes afforded by the chief of plans position.

The FA 57 serving as the chief of plans also logically injects an additional field-grade leader into planning cycles such as deliberate MDMP sessions or the orders production cycles required to support real-world operations and/or warfighter exercises. During deliberate MDMP sessions, the FA 57 can easily steer the staff to effectively organize and consolidate information when the XO and S-3 are faced with competing requirements. As the chief of plans, the FA 57 will likely have the fewest brigade-external commitments (e.g., rehearsals, battle rhythm events, division-level meetings) and is easily able to assume a lead role in the absence of other leaders, complementary to the FA 57's KM responsibilities.

During real-world operations or large-scale exercises, the FA 57 in the chief of plans position enables staff synchronization during planning cycles because of the resultant 24-hour, or nearly 24-hour, direct field-grade leadership the position provides within the operations section. For example, during Warfighter Exercise 19-03, the S-3 and chief of plans each deliberately worked shifts of approximately 16 hours that usually overlapped for 12 hours (S-3's shift: 0700–2300; chief of plans' shift: 1000–0200) (82nd CAB Staff, 2019, p. 14). Shifts synchronized in this manner enabled the S-3 and chief of plans to attend the operations and plans synchronization meetings run by the S-3 and chief of plans, respectively, ensuring continuity between day and night staff shifts during planning efforts (82nd CAB Staff, 2019, p. 14). Shift synchronization also enabled the S-3 and/or chief of plans to lead intensive planning efforts, while simultaneously granting the S-3 the ability to attend/manage battle rhythm and non-battle rhythm events and direct current operations as required (82nd CAB Staff, 2019, p. 14). Although not a real-world operation, the processes practiced and developed during Warfighter Exercise 19-03 would have undoubtedly

[1] The primary tool used to synchronize orders production during this planning effort was the G2 provided Exercise Design Tool found at https://oedata.army.mil/index.html. Access to this database requires a valid common access card.

been implemented in support of real-world operations if the 82nd CAB were called upon. The FA 57 serving as the chief of plans allows the option of 24-hour direct field-grade leadership in the operations section, enabling planning efforts and synchronization across the staff and complementary to the FA 57's KM responsibilities.[2]

MISSION COMMAND SYSTEM INTEGRATION:
Although serving as the chief of plans physically locates the FA 57 outside of the CUOPS floor where the MCIS reside, the FA 57 can and should heavily influence mission command system integration and related training. By definition, the FA 57 holds an appreciation for the importance of MCIS integration and individual operator training. As the chief of plans, the FA 57 maintains a detailed understanding of future training, allowing him to suggest to the S-3 and CUOPS team when staff members should conduct training on their assigned systems. The FA 57's unique vantage point of the LRTC and development of the CPX training series previously described provides critical context to scheduling key individual training. Moreover, the FA 57 can and should maintain awareness of and promote courses such as the digital master gunner course to maintain proficiency among supervisors responsible for maximizing MCIS integration on the CUOPS floor. Though the influence is somewhat indirect, the mission command system integration aspect of an FA 57's responsibilities is maximized from the chief of plans' position.

A FEW THOUGHTS TO ENHANCE THE FA 57'S CONTRIBUTIONS.

1. ENABLE THE S-3. The best way for the FA 57 to contribute to the CAB's operations is to enable the S-3. Enabling the S-3 is best characterized by allowing him to work up and out or to simply focus wherever he must at that moment, rather than remaining decisively engaged in long-range planning efforts. This means the FA 57, as the chief of plans, must keep the "ball rolling" on projects that may not be the current priority. This momentum is achievable when the FA 57 tracks the projects issued to planners and ensures progress is maintained, even when a project is not highly visible in command channels.

2. INTEGRATING WITH THE COMMANDER. To best aid the entire CAB staff in developing complete and actionable plans, the FA 57 serving as the chief of plans must maintain a clear understanding of the commander's priorities and consistent touchpoints with the commander to ensure accurate plans are being developed. While serving as the 82nd CAB's chief of plans, the best method I found to ensure flattened understanding of the commander's priorities and necessary steering was a monthly plans update brief. During the briefing, the chief of plans, individual planners, and the brigade S-3 provided the commander with updates on long-term projects and planning efforts. During busier tactical operations, we conducted air tasking order-focused daily update briefs.

COUNTERPOINTS TO THE "MOST LIKELY" COUNTERARGUMENT.

A likely counterargument to this article's thesis (FA 57s should be chiefs of plans) is that FA 57s should serve as chiefs of operations in CUOPS cells due to the KM and mission command system integration core competencies. However, the CUOPS cell's required depth of knowledge for relatively short-term events would likely degrade the FA 57's ability to focus on any competencies outside of KM, minimizing his impact for the CAB. Additionally, the FA 57 is not a natural fit on the CUOPS floor during tactical exercises or operations. The presence of a field-grade FA 57, FSO, and S-3 on the CUOPS floor would likely overwhelm any captain charged with executing battle captain tasks. An FA 57 on the CUOPS floor would also simultaneously contribute to the degradation of FUOPS cell planning efforts by removing an additional planner from the cell, as well as the option of direct field-grade oversight during all orders development cycles. The option of 24-hour direct field-grade leadership in the operations section is achievable when the S-3 and chief of plans' rest cycles are sequenced properly (as previously described in this article's Warfighter Exercise 19-03 section), arguably reducing organizational risk.

CONCLUSION:
FA 57s assigned to CABs should be used as chiefs of plans to maximize their ability to support the CAB commander and staff. The formal training and core competencies of the FA 57 prepare him to support long-range training management and planning, and provide the CAB commander with a seasoned officer whose talent can reduce risk, integrate plans, and effectively steer the organization. This article is not all-inclusive of the duties and responsibilities an FA 57 can execute in a CAB; rather, it provides "a way" that FA 57s can be effectively employed to enable CAB success. Utilization as the chief of plans best enables the FA 57 to support the CAB through the operationalization of the simulation operations branch's core competencies.

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References:

Department of the Army. (2014). *Commissioned officer professional development and career management* (Department of the Army Pamphlet 600-3). Washington, DC: Headquarters, Department of the Army.

Department of the Army. (2017). *Training the mission command warfighting function* (Training Circular 6-0). Washington, DC: Headquarters, Department of the Army.

Heinlein, R. (1987). *Starship troopers*. New York, NY: Ace Books.

82nd Combat Aviation Brigade Staff. (2019). *82nd Combat Aviation Brigade WFX 19-03 AAR comments & notes (version dated 211716MAR19)*. Fort Bragg, NC: 82nd Combat Aviation Brigade Staff.

[2] The points cited in this section are a direct result of my experience during Warfighter Exercise 19-03 and were originally written for, and included in, the 82nd CAB staff-generated document "82nd Combat Aviation Brigade WFX 19-03 AAR Comments & Notes" dated 211716MAR19.

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CROSS-CULTURAL COMMUNICATION IN THE COCKPIT

By CPT William J. Caffery

"Brief will begin in 5, 4, 3, 2, 1, time is now, time is hack," starts every air mission brief (AMB) conducted with the Afghan Special Mission Wing (SMW). It is an introduction that any U.S. Army aviator is accustomed to hearing. The genesis of this phrase is to ensure that all aircrews are operating off the same time, down to the second, for the synchronization of all efforts during the mission. The numerous global positioning system devices now used in Army aircraft ensure that all aircraft in a flight are always on the same time down to the second, making that opening phrase somewhat obsolete.

As a phrase that was taught to Afghan pilots over the last 2 decades, the time hack has not retained its original meaning. No one attending the brief is syncing his watch to the time hack the briefer is reciting, no one sets his aircraft clock to the mission brief time, and no one gives a second thought as to why the AMB is beginning with an antiquated axiom. To many of the personnel present in the briefing, the time hack is how the American pilots first instructed them to start the AMB, so the call out lives on.

This article is certainly not meant to cast the pilots of the Afghan SMW in a negative light. They are a highly trained and professional aviation force who have been providing aviation support to U.S. and Afghan forces across the theater daily for the last several years. Instead, this account serves to highlight the type of miscommunication that can occur when conducting cross-cultural aviation operations. It is not enough to just instruct someone how to perform a task. Comprehension across cultural barriers must be learned. In working with the Afghan SMW over the last year, I believe there are some important highlights to reference about aircrew coordination principles when dealing with a multicultural, multilingual, and multinational cockpit.

Joint Publication 3-16, "Multinational Operations," defines the tenets of a multinational operation as, "... respect, rapport, knowledge of partners, patience, mission focus, teambuilding, trust, and confidence" (Joint Chiefs of Staff, 2019). The four layers of cross-cultural communication in the cockpit closely align with these tenets. Confidence in foreign aircrew members, simplified language in the cockpit, strong relationships, and a thorough understanding of partner force standard operating procedures (SOPs) are all critical components when dealing with a multinational cockpit to enable proper aircrew coordination.

LTC Fred Koegler, commander/Mi-17 advisor pilot, 441st Air Expeditionary Advisor Squadron, watched Afghan National Army soldiers board a Mi-17 helicopter, Sept. 8, in Dai Chopan, Zabul Province, Afghanistan. U.S., Afghan, and Lithuanian airmen from the Kandahar Air Wing, Kandahar Airfield, Afghanistan transported passengers traveling from remote locations throughout Afghanistan during an operational sling load mission. U.S. Army photo by Senior Airman Jessica Lockoski

All four layers of cross-cultural communication can be viewed as overlaying the four principles and four objectives of Aircrew Coordination Training-Enhanced (ACT-E). There are aspects from each layer that must be considered and applied when dealing with foreign crewmembers. The layers are also mutually supportive and reinforcing aspects where each aids in the application and utilization of the other.

The first layer of cross-cultural communication is having confidence in partner force aircrew members. As a U.S. Army aviator, there is a common understanding of personal competency established by the training each U.S. crewmember receives. There are strictly enforced standards, both at the schoolhouse to ensure proper initial training and at the unit level to ensure adequate continuation training. As a U.S. aviator assessing a foreign counterpart, that counterpart's training history can be opaque and lead to a loss in confidence in the abilities of the foreign aviator. Not fully understanding the qualifications and training history of someone you are about to go fly with should make you uncomfortable.

Within the SMW, Afghan pilots have received their initial training from a wide range of sources such as Fort Rucker, within Afghanistan itself, or in Europe. While we may be unfamiliar with some of the training pipelines for foreign aviators, a certain level of trust must be assumed in that they have received the proper certification as a professional aviator. This added complexity is inevitable, owing to the unfamiliar nature of foreign aviation training. Before flying in the same aircraft or in the same flight with a foreign counterpart, it is imperative to gain a full understanding of the qualifications and training history of that counterpart. It is far easier to avoid the risk of the unfamiliar by not flying as a multinational flight or cockpit. However, as Army aviation continues to increase mission support across the world, these foreign aviators become a valuable source of local professional aviation experience and simply cannot be avoided.

Having confidence in partner force aircrew members is critical in maintaining a climate of ready and prompt assistance within the cockpit or flight. Aircrew Coordination Training-Enhanced asks us to "... respect the value of other crewmember's expertise and judgment regardless of rank, duty or seniority" (Directorate of Training and Doctrine, 2018, p. 3). As U.S. Army aviators, we cannot devalue someone's opinion during the conduct of aviation operations just because they are from another country, even with a vastly different training background. Within the SMW, we work daily with our Afghan counterparts to increase our trust in their capabilities. Every interaction is an opportunity to gain further insight into our partners and enhance our confidence in their abilities as professional aviators.

Going hand-in-hand with having confidence in partner force aircrew members involves creating strong and real relationships with them. As the second layer of cross-cultural communication, an established relationship in the cockpit is critical to overcome any inherent or latent cultural barriers that will be faced. Within our organic units in the U.S. Army, we build friendships and working relationships with coworkers on a daily basis. Our shared heritage as Americans further enables the friendships we build with fellow Soldiers. Close and sustained proximity will often breed the required relationships needed for effective crew communication in the cockpit. When working with a foreign counterpart, there are additional hurdles to overcome. With the Afghan SMW, it was not enough to just be near the Afghan crewmembers on a daily basis. Conversations that are limited to operational requirements are simply not conducive to building a real and lasting relationship. For instance, within the Afghan culture it is perceived as rude by the Afghan crewmembers only to discuss work issues. To build enduring relationships requires inquiring about more than flight duties. Time to do this has to be deliberately set aside.

Ultimately, spending the time necessary to build relationships outside the cockpit has paid dividends during the execution of flights with our Afghan counterparts. Having a personal relationship with the Afghan pilots and flight engineers allows for more indepth understanding of challenges they may be experiencing in the aircraft. Distractions from home or lack of adequate crew rest are only identifiable if you are personally familiar with the crew. These risk factors have a tendency to be written off as cultural differences or language barriers, which is why a strong relationship must be in place.

The third layer of cross-cultural communication is simplified language within the cockpit. The ACT-E already tells us to "Be explicit. Crewmembers should use clear, concise terms, standard terminology, and phrases that accurately convey critical information" (Directorate of Training and Doctrine, 2018, p. 3). In a cross-cultural flight or cockpit, this guidance takes on a different meaning. Language barriers, cultural references, and even the tone of voice can all convey disparate meanings. The most common example in conducting flights with SMW is the description of helicopter landing zones and touchpoints for the aircraft while on short final during an air assault. "I'm going to land to the left of the dark, football-shaped part of the field," can be a very difficult phrase to understand for crewmembers if they're unfamiliar with the general shape of a football. Cultural references and verbal idioms are, of course, ingrained in our speech. For a U.S.-pure crew, this description would not cause any issue; however, with a cross-cultural crew, these seemingly benign terms can increase confusion and danger during a critical phase of flight.

All U.S. Army aviators have the ben-

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efit of English as the common language for all aviation operations across the world. It is also a huge benefit in that most, if not all, foreign pilots we work with will have a working understanding of our native language. It is important, though, not to let this perk become a crutch. Having a basic understanding of some simple aviation terms and numbers in a foreign language can help increase situation awareness. This is especially important when unexpected events occur, as it is more likely that a partner force crewmember will revert to his native language. Learning even those few key words can greatly aid in building that strong relationship with foreign crewmembers and increase overall efficiency as a crewmember.

The final layer of cross-cultural communication in the cockpit is having a thorough understanding of all partner force SOPs and regulations. As professional U.S. Army aviators, we are required to have a comprehensive understanding of all applicable Army regulations; training publications; aircraft tactics, techniques, and procedures; and unit level SOPs. While some variation exists across the force, the core of our required knowledge remains constant. Of course, the importance of these documents is drilled into us from the earliest points of our initial entry rotary-wing training. When working within a multinational cockpit, it must be understood where there are critical differences in this baseline knowledge.

Foreign crewmembers are not bound to the same regulations as we are, but this does not make them a liability to be marginalized. They have their own set of rules governing conduct in the aircraft. One example is that the Afghan pilots in command in the Mi-17 will only sit in the left seat of the aircraft. There are only a few structural differences to the sides of the cockpit in the Mi-17: the placement of engine control levers, fuel shutoff levers, and the parking and rotor brakes. For U.S. pilots, there is no restriction of which seat the pilot in command will occupy. Understanding this restriction aids in making an informed choice when choosing crew positions for a flight. Without a comprehensive understanding of this SOP idiosyncrasy, it would be easy to assume that an Afghan pilot would be equally proficient in either crew station.

The final layer of understanding partner force SOPs is critical in creating confidence in the partner forces. With a more thorough understanding of the shared expertise that we have as professional pilots, we can more easily overcome the cultural difference between us.

The SMW Special Operations Advisory Group (SOAG) continues to be a small niche of active Army aviation where, on a daily basis, U.S. pilots are afforded the opportunity to fly with Afghan counterparts in the conducting of both training and wartime mission sets. The U.S. Army Forces Command worldwide individual augmentation system provides the SMW SOAG with a small group of pilots to conduct its mission. Sharing the cockpit with the Afghans enables the unit's mission to train, advise, and assist the Afghan crews and staff. The experience gained in flying with foreign counterparts provides U.S. Army aviators with a broader view of aviation operations. Lessons learned can be directly applied back at home station to provide increased crew capabilities of organic combat aviation brigades. Understanding the complexities of working with a mixed language, mixed cultural crew enhances a crewmember's understanding of aircrew coordination.

In conclusion, with the U.S. Army continuing to increase the number of partner forces we directly operate with across the globe, it is imperative that U.S. Army aviation crewmembers understand the importance of cross-cultural communication in the cockpit and how to safely and effectively accomplish it. Obtaining confidence in partner force crewmembers ensures that U.S. crewmembers are comfortable and ready to direct actions with foreign crewmembers while conducting flight duties. Building real relationships with partner force aviators facilitates overcoming cultural differences in the cockpit, as well as laying a foundation for effective communication in the cockpit. Simple and easy-to-understand language enables quick communication between different members of the crew and decreases any chance that actions are misinterpreted. Shared knowledge of SOPs creates shared understanding and helps crews identify the strengths and weaknesses of each other, mitigating risk during operations.

U.S. Army aviation cannot afford to shy away from the complexities of cross-cultural aviation operations. Naturally, there is an inherent increase in the risk of these operations that does need to be carefully identified and properly mitigated. The four cross-cultural communication layers just discussed are a guide to aid in identifying and mitigating these risks. U.S. Army aviators are already applying these lessons to great success on a daily basis in some of the most demanding flight profiles. In order to continue to achieve strategic objectives in places where the U.S. Army is operating, we must be ready to partner with, fly with, and crew with our foreign counterparts across these theaters.

CPT William J. Caffery, U.S. Army, is the J3 of the Special Operations Advisory Team—North (SOAT-N) SMW. His assignments include service as a CH-47F maintenance and flight platoon leader, brigade plans officer, and CH-47F heavy lift company commander. His overseas tours working with multinational aviation partners include two tours in Afghanistan and a long tour in Korea. He has over 9 years of experience in U.S. Army aviation and is a pilot in command and air mission commander in both the CH-47F and Mi-17.

References:

Joint Chiefs of Staff. (2019). *Multinational operations* (Joint Publication 3-16). Washington, DC: Headquarters, Department of Defense.

Directorate of Training and Doctrine. (2018). *Mi-17 aircrew training module (ATM).* Fort Rucker, AL: United States Army Aviation Center of Excellence.

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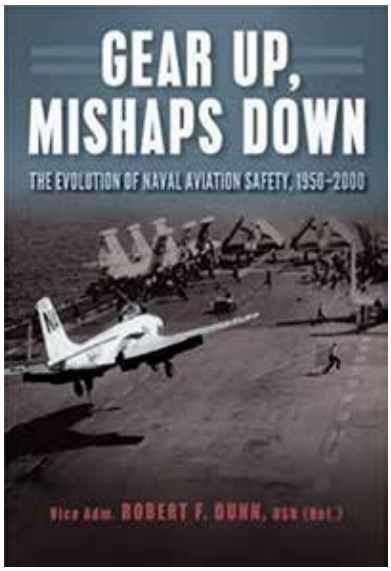
Gear Up, Mishaps Down: The Evolution of Naval Aviation Safety, 1950–2000

By Robert F. Dunn. Annapolis: Naval Institute Press. 2017. 224 pages

A book review by SFC Bowie Daniel Hall



With publications from *Popular Mechanics* to *Army Times* reporting on military aircraft safety challenges since the Budget Control Act of 2011, now is an opportune time to appreciate the lessons of a decades-long decline in mishap rates that once plagued the challenging field of naval aviation. Retired Vice Admiral Robert F. Dunn's *Gear Up, Mishaps Down: The Evolution of Naval Aviation Safety, 1950–2000*, explores this trend in an engaging historical narrative.

Addressing questions of "how" and "why" the Navy brought about an almost unbelievable reduction in aviation accident rates, Admiral Dunn summarizes several factors that one could attribute: "better leadership, better selection, better personnel management, improved integration of aviation medicine, better aircraft and systems, better maintenance and supply, angled decks and mirrors, the replacement training concept, or NATOPS" (Naval Air Training and Operating Procedures Standardization) (p. 68–69).

The author is uniquely qualified to illustrate the interplay of these elements over the period in question, having graduated from the United States Naval Academy in 1951 before serving a distinguished career as a naval aviator, including combat experience and command of the USS Saratoga and the Naval Safety Center. The three-star admiral's retirement has featured positions as deputy chairman of the National Aeronautics and Space Administration Aerospace Advisory Panel and as a Ramsey Fellow at the Smithsonian National Air and Space Museum, the latter allowing him to conduct research for *Gear Up, Mishaps Down*.

Though the book's subject would lend itself well to statistical methodology, the author notes in his afterword that records sufficient to treat mishap data as dependent variables and "specific changes in operating policies or material improvements" as independent variables appear not to exist (p. 137). Admiral Dunn's approach based on extant information therefore proceeds by highlighting key events along generally downward-sloping mishap rate charts. The first several chapters follow a chronological framework before the book shifts to a topical organization, with chapters highlighting (among others) aerospace medicine, human factors, and aircraft systems.

Admiral Dunn's literary skill compensates for the acknowledged lack of data to support more rigorous statistical methodology. Where a correlation coefficient may be impossible to calculate for example, readers encounter a transition from maintenance chiefs informally trading for spare parts (p. 12) to Commander (later Vice Admiral) Eugene Grinstead and Commander (later Captain) Howard Goben developing the Naval Aircraft Maintenance and Material Management Program (p. 94–96). This narrative approach answers the "how" and "why" of flight safety improvements in a manner that readers will likely find effective and entertaining.

Another strength of *Gear Up, Mishaps Down* lies in Admiral Dunn's ability to craft prose that maintains authentic and detailed terminology without bewildering readers from outside of the naval aviation community. Where necessary, one can turn to several appendices and a glossary for additional information. The main portion of the text successfully balances accessibility with meticulous research. This expands the potential audience to include both aerospace professionals interested in safety and casual readers interested in a historical success story.

Although the book's quality of writing and editing surpasses that of comparable works, occasional punctuation and word choice issues could lead to content questions. In one such case, the occurrence of helicopter mishaps during search and rescue, anti-submarine warfare, and Marine insertion is described as "atypical," but the context suggests that the author means "typical" (p. 22). This may prompt readers from the Army aviation community to ponder what coordination occurred with their Service to improve rotary-wing aircraft safety. The Army is indeed noted alongside the Air Force and Civilian agencies as an organization with which outreach regarding safety at one point "received more emphasis" (p. 54). However, a quick search reveals only five additional appearances of the word "Army"—three illustrating this Service's role in aerospace medicine prior to 1939 (p. 71) and two referring to General Hap Arnold, World War II Commander of the Army Air Forces, in an end note (p.

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175). By comparison, "Marine" and "Air Force" appear 141 and 110 times, respectively, with the former receiving credit for having shown "dramatically the utility of the helicopter" during the Korean War (p. 105).

The pending question regarding aviation safety coordination with the Army does not suggest that personnel from this Service may find limited benefit from *Gear Up, Mishaps Down*. To the contrary, the author's focus on other branches may offer unexplored lessons for the Army aviation community. This is especially interesting because the book's historical range includes multiple defense funding circumstances, perhaps inspiring solutions for the future given current budget limitations.

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TURNING PAGES
book reviews of inte

Blades of Thunder

Author: LTC W. Larry Dandridge (Ret.) Tiger, Vikings, & Vipers Publishing, LLC, Charleston, South Carolina, 410 pages

A book review by MAJ Stephen D. Martin

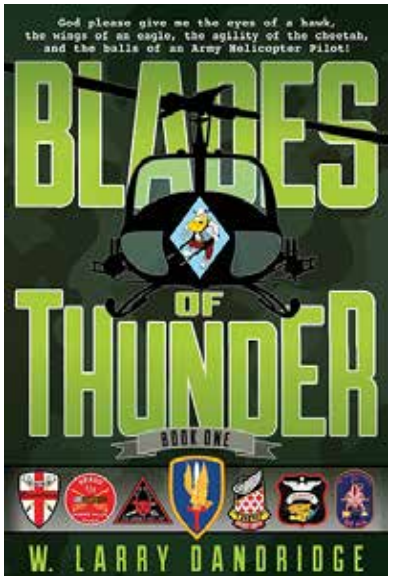
I've always been fascinated by the mission of the Army aviator in Vietnam. This craft of ours was in its early development in Vietnam, and everyone was trying to figure out how best to utilize Army aviation as a platform and a resource. The aviators who got to participate helped frame those expectations of both the ground commander and command groups echelons above the fight. It was a bit of the Wild, Wild West.

LTC W. Larry Dandridge (Retired) arrived in Vietnam in 1969, just after completing flight school. Through this book, he tells stories from his own experiences, fellow aviators, crew chiefs, and door gunners from their time in combat. He formats those stories in letters to each other, where some are fictionalized and others are actual, but—according to Dandridge—all are true.

Additionally, each letter is peppered with photos from the service members who served overseas while in country. Dandridge makes a great effort in covering the details of the photography, discussing who was in the photo and specifics on the equipment that is highlighted. It humanizes the stories for the reader, allowing them to get a better understanding of how young the aviators actually were going into battle during this war.

In today's environment, there's a lot of talk about strategy and operation in our field, ensuring that we are effective and efficient as an organization. Larry's book reminds me of the joy it is to problem solve in realtime (a lot of times in the air) and provide direct support to the customer. It also reminds me that just because there is doctrine out there doesn't mean that it can't be improved upon if it's not providing the best support in the most effective manner.

This book is worth reading, if even to be reminded of the harrowing experiences our aviators had piloting the iconic Huey and Cobra across the jungles of Vietnam.



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(magazine published on or about May 15, 2020)

July-September 2020 Focus Topic: Large-Scale Combat Operations and Unmanned Aircraft Systems
July-September 2020 issue articles due June 1, 2020
(magazine published on or about August 15, 2020)

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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