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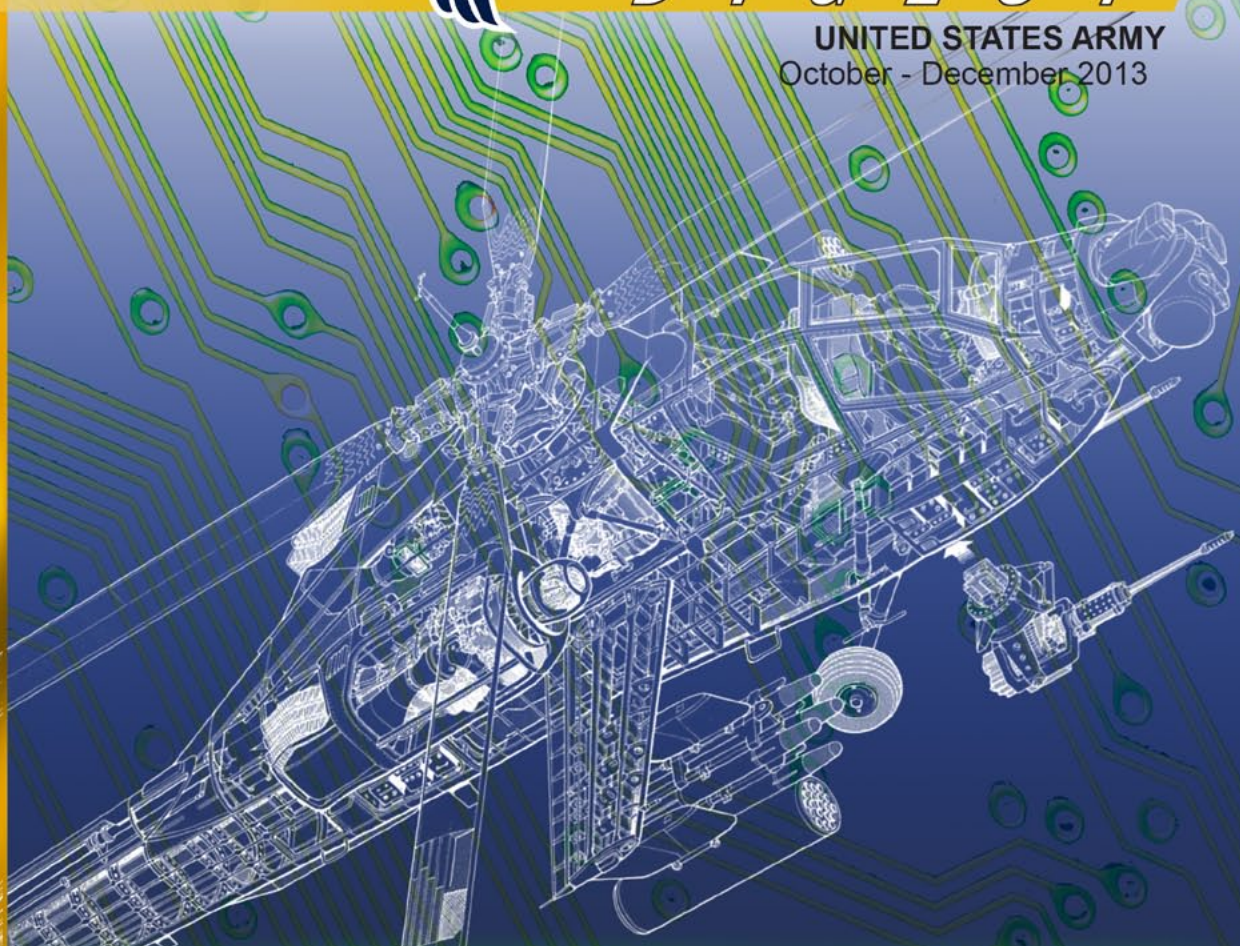

MAINTENANCE & SUSTAINMENT

UNITED STATES ARMY
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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

The complexity of today's modern aircraft require a dedicated workforce of Soldiers, civilians and contractors to meet mission requirements.

Editor's Note

Unquestionably, some of the hardest working Soldiers in our formations are our maintainers. Success in aviation maintenance requires a coordinated effort by a dedicated team who understand sophisticated systems, troubleshooting techniques, and logistics. This edition of *Aviation Digest* focuses on the insights of our maintenance professionals and some of the best practices which sustain our fleet in a variety of challenging environments. Many readers will recognize some of the maintenance techniques discussed throughout this issue. They are proven methods for improving efficiency, which translates to getting aircraft out of the hangar and back on the flight line quickly and safely. Although the *science* behind how we maintain aircraft has remained largely unchanged, the *art* of aviation maintenance is a continuing study of lessons learned, leader innovation, and human dynamics.

In this issue of *Aviation Digest*, we introduce our "Feedback Forum;" a section dedicated to providing our readers with "the rest of the story." The influence of your articles and letters to the editor does not end at publication; submitted articles and comments frequently inspire further research and a holistic effort to address potential areas for improvement. In the "Feedback Forum", we share what is being done across the Aviation Enterprise in response to reader inputs.

I am also pleased to announce the launch of the new *Aviation Digest* webpage. The interactive page will give you quick, easy access to the information that interests you most; individual articles from the current issue, "Letters to the Editor," the "Feedback Forum," or the ability to download the whole issue at once. You will also have access to the archives which contain issues of *Aviation Digest* from 1955-1995. Finally, the webpage provides links to important locations for finding lessons learned and tactics, techniques and procedures. You will find more information about the new webpage on page 46.

As always, we welcome Soldiers of all ranks to share their perspectives on the issues that are important to Army Aviation.

ABOVE THE BEST!

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Visual material such as photographs, pictures, charts, graphs, or drawings supporting the article should be included as separate enclosures. All visual materials should be high resolution images, (preferably set at a resolution of 300 dpi) saved in TIF or JPEG format.

Please do not submit articles that have been submitted or published in other Army professional publications. *Aviation Digest* staff will make necessary grammar, syntax, and style corrections to text to meet publication standards and redesign visual materials for clarity as necessary. These changes may be coordinated with the authors to ensure the content remains accurate and reflects the author's original thoughts and intent.

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Please forward any Reader's Respond comments to the *Aviation Digest* mailbox at usarmy.rucker.avncoe.mbx.aviation-digest@mail.mil.

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The Command Corner

Discipline is the soul of an Army. It makes small numbers formidable; procures success to the weak, and esteem to all. – General George Washington

Throughout the past ten plus years of persistent conflict, Army professionals have displayed unparalleled discipline where it matters most-on the battlefield. This certainly holds true for Army Aviation as few have been asked to do as much as our combat aviation brigades have in both Iraq and Afghanistan since the onset of the Global War on Terror.

As our Army transitions from a dedicated focus on winning our nation's wars to an Army training for war, it is certainly prudent now to shift some of our focus to the Army as a profession. Leaders at all levels must re-energize their efforts, placing considerable emphasis on standards and discipline.

Army Doctrine Reference Publication (ADRP) 6-22 defines standards as formal, detailed instructions-describable, measurable, and achievable. They provide a mark for performance to assess execution of a task. To use standards effectively, leaders know, communicate, and enforce high but realistic standards. Effective leaders explain the standards that apply to their organizations and empower subordinates to enforce them.

Standards are the bedrock upon which we do business in the Army and certainly within Army Aviation as we have many established standards that come in the form of checklists, standard operating procedures, technical manuals, and regulations. Most would agree that adherence to these standards is critical to conducting effective and safe aviation operations.

Discipline at the individual level is primarily self-discipline, the ability to control one's own behavior. Discipline expresses what the Army values require-willingly doing what is right. Discipline is a mindset for a unit or an organization to practice sustained, systematic actions to reach and sustain a capability to perform its military functions (ADRP 6-22).

When standards are being met consistently across an organization, it is evident that the leaders of that unit are disciplined; disciplined to not only follow established standards themselves, but to educate the Soldiers on those standards and subsequently enforce them.

Seldom will you find aircraft maintenance being performed in a hangar or on a flight line without non-commissioned officers (NCOs) in the area, but how often do we find that maintenance being performed without the proper technical manuals present? This indiscipline is really twofold, one on the Soldiers' failing to conduct proper maintenance and secondly by the NCOs not enforcing the standards. NCOs are the standard bearers of the unit, which brings with it tremendous responsibility. If we don't have the discipline to enforce standards, even the seemingly insignificant ones, we are not only failing as leaders, but putting lives in jeopardy. The Soldiers flying in our aircraft and those fighting on the ground are depending on Army Aviation to be disciplined and uphold the standards.

Discipline and adherence to standards are hallmarks of Army professionals and leaders. As an NCO Corps, we should be asking ourselves if indeed "no one is more professional than I, and if I am providing outstanding leadership?"

Above the Best!

CSM James H. Thomson

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Letters To The Editor

The authors of the articles, "Intelligence Support to Army Aviation is Broken... Does Anyone Care?" and "Fixing Aviation Intel" focus their efforts on areas in which they believe intelligence support to aviation could improve. All three premises they articulate are correct: there is not an aviation specific intelligence course, 15C35s (Military Intelligence Aviator) are mythical creatures in the combat aviation brigade (CAB), and the table of organization and equipment is not as robust as it was in the past. What the authors failed to accomplish in general was to adequately frame a problem before discussing recommendations for the Military Intelligence Corps. Not a single facet of military intelligence support to Army aviation was identified as not to standard and in need of redress. Without a problem statement there is no focused direction for the discussion to continue. The Army's failure to fulfill antiquated doctrinal requirements does not equate to a failed mission. It does mean that doctrine must catch up to reality.

In their introduction, the authors assert that helicopters and training cost the Army significant amounts of money, alluding to the need for better intelligence to increase aircraft survivability. Additional discussion should be focused where threats are greatest to aviation—the human factor and the environment. These factors have far outweighed the threat of the enemy during the Global War on Terror and will continue to be present long after the force returns to garrison. Open source analysis reveals in FY12 that U.S. Army Aviation had 95 Class A, B & C manned flight or flight related accidents. Open source analysis of the same time frame also reveals that in Afghanistan 10 US Army aircraft crashed and only three were attributed to enemy forces by a credible organization.

The authors estimate that the creation of a four week aviation intelligence course that trained every CAB S2 Soldier would cost $1.4 million for the first year and $550,000 each subsequent year. This is a fraction of the cost of a single shoot-down and an option worth exploring. However, this option is still mission enhancing, not mission critical and in the current environment every dollar must be scrutinized. Every branch could likely make a similar case for additional training or a piece of equipment and $1.4 million only looks small when compared to tens of millions of dollars.

There is not a single quality leader that would not desire more professional training for their Soldiers. Additional intelligence courses that incorporate blue forms of movement and maneuver would greatly enhance the quality of the intelligence professional. Formal instruction on threat weapons would be beneficial but with far less impact than the contextual understanding of doctrine. A simple review of the Worldwide Equipment Guide (WEG) yields large amounts of information on capabilities and limitations of military equipment and weapons systems. Vastly more data is available via the National Air and Space Intelligence Center and the National Ground Intelligence Center to analyze threat weapons. The ability to apply threat rings to an objective or route can be done by any competent Soldier for any mission using these sources. Failure to incorporate such data is not a failure of training but a failure of the senior intelligence officer to seek out and incorporate available data.

Predictive analysis will not reveal when or where the next aircraft will be shot down by small arms or rocket propelled grenades regardless of any training course, optimum number of assigned personnel, or officer branch. There is no doctrinal template for highly proliferated infantry weapons because the assumption is, and must be, that they are everywhere. In the counter-insurgency fight as CAB S2 sections are structured now, they can describe where the threat is greater, when it is greater, and what weapons to expect, but the enemy still gets their vote. In the linear fight any intelligence officer should be able to template conventional air defense artillery forces. If they cannot, then there is either no intelligence to provide the basis for an assessment or the officer would be failing to meet the standard within any formation. MAJ Koehler and Dr. Tatarka had interesting points and sparked an even better discussion among intelligence officers providing support to aviation. Still, without knowing what needs to be fixed, there is no direction to move forward. In a world of finite resources, the addition of one capability means degradation of another and all leaders share a responsibility to be discriminate in requests for assets.

Intelligence Support to Army Aviation Is BROKEN

Does Anyone Care?

By MAJ Corby Koehler and Christopher Tatarka, Ph.D.

Army aircraft are the single most expensive piece of Army equipment operating on the battlefield, with the cost of replacing individual airframes ranging from $9.5 million for a UH-60L Blackhawk to $28 million for an AH-64D Apache (Congressional Budget Office, 2007). Likewise, along with disastrous personnel and unit impacts, the loss of a single aircraft can have a substantially negative strategic level impact on operations due to loss of life of aircrews and, when applicable, the passengers onboard. For example, such personal and operational impacts were clearly demonstrated by the downing of "Extortion 17" (CH-47 Chinook) in Afghanistan on August 6th, 2011 when 30 U.S. troops were killed (including nearly 20 highly-trained U.S. Navy personnel reportedly from SEAL TEAM VI). Likewise, the significant impacts that aircraft shoot downs can have on operations and public opinion are further demonstrated by the shoot down of "Easy 40" (12 U.S. Troops killed) in Iraq on 20 January 2007 which was the first of a rash of seven helicopter shoot downs from January to February 2007. These shoot downs garnered worldwide media attention at the start of the Iraq "Surge" which helped to undermine public support of the "Surge" and the Iraq War.[2]

Despite the aforementioned criticality of Army aircraft and the fact that during the Global War on Terrorism (GWOT) U.S. Army aircraft have, by far, flown the most flight hours in combat zones and have had the greatest number of aircraft hit and lost due to enemy action of any U.S. military service, virtually no

assigned to Army aviation units. As such, intelligence soldiers assigned to aviation S-2 sections are left to their own initiative, research, and informal "on the job training" (OJT) to develop an understanding of how to provide intelligence support to aviation unit

All military intelligence (S-2) sectio must understand blue (friendly) operat to be able to predict red (threat) ac and reactions. In order for Army a intelligence sections to be successf must understand: the different airframes, the unique aspects of missions, aircraft survivability e (ASE), and aviation tactics at a m be effective at predicting and a threat. Due to the complexit operations, few Soldiers assi aviation intelligence sectio able to adequately gain thi through OJT.

The Military Intellige offers numerous MOS indicator (ASI)-produ all intelligence disci the 2012 Foundry Opportunities the Foundry training related courses t nuance of intelli the aforementi emphasizes, o to aviation in

This lack of likely pron which ass between ground

Aviation Intelligence Sections/ Personnel Lack Formal Training:

There is currently no formal Army course to teach the basics of aviation intelligence personnel to Military Intelligence

An assessment of the current state of intelligence support to Army aviation suggests that this lack of institutional support has meant that S-2 (intelligence) sections in the combat aviation brigades (CABs) and their subordinate battalions seriously lack formal aviation-related intelligence training and qualified and trained dual-track aviation and intelligence professionals (i.e. individuals with Military Occupation Specialty [MOS] 15C35s), and suffer from inadequate manning levels needed to sufficiently provide high quality intelligence support to aviation. Along with providing evidence to highlight these shortfalls, this paper proposes three areas in which these shortfalls can be overcome in order to substantially reduce the probability of costly and devastating aviation losses from enemy activity.[3]

https://us.army.mil/suite/page/usaace-dotd

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Letters To The Editor

In response to MAJ LaValley's article, A Hard Lesson Learned: The Need for Weapons and Tactics Instruction in Army Aviation in the Jul-Sep 2013 issue of the Aviation Digest, I fully agree that U.S. Army Aviation is lacking in this area of advanced training for all the reasons mentioned. I would, however, like to pose an alternate course of action. Instead of having instructor pilots (IPs) assume the weapons and tactics instructor task in addition to their current duties; I suggest the aviation mission survivability officer (AMSO) would be the more suitable candidate to assume the mantle of weapons and tactics instructor. I realize that unit IPs would be the most likely candidate and could provide excellent training in this area; however, in practice there are significant shortages of IPs at all levels below brigade. Unit IPs are fully engaged with the work they were hired to do – readiness level progression training, annual/semiannual/no-notice flight evaluations, and records maintenance. Even when all IP slots are manned, getting time away from progression and proficiency rides for advanced training is often times difficult.

MAJ LaValley stated the need for the instructor to be intimately familiar with all aircraft survivability equipment (ASE) to effectively detect, decoy, jam, or evade the threat systems. The TC 3-04.16 Draft indicates that AMSOs are expected to be experts on threats to aviation, personnel recovery requirements, and the development of aviation tactics, ensuring combat survivability. These responsibilities are also spelled out in the 2012 Critical Task List Task 011-410-0010 Conduct Unit Level Combat Aviation Mission Analysis/Planning and Task 011-410-0012 Conduct Aviation Mission Survivability (AMS) training which, in summary, instructs AMSOs at all levels to employ and instruct aircrews on proper methods of employment of aircraft ASE and weapon systems.

During the AMSO course, students are provided detailed information on threat systems and defeat tactics, techniques, and procedures. To date most of this information has been classified and generally not accessible to most aviators.

AMSOs are also generally school trained on aspects of fires and effects. Most AMSOs have attended the Joint Firepower Course by the time they are senior CW2s or CW3s. This course gives the AMSO knowledge on how joint fires are planned and executed. The Joint Targeting Staff Course is also a normal progression for senior AMS Officers which trains them on weaponeering assessment, force application, and force execution.

Given that AMSOs already possess substantial knowledge on how ASE works and the weapon systems the ASE is programmed to defeat and knowledgeable of the weapons system Army Aviation and the Joint community can bring to bear upon the threat, they should be more than capable to accomplish the hands-on portion of the training and evaluation as weapons and tactics instructors.

CW3 David A. Caudill, AMSO, 2916 Aviation Batttalion, Fort Irwin, CA

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Aviation Maintenance In A Field Environment

By CW3 Derrick Holland

In 2012, the 3-3 Heavy Brigade Combat Team conducted the first decisive action (DA) rotation at the National Training Center with support from Aviation Battalion Task Force (ABTF) Light Horse (3-17th Cavalry) of the 3rd Combat Aviation Brigade (CAB). TF Light Horse consisted of ten OH-58D, eight UH-60L, and three UH-60 A/L medical evacuation aircraft. The Blue Tigers of D/3-17 Cavalry in conjunction with aviation maintenance troop/company elements from D/1-3 Attack, D/4-3 Assault, and the 603rd Aviation Support Battalion (ASB) provided maintenance support. As the Army transitions from counterinsurgency to DA operations, a shift from fixed-based operations to field operations represents a significant change in environments. Nowhere does this change present as much a challenge as in aircraft maintenance where Soldiers are required to adapt to performing maintenance in the field without the use of a hangar, overhead cover, hardstand, or the many other conveniences of a fixed maintenance facility. Throw in the additional challenge of maintaining multiple mission, design, and series aircraft comprising the ABTF to provide maximum combat air power supporting daily operations like security, aircraft launch and recovery, and downed aircraft repair and recovery and you have, well – a greater challenge. This article will highlight the observations, insights, and lessons learned identified during this rotation and make recommendations for sustaining the unit combat power in this harsh environment.

The basic technical requirements for maintaining aircraft are the same in just about any environment, but maintaining aircraft at the same level in a field environment takes more careful planning, anticipation, coordination, and adaptation to changing circumstances—note that the first three are critical enablers for adaptation. Unlike previous unit rotations that operated from an improved forward operating base, the Blue Tigers established maintenance support at a tactical assembly area (TAA) and were tied in to the base defense with other elements of the brigade combat team (BCT). Aviation maintenance team (AMT) personnel were required to clear suitable parking positions and maintain 24-hour maintenance support while conducting a tactical vehicle road march with the rest of the ABTF to occupy the TAA, support local security, and set up common unit shelters and individual tents. The majority of Soldiers within the AMT had not participated in a field exercise of this nature. Additional tasks such as field sanitation, tent set-up, protection against chemical, biological, radiological, nuclear, and explosives (CBRNE) threats, convoy operations, and base security (e.g., stand-to, preparing fighting positions, and establishing range cards) had not been a focal point of training for over a decade. The AMT had to redirect many of its assets to accomplish those responsibilities while ensuring that the ABTF had safe, airworthy aircraft available to conduct its mission.

This can be done by ensuring the aviation maintenance company (AMC)/ AMT/ aviation support company (ASC) perform maintenance by the book and consistently apply problem, people, parts, plan, tools, time and training (P4T3). As MG Anthony G. Crutchfield stated in the October 31, 2012 issue of *Army Aviation*, "Nothing is more basic in maintenance than the phrase Do it right the first time (DIRT FT)."Not only does this philosophy save the aviation units' time, but also benefits the entire BCT when it comes to accomplishing the mission. This requires reinforcement during regularly scheduled maintenance activities and requires training and rehearsal in similar austere environments where DA missions are expected to be conducted. This emphasizes the importance of

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careful planning, anticipation, thorough coordination, and adaptation.

Aviation maintenance support equipment is not necessarily designed for unimproved terrain; therefore, these mobility challenges need to be identified while planning the layout of the TAA. For instance, uneven terrain made it impossible to move aircraft

using the standard Army towing system from the constant aircraft movements on the "flight-line". Maintenance stands, essential for safe maintenance practices, are difficult to move and stabilize and aviation ground power units, while a bit more mobile, still have restricted mobility in a field environment. An AMC/AMT has many moving pieces, including containers and specialized components that are essential for maintenance operations. Unlike the aircraft they support, the aviation maintenance components move primarily by ground. This is very difficult for a regular aviation maintenance company, unless supported by the ASB or a transportation unit. These are a few of the many mobility challenges maintenance elements should anticipate and plan for while occupying a TAA in a field environment.

Aircraft fluid reservoirs, hydraulics, any component removed/replaced in the normal course of repair activity, and sophisticated electronics are at risk for contamination in any maintenance operation; however, in a field environment, they are exponentially more so. Contamination and foreign object damage (FOD) from blowing dust caused by weather or aircraft operations in close proximity to aircraft maintenance activities can cripple a unit either by reducing aircraft readiness or causing a catastrophic aircraft loss. FOD prevention is a must and has to be done in conjunction with all maintenance as well as with thorough pre- and post-flight inspections.

Establishing a resupply line is vital to any unit's success. The inability to obtain Class IX can immediately immobilize an aviation task force, with serious consequences for the warfighter. Direct communication and a secure and reliable military supply route to a dedicated source of supply such as the brigade support battalion must be in place to complete the supply chain. There is a significant chance of a convoy getting compromised or delayed en route to a TAA in a fluid or hostile security environment, so this also has to be calculated in the P4T3 process. Pre-positioning parts and equipment is a technique that could eliminate costly aircraft down time.

Aircraft returning to the TAA from a night mission with a deadline fault should ideally be repaired by the next mission cycle. This can be done only if the threat around the TAA allows maintenance to perform repairs on that aircraft. If the threat is too high and it's deemed too much of a risk to perform those tasks at night, then the combat readiness and power for the customer is drastically affected. If "white light" maintenance becomes a requirement, it requires extreme caution. Performing maintenance chores with a light restriction in a TAA with the threat of receiving fire from "outside the wire" produces an additional stress that maintenance elements will endure in this situation. Such chores include but are not limited to climbing onto the aircraft, servicing various aircraft systems, removing and reinstalling components, FOD detection and prevention, cleaning, and careful inspection and testing. The time to practice these tasks under austere and possibly hostile conditions is before you actually find yourself in such conditions.

The operating tempo in any deployed environment can be daunting, but performing maintenance in a TAA multiplies the stress on an already task-saturated AMC/AMT. Long hours of tedious maintenance, along with the requirement to maintain 24-hour security, can wear Soldiers down. The leaders of a maintenance unit must ensure every Soldier receives sufficient rest, just as leaders must assure sufficient rest for aircraft crew members. This can be done by having a well thought-out fighter management program tailored to the unit's specific needs. Composite risk management must be applied to every task in the maintenance cycle to eliminate accidents caused by over-extended maintainers.

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The security of a hangar or hardened aircraft shelter can pay dividends when it comes to performing and maintaining aircraft, but that amenity is usually not available in a TAA. The time and resources it takes to put up and take down mobile maintenance shelters can reduce a unit's ability to relocate in a short period of time. Carrying out daily maintenance in the elements can not only be harsh to the maintainer, but also to the aircraft itself. High winds can flip aircraft over and might damage blades if not secured with the proper tie downs. Torrential rains can leak through aircraft cockpits and short out radios. Dust storms can roll in and cripple a unit with sand penetrating though seals. These are all potential events that can affect the maintenance of aircraft in a field environment. Leaders must ensure Soldiers are properly trained to react to all types of severe weather. Proper planning and scheduling of maintenance must take into consideration the environmental conditions. Units must plan for the unexpected by ensuring necessary items like mooring kits, chains, tie-down ropes, and protective covers are available to reduce weather-related damage. Leaders must also have sufficient situational awareness to determine whether time available to set up a maintenance shelter provides any operational advantage.

Any threat to the TAA is going to affect maintenance operations. A local threat will require all available personnel to man defensive positions on the perimeter and a CBRNE threat can be expected to significantly increase the time to perform even the most basic task. If the threat requires relocation of the TAA, careful risk assessment and planning may allow some scheduled maintenance to be performed early or performed in stages as the unit and maintenance operations

are relocated. In any case, each of these circumstances has the potential to reduce the availability of aircraft for continued mission support. The unit commander, in conjunction with his maintenance personnel, must carefully evaluate all appropriate courses of action and the risks associated with each to determine the best option for continued maintenance support and aircraft availability.

The transition from counterinsurgency (COIN) operations to an environment characterized by offensive, defensive, and COIN operations against a near-peer threat will place challenges on maintenance operations that have not been exercised since the beginning of the Global War on Terror. While attempting to meet the daily operational requirements, a seemingly endless gauntlet of obstacles appear out of the unpredictable environment of decisive action operations. We can, however, minimize the effects of these detractors by preparing, planning, and projecting faults by applying condition-based maintenance practices. Experiences of ABTF Light Horse during 3-3HBCT DA Rotation 12-05 can go far to prepare follow-on units to meet those challenges. Ultimately, proper planning, thorough coordination (prior to and during operations), anticipation (ensuring the unexpected is expected), and adapting to the environment will ensure the success of a unit.

CW3 Derrick Holland is an Aviation maintenance Technician. He is currently assigned to B Company, 404th Aviation Support Battalion, 4th Combat Aviation Brigade as the AH-64 Armament Platoon Leader and Technical Supply Officer-in-Charge. Previous assignments include National Training Center Eagle Team Observer/Controller-Trainer and Aviation Maintenance Officer, Production Control Officer, and Technical Supply Officer-in-Charge for 3-158th Assault Battalion, 12th Combat Aviation Brigade. CW3 Derrick Holland has three combat deployments and has completed 18 years of military service.

Acronym Reference

ABTF - aviation battalion task force
AMC - aviation maintenance company
AMT - aviation maintenance team
ASC - aviation support company
ASB - aviation support battalion
BCT - brigade combat team
CAB - combat aviation brigade
CBRNE - chemical, biological, radiological, nuclear, and explosives
COIN - counterinsurgency
DA - decisive action
P4T3 - problem, people, parts, plan, tools, time and training
DIRT FT - do it right the first time
FOD - foreign object damage
TAA - tactical assembly area

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P4T3 Success In Afghanistan

By MAJ Shoshannah Lane

As maintainers, the most important thing we do is return aircraft to the fight to provide the ground force commander with critical air assets. This is certainly the case in Afghanistan where ground forces require troop or equipment transport, security, reconnaissance, or attack assets for mission success. To meet these requirements as maintainers, we have to create a plan prior to executing any maintenance to turn aircraft around as expediently as possible. If we fail to do so, an aircraft can sit for an extended period of time and potentially deprive a ground commander of a force multiplier. In Army Aviation, we have become accustomed to using "P4T3" (problem, plan, people, parts, time, tools, and training) – in developing our plan to service aircraft. During a deployment to a combat environment, following P4T3 is essential to avoid extended down time and must be put into practice at home station to ensure all resources are either organic to the task force or accessible without long lead times.

This article is comprised of my thoughts and experiences as an aviation support company (ASC) commander and includes examples of the challenges my company faced while deployed to Bagram, Afghanistan.

The Challenges

Commanders must fully understand the scope of maintenance they will face while deployed; and the earlier they understand the extent of their responsibilities, the more prepared for the challenges they will be. As an ASC and brigade asset, the most common tasks encompass phase maintenance on Blackhawk, Chinook, and Apache Longbow helicopters; component services and repairs, to include avionics equipment and night vision devices; dedicated aircraft recovery; and forward arming and refueling point operations. Doctrinally, the ASC downed aircraft recovery team (DART) performs dedicated aircraft recovery and extracts the aircraft when aerial or surface recovery is necessary. Additionally, unscheduled maintenance resulting from battle damage, mechanical failure, component fatigue, etc., is often required.

The ASC can also receive maintenance missions that directly affect brigade operations, such as the download, buildup, teardown and upload of aircraft associated with unit reliefs in place (RIP). For example, the 101st Combat Aviation Brigade's (CAB) ASC transitioned nearly 100 helicopters through Bagram Airfield during the most recent nine-month deployment. Other missions for the ASC include preparing and containerizing aircraft damaged beyond repair for shipment back to the United States or for disposal in theater. Because maintenance companies are generally the largest unit in a battalion organization, additional taskings are always a factor for consideration in the planning and execution phases.

The surrounding environment provides a problem or challenge, especially in the mountains of Afghanistan. At Bagram Airfield, the weather presents significant challenges throughout the year. In the summer, the extreme heat and the altitude affect the lift capability of each aircraft and can contribute to exceeding aircraft limitations, which will incur unscheduled maintenance such as inspections or component replacement. The heat also affects the productivity of the Soldiers, and leaders must be keenly aware of their Soldiers' status to prevent heat related injuries. Coupled with the heat is the challenge of enemy activity.

The fighting season begins in April and continues through October or early November. Small arms fire and indirect fire are the most common enemy actions to affect maintenance. In the ASC and the aviation maintenance company, battle damage sustained during these months most often yields additional work for the airframe repair Soldiers, but the damage can affect any section. As a brigade asset who is tasked to support task forces across the brigade's area of responsibility, it may be necessary for the ASC to dispatch teams to other forward operating bases (FOBs) to assist with battle damage. In one indirect fire attack at a neighboring FOB, the task force simultaneously received damage to several CH-47s, two of which remained non-mission capable for two weeks. After this particular attack, the ASC sent a team of three (one noncommissioned officer(NCO) and two Soldiers) to assist with the sheet metal repairs on the two Chinooks to bring them to fully mission capable as quickly as possible. Although the fighting slows down in November, the harsh winters present unique challenges as well.

Winters in Afghanistan, specifically in the vicinity of Bagram, consist of rain and

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snow. From November to March, it is not uncommon for maintenance test flights to be delayed 48 to 72 hours because the weather completely prohibits flight operations or the low ceilings prevent the test pilots from climbing to higher altitudes for performance required checks. Flight line maintenance can be limited due to safety precautions, and Soldiers must also be creative in finding areas and the right times of day to perform pre- and post-phase aircraft washes. Throughout the winter, it was common for my Soldiers to wash much of the aircraft inside the hangar to prevent icy conditions and avoid cold-weather injuries.

Winter also presents the challenge of clearing the snow and ice from the flight line. While airfield management generally provides snow removal from the runways and taxiways, units often clear their aircraft parking areas and the aprons directly in front of their hangars. Snow removal requires appropriate equipment, teamwork, training, time, and the ingenuity of Soldiers. Proper training is essential for Soldiers operating trucks with snow removal blades and other equipment in the vicinity of helicopters to prevent unnecessary damage to aircraft. Platoon and company leadership must also balance personnel requirements for snow removal against maintenance missions to ensure this additional task does not delay ongoing work inside the hangar.

Not directly related to maintenance are the conditions the Soldiers face in and around the living and work areas. With ice and snow covering much of the surface, it is incumbent on the leadership to provide transportation to and from work and to put other safety measures into place to prevent unnecessary injuries. Early coordination with the S-4 to procure salt and YakTrax walker ice grippers or other devices to assist Soldiers in walking on ice and snow will pay dividends and ensure maintenance continues through the winter months. Leadership should also consider the morale and welfare of the Soldiers by providing indoor opportunities to conduct physical training and areas where Soldiers can spend their off time.

Planning

Every maintenance task begins with planning. P4T3 is a tool used to prepare for the simplest to the most complex tasks, to include the deployment as a whole. To facilitate a successful deployment, units should begin the planning process long before deploying to assess personnel and equipment requirements and to fully understand the scope of their responsibilities. Communication with the unit on the ground is potentially the most advantageous planning factor for a unit preparing to deploy. Such communication will enable a deploying unit to determine personnel and equipment shortfalls and allow time to fill those shortfalls while shaping pre-deployment training exercises. With sufficient lead time, unit leadership has the opportunity to fill personnel gaps and identify inexperience with focused training events. Early communication can also ease the challenges of the (RIP), which may be accelerated due to shifting flight timelines for both the deploying and redeploying units.

Planning does not stop with arrival in theater. Senior leadership throughout the company must continually plan for different maintenance tasks using P4T3 and train junior Soldiers to use the same tool, no matter how routine a task may seem. As a company commander, I required each phase team leader to brief me prior to a phase, a requirement that remained in place throughout the deployment, even after we had performed more than ten phases per mission design series (MDS). Each brief followed the P4T3 format and ensured phase leadership identified components to be overhauled, write-ups in the logbook that might present challenges or extend the phase timeline, training goals per phase, or any distracters that might affect the phase. Not only did the phase brief allow me to challenge each phase team leader to think more critically about the upcoming phase, it also ensured my maintainers never began a phase unprepared. When possible, I also asked the contract teams working as part of my team to perform phase briefs.

I often required a P4T3 brief when my company received complex missions. The many downloads and uploads the ASC executed are examples. Because these missions required coordination with several entities, to include the unit owning the aircraft, the gaining or losing battalion task force, various Air Force organizations and offices, brigade staff sections and airfield management, in-depth planning was absolutely necessary. Proper planning also enabled my teams to prepare for contingencies such as shifting timelines. Over the course of the deployment, we developed best practices and standard operating procedures, which eased our planning, delineated responsibilities for the owning unit and gaining/losing task forces, and facilitated better coordination with the many parties to support a successful operation.

Planning for the RIP at the end of a deployment presents its own challenges and cannot begin too early. Some planning will occur directly after a unit experiences the initial RIP and after action review (AAR) data is captured. Training events during the RIP should be recorded to create a base line for the end-of-tour RIP. Again using P4T3, the outgoing unit must identify a date to stop receiving work orders to prevent maintenance delays that may occur

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as the new unit assumes responsibility of the mission. This also includes identifying critical tools and equipment that must remain available until the incoming unit has the opportunity to receive and unpack its equipment. It should be every unit's goal to execute a better and more professional RIP than they received. It is all too easy to get caught up in the excitement of going home, but it is the outgoing unit's responsibility and duty to provide the incoming unit with a warm welcome and the tools to be successful.

People

People can be one of the greatest challenges on a deployment, especially as downsizing in Afghanistan continues. Gone are the days when units deploy at more than 100% strength. Although the number of troops decreases, flight time and required maintenance will likely remain constant as Army Aviation fulfills the role as the workhorse for retrograde operations. Even in combat, units are asked to do more with less.

People posed a particular challenge for my company while at Bagram Airfield. My company deployed at approximately 70% strength with only one maintenance test pilot (MTP) and two technical inspectors (TIs) per MDS. Manned with only an OH-58D MTP, my company had to rely heavily on the task force collocated at Bagram for post-phase test flights. Aircraft often sat up to 48 hours before a test pilot and crew were available. To overcome this challenge, we worked very closely with the theater aviation sustainment maintenance group at Bagram who supported us with UH-60 MTP and a CH-47 MTP. We eventually received an AH-64D MTP in our company who was critical to the success of the AH-64D program. By the end of the deployment, we worked directly with the owning unit of the aircraft, and 72 hours before the aircraft reached test flight status, production control (PC) coordinated with the owning unit to send MTP and crew from neighboring FOBs. We housed the crews within our company area, and they remained until phase completion.

At less than 50% strength in the TI shop, our TIs were constantly on the go. At only two deep per MDS, it was often a challenge to maintain 24-hour operations and give our TIs much needed rest. To ensure maintenance did not stop, we put our platoon sergeants with the right experience on TI orders to make certain quality control was always available.

Additional taskings on deployment are necessary, but can also strain companies when performing maintenance. Companies who seem to have more than enough Soldiers to meet mission quickly understand the importance of personnel management when faced with taskings, scheduled maintenance, unscheduled maintenance, DART drills and missions, special missions, and fighter management. It is in these cases, P4T3 becomes even more critical to ensure mission accomplishment.

Having the right people in the right positions can also alleviate deployment challenges. Life in a deployed environment can be very different than at home station, and it is not always possible to predict how Soldiers will respond while deployed, even if it is not the first deployment for the Soldier. Unit leadership must closely observe their Soldiers and their productivity and know when to move people into different positions to create synergy within a section and to increase productivity. Unit leadership must know their Soldiers, their strengths and their weaknesses in order to find the right position for each person and maximize the talents of each Soldier.

Parts

Associated with each maintenance mission are the procurement, replenishment, and management of thousands of lines of bench and shop stock to prevent work stoppage due to part unavailability. Parts procurement is tied very closely to people and planning. The challenges associated with parts are generally caused by not doing proper analysis before beginning a mission or task or by having inaccurate information. It is crucial for the technical supply section in each unit to have the correct inventory data for each and every item, from the smallest cotter pin to a CH-47 transmission. Additionally, in most units, individual sections have their own bench stock lines, which must be visible to the entire company.

My company arrived in Afghanistan and fell in on an established bench stock for each section; however, there were generally only locations without accurate numbers for each item, which were not entered into the company's Unit Level Logistics System (Enhanced). Consequently, my maintainers determined the location for a bolt or nut required by the manual, went to the given location, but found the location either zero balance or stocked with an entirely different item. During this time, it was not uncommon for a phase to have an aircraft on ground (AOG) request for common hardware such as a washer. To rectify the situation, my Soldiers spent months getting a 100% inventory of their bench stock and entering each line into the company database to provide visibility across the company. Although the completion of this project took months, we reduced AOG requests and increased productivity.

For items not commonly stocked, the warfighter receives priority for funds and parts; therefore, parts "in the system" can arrive quickly and may not delay maintenance at all depending on how early the deficiency is found and the part ordered. However, challenges still exist in receiving parts with limited quantities. Having the right people, i.e. Army Aviation logisticians who understand the Army supply system and aviation maintenance, in the right positions is critical to success. Technical supply and production control personnel and the System Program Office (SPO) Aviation not only understand the Army supply system, they also recognize the importance of relationships with people around the world who have the ability to assist in procuring difficult-to-acquire parts. Logistics assistance representatives can greatly assist in locating parts, getting parts released by project managers, or in expediting shipment. Additionally, technical supply sections have the ability to contact the unit technical supplies throughout the brigade and make FOB-to-FOB requests.

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SPO Aviation can then assist in moving the part from FOB to FOB using fixed- or rotary-wing assets.

Time

There are a variety of challenges associated with time on deployment, which may or may not be directly related to maintenance. In an environment where 24-hour operations are the norm, time does not present the same limitations experienced at home station. Time constraints can be related to the length of the deployment, determining the right length and number of shifts per 24-hour period, or establishing an effective fighter management policy to allow the Soldiers to recuperate and sustain their efforts throughout the deployment. Although the nine-month deployment is shorter than those most Soldiers have become accustomed to, nine months is a long time for Soldiers to remain in a foreign country without the ability to see family and friends, enjoy weekends, or to take more than four days off at a time.

Time can facilitate maintenance in a deployed environment. By setting deployment specific time goals for various tasks and inspections, Soldiers are driven to meet the mark and continually improve through experience and increased efficiency.

Tools

Proper planning prior to deployment can alleviate many of the challenges associated with having the right tools on hand. Constant and early communication with the unit on the ground will give the deploying unit a solid understanding of the scope of the maintenance mission and provide an accurate account of the theater property equipment, which will assist in packing the right tools, especially as budgets decrease and container space is limited for deploying units. As the Army downsizes in Afghanistan, early and constant communication with the unit on the ground may be the secret to success for upcoming deployments.

Special tool constraints do exist as a result of multiple teams performing the same maintenance. In an ASC or in any maintenance hub, there are likely to be two to three phase teams per MDS. If not properly planned, the teams may require the same special tool at the same time. In such cases, good working relationships among the teams and maximizing the time the tool is unavailable to perform other tasks can alleviate extended delays.

Training

Deployment provides an excellent opportunity to train Soldiers in both leadership and technical skills. Although the early stages of the deployment will be challenging because the unit will inevitably have new and inexperienced Soldiers, Soldiers work constantly and learn an incredible amount each and every day. Junior and senior NCOs alike train on a daily basis and create further opportunities for Soldiers to gain experience.

On the technical side of the house, NCOs can track the different tasks performed by their sections, observe the work, and then determine when a Soldier is able to autonomously make a repair or perform an inspection. Soldiers who are motivated to progress will return to home station with a wealth of knowledge and then serve as trainers for Soldiers new to the unit following deployment.

To train leadership, seasoned NCOs generally establish a standard by setting the example at the onset of the deployment. After junior NCOs and Soldiers observe their leaders, they then receive the opportunity to take leadership positions such as phase team leader. Each phase team leader is responsible for planning the phase, briefing the commander, managing personnel and daily tasks, and conducting an AAR. With every phase, the phase team leader can establish a training goal to train his or her team to increase proficiency and efficiency.

DART training can be a challenge during deployment because, when performed correctly, the drill involves the entire company, and maintenance can come to a halt for a period of time. Companies with a DART mission must accept this risk. DART is a no-fail mission, and Soldiers must have the opportunity to properly train and have confidence in their ability to execute their roles and responsibilities in the event of a real-life mission outside the wire.

The RIP is a critical training opportunity, which the arriving unit must fully embrace to maximize the benefits. The departing unit must diligently plan the RIP prior to the incoming unit's arrival to provide detailed continuity files, answer pointed questions, and provide professional training events on a compressed timeline when the incoming unit is also engaged with theater training requirements.

The opportunities for units to develop as a cohesive team are limitless in a deployed environment. To facilitate unit growth, P4T3 is an excellent tool for units to effectively plan deployments and individual maintenance tasks, overcome the challenges of a harsh environment and a high operational tempo, and avoid overlooking both vital and basic details.

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Acronym Reference

AAR - after action review
AOG - aircraft on ground
ASC - aviation support company
DART - downed aircraft recovery team
FOB - forward operating bases
MDS - mission design series
MTP - maintenance test pilot
NCO - non-commissioned officer
P4T3 - problem, people, parts, plan, tools, time and training
PC - production control
TI - technical inspector

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By CPT Scott Button

Everyone knows that aircraft maintenance is a challenge even under the best conditions. Throw in a forward deployed environment, reduced manning, logistical constraints, and the perpetual withdrawal of forces from Central Command's theater of operations, and you get a recipe for an aviation maintenance migraine. The real challenge comes with

taking the hand that you have been dealt and being able to still make mission safely.

General Richard Cody coined the acronym P4T3 (problem, plan, people, parts, time, tools, training) as a method to deal with maintenance issues in Army Aviation. Today we still use P4T3 to address aviation-related maintenance issues. It is the foundation for identifying problems and applying solutions. Even though it is not regulatory, task accomplishment becomes more efficient if you apply the principles of P4T3 towards your maintenance program.

Every task begins with a problem. Discovering the problem can sometimes be as easy as doing a walk around and noticing a cracked beaded panel on a UH-60L, or as difficult as trying to fix a modernized target acquisition designation sight fault on an AH-64D during a quick reaction force launch. Problems can arise from simply identifying a scheduled time between overhaul during an aircraft logbook reconciliation, or they can occur suddenly in the form of a catastrophic component failure. Once the problem has been recognized, the next step is to formulate a plan that will best address the issue.

Putting together a plan takes input from the entire maintenance team. The extent and the severity of the problem drives the decision making process as to whether the issue will be addressed on site, or if the aircraft is to be evacuated to the next higher maintenance facility. These decisions are based on available fault data, by-the-book maintenance procedures that are outlined in the technical manuals, and the recommendations that the senior maintenance personnel provide. The best plans have multiple courses of action so that the team can insert ideas from each and prepare a more sound and complete product.

Selecting the right personnel for the task takes more effort than just simply matching a military occupational specialty with the task requirements from the technical manual. The Soldier selected to work on the task must possess the requisite knowledge and skill sets necessary to complete the job in the most efficient manner possible. This may call for outsourcing the request to the maintenance company in the aviation support battalion or having to bring in a specialist from the depot-level maintenance section assigned to the brigade. Another consideration is making sure that the task is adequately supervised. Maintenance supervisors need to ensure that Soldiers have the necessary materials present and are conducting the maintenance to standard.

Acquiring the proper parts involves pulling data from the appropriate work packages and technical manuals. It also takes a skilled technical supply that can identify and order the proper parts needed. When the national stock and part numbers in the work package are not available in the technical supply's yard locations or inventories, the search then expands to the nearest supply support activity (SSA). In the event the SSA cannot fill the parts requisition, and depending on the precedence of the required part, the next course of action is to elevate the part request to either a 02 high priority, or to an aircraft on ground request.

Coordinating the unscheduled with the scheduled maintenance is a task that production control has to balance with current and future operations. The time

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required to complete scheduled phase inspections is dependent upon the skill levels of the maintainers in the company and having the parts and tools needed on hand. Time can easily be measured in the success rate of a product coming out of major maintenance. If it takes 20 days to complete an AH-64D 500-hour phase inspection and it goes back into major maintenance five days later, then the time spent fixing the fault cannot be recovered. The measure of success must be to minimize mistakes and produce a quality product the first time.

Performing the physical labor in aircraft maintenance requires the synchronization of obtaining the proper personnel, parts, and the necessary tools to perform the task. The tool requirements are listed in the tasks and work packages associated with the related faults and deficiencies. The essential tools may be found in aircraft tool kits, aviation foot lockers, or in the tool room. If the tool called for is for a specific repair and the maintenance company does not own it, then a request may be forwarded to the aviation support battalion's maintenance company. Another viable option is to have the tool fabricated locally. Army Aviation and Missile Life Cycle Management Command (AMCOM) logistics assistance representatives (LARS) can expedite tool fabrications through direct coordination with AMCOM's engineering department.

Nothing can substitute tough realistic training. Working on an aircraft that sustained battle damage or experienced a hard landing provides unique opportunities in a deployed setting. Aircraft maintainers go through their technical training and then arrive to serve in an apprenticeship as they learn their trade. They are generally capable of handling work orders and repairs at the field-level, but certain maintenance procedures may call for more specialized and skilled maintainers. The theater aviation sustainment maintenance group (TASMG) provides depot-level assistance when the brigade maintenance program is unable to perform the maintenance needed.

Whether at home station or deployed, the challenges that maintainers face are similar. However, funding and personnel shortages are less of a problem while deployed. Acquiring the needed parts and personnel are much easier, and their requisitions are processed much faster in theater.

Aircraft maintenance is a complex and often perplexing problem set. It is important to remember that it is also a team effort. There is no one task that calls for a single maintainer. You always need a supervisor or technical inspector to validate the maintenance performed. If the problem is above the level of the maintainer's proficiency, then expand the problem to other sections. Utilize the subject matter experts that you have on hand, and when the situation calls for it, expand the problem to the LARs, aviation support battalion or TASMG.

COL Pepin, Commander Task Force Falcon, 3rd Combat Aviation Brigade, stated, "Without dedicated skilled maintainers and leaders, an aviation unit is combat ineffective. The principles are time tested and ensure maximum support to the ground force commander."

CPT Scott Button is the D Company Commander and an AH-64D maintenance test pilot for 1st Battalion, 3rd Aviation Regiment (Task Force Brawler), 3rd Combat Aviation Brigade (CAB). He has deployed in support of Operation Iraqi Freedom V, Operation Enduring Freedom X and XIII with 3rd CAB. CPT Scott Button has served 21 years on active duty.

Acronym Reference

AMCOM - Aviation and Missile Life Cycle Management Command	**P4T3** - problem, people, parts, plan, tools, time and training
LARS - logistics assistance representatives	**SSA** - supply support activity

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A LOOK BACK, A LOOK FORWARD:

Army Aviation Maintenance Adapts

By CW5 Keith Langewisch

For more than 12 years, America has been a nation at war. No one in the military needs to be reminded of the multiple 12 to 15 month deployments in which countless missions and flight hours have taken a significant toll on Army airframes. As the Army draws down from Afghanistan and faces dramatic reductions in force due to budget reductions and force restructuring, leaders have a great responsibility to uphold the high standards of Army aviation maintenance and sustainment. By adhering to the standards during these planned reductions, Army Aviation leaders ensure that they are ready for future missions.

How can Army leadership ensure its aviation Soldiers are prepared? One key to success is to look at the past. Aviation leaders can better prepare today's Soldiers by explaining the drawdown process and its possible scenarios. For example, after Desert Storm, aviation experienced a significant decrease in flying hour program funding. Suddenly, ordering a needed transmission late in the fiscal year was a very big deal. Maintainers sought new and alternative ways to repair transmissions on site. Maintenance engineering calls by liaison engineers from Corpus Christi Army Depot (CCAD) increased in frequency as units received authorization to take transmission cases apart to replace the seals and then reassemble. Controlled substitutions increased to keep other aircraft flying and replacement parts were ordered in the next fiscal year.

During this period, training events were maximized for each aircraft flight hour. Traffic pattern training for newly assigned aviators diminished greatly. Units never lowered their standards and used every effort to get the most training out of every training opportunity.

During that time, the focus at production control meetings was on innovation and efficiency. Contract field service representatives (CFSRs) provided more in depth training on schematics and logistic assistance representatives (LARs) became more involved with resolving issues. The aviation community pulled together to meet the needs left behind from reduced funding. The same scenarios are on the horizon now.

The high operational tempo during the last 12 years has exceeded a unit's capability to provide its own maintenance support. Units now rely on contractor field teams to augment their maintenance capability. Aviation maintenance companies and aviation support companies provide fewer phase teams. As a result, fewer Soldiers turn wrenches and learn the maintenance craft.

Despite all the uncertainties, Army aviation can prepare its Soldiers for the future. The aviation community needs to get "back to the basics" and use every resource to rebuild phase teams.

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First, unit leadership must train the trainers. Non-commissioned officers (NCOs) need to be trained how to run a phase team. The trainer may be the first sergeant, or even the quality control NCO but they must be empowered to mentor the younger NCOs on proper work performance and set the highest standards. When it comes to maintenance, there are no short cuts in getting an aircraft out of the hangar and back in the air.

Empowering the trainer includes effective problem solving and presentation skills. P4T4 (problem, plan people, parts, time, tools, training, technical Inspector) is a viable method that focuses the unit on how to resolve a maintenance action, and enhances the maintenance supervisor's pre-phase and post-phase briefs to unit leadership. Although not easy at first, using the P4T4 method as a briefing tool allows the inexperienced maintenance NCOs to tell their unit leaders about the planned aircraft maintenance procedure. The result is that NCOs gain more confidence, develop their communication skills, and most importantly have a plan for the maintenance tasks ahead. A number of units have modified the P4T4 acronym by including an "S" at the end for safety – a great addition to bring a critical consideration to the table in the planning stage. Despite reduced funding, technical training is still available. Sometimes unit leaders will need to think outside of the box to keep their Soldiers current and well-equipped. From proper trouble shooting to basic corrosion control, a LAR is a valuable resource in providing supplemental training to aviation units. Additionally, E-LARs, the "E" annotating electronics, have received more in-depth training on wiring schematics and troubleshooting and are a valuable and available resource.

Corrosion control is a big issue in both Army aviation and missile systems. A study conducted in May 2007 identified $1.6 billion in losses to Army aviation and missile systems. A follow up study in July 2010 indicated a loss of $1.4 billion in those same systems. The decrease of $200 million is likely in response to on-site training conducted by the Corrosion Prevention and Control Center of Excellence (CPCCoE). CPCCoE personnel will come to a unit and train maintainers on current corrosion prevention applications and products but if travel funding is not available, LARs can provide basic corrosion control training.

Each LAR has reach-back capability to engineers at the Aviation and Missile Research, Development and Engineering Center's Aviation Engineering Directorate (AED). This relationship can be especially helpful when additional expertise is needed to understand a complex maintenance fault. AED can also provide training at a unit's home station, when changes in maintenance manuals are significant and require additional instruction. LARs can also assist with funding additional training. Sometimes, travel for these teams is already funded, so simply asking for the training is a good starting point.

Maintenance test pilots are also a valuable resource for training. Each one of them receives in-depth system classes when they attended the Maintenance Test Pilot Course at Fort Rucker. Also, the regional CFSR can provide some additional classes on trouble shooting.

Each Army airframe project management office (PMO) has a fleet manager who interacts with units in the field. Generally, they provide new equipment training but can come back and retrain units as required. Your brigade aviation maintenance officer can contact the PMOs fleet manager's office to inquire about training assistance.

CCAD also provides limited training. CCAD has artisans that are experts at replacing seals, overhauling components, refurbishing blades, and applying modification work orders to aircraft. LARs can contact CCAD to coordinate specific training requirements.

Another source for training is regional theater aviation sustainment maintenance groups (formerly known as aviation classification repair activity depots). These organizations normally service an Army National Guard Bureau region with depot-level pass-back support and are manned with highly skilled maintenance personnel. They are more than willing to assist with any training needs. Located in California, Mississippi, Missouri, and Connecticut, they may be closer to a unit than CCAD.

As we move into the future, the U. S. Army Aviation Center of Excellence Directorate of Training and Doctrine (DOTD) is engaged with a company (D2) that has a contract through Training and Doctrine Command to modernize Army programs of instruction. It is hoped that this initiative will eventually enable a unit to download a class that is taught at one of the aviation training sites allowing a unit trainer to conduct refresher training for their Soldiers without travel or funding.

Army aviation is continually growing and changing, often requiring creative training adjustments. A recent example is the addition of composite materials. Training has been developed at Redstone Arsenal and approved by AED to teach Aircraft Structural Repair Soldiers (15Gs) repair procedures for these new materials. This training has not been inserted into 15G training yet, so rather

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than wait for it to be inserted, Army Aviation and Missile Command's CSM Glidewell worked with the Program Executive Office for Aviation and different PMOs on Redstone to get the training written, approved, and implemented. So far, artisans from CCAD and some active-duty units have received the training. NCOs that have received the training return to their unit and train other 15G Soldiers.

Another area requiring additional training is reliability centered maintenance (RCM). RCM, in a nutshell, is the analysis of a system to determine why it broke and then taking actions to prevent the system from breaking again. RCM involves mechanics who tear down components, engineers who analyze the data, project managers who set priorities, and Soldiers in the field who initially identify a maintenance fault with technically correct and accurate descriptions. It is critical for maintainers in the field to not skip over details of why components fail - a concept unit leaders can help instill in their unit. Soldiers should annotate details in the remarks section of the appropriate maintenance form if there is not another field on the form that applies. Failure codes are helpful as well. Many opportunities are missed to inform people in the sustainment community why something broke. Changes can be made based on information supplied by unit leaders and Soldiers.

RCM has two legs: Conditioned Based Maintenance (CBM) and Rimfire. CBM is the concept of replacing components based on their condition, not necessarily on the amount of time on wing or between overhaul. The Rimfire Maintenance Control System is a process of identifying components, many of them high dollar ones, with a high failure rate and trying to get more life out of them between maintenance events designed to simplify the control of planned maintenance tasks and the analysis of breakdowns and their causes.

CBM digital source collection systems are now on most platforms. The integration of CBM training into Aviation Branch classrooms is challenging. DOTD is preparing to integrate CBM tasks inserted into course schedules. From entry to artisan levels, the Army aviation community is improving how branch maintainers are trained on CBM tasks.

CBM gives the maintainer another tool to conduct maintenance on the condition of a component rather than the component presenting a failure mode that requires a maintenance action to be completed. Put simply, maximizing the use of CBM data increases the life of a part. If a component enters the yellow range, one can look at the rate of change to better determine expected remaining useful time on that component. Under combat operations, units may have replaced a component when it entered a yellow indication, but now only need to manage the remaining time of the component to save financial resources. An informed decision can now be made with some degree of certainty rather than simply using the repair-and-replace mentality.
CCAD runs the Rimfire program, which determines why parts fail before their expected life spans. When a component in the program arrives at CCAD, it goes to a separate warehouse where technicians tear the component down. During this process, they note internal damages, record, and photograph them. This information is then entered into a database where engineers and project managers look for trends and try to discern if there is a fix.

Change is coming and the Army aviation community must adapt while keeping sustainment and maintenance standards high. Uncertainty of funding and personnel levels require that aviators return to fundamentals and focus on training and readiness. Lives depend on Soldiers doing their tasks to the standard.

CW5 Langewisch currently serves as the Aviation Branch Maintenance Officer assigned to the Aviation and Missile Command. Previous assignments include 2nd Armored Division, 5th Infantry Division, 1st Cavalry Division, 1st Armored Division, and the United States Army Aviation Center of Excellence in various senior aviation instructor and maintenance roles. CW5 Langewisch is qualified as an AH-64A/D Instructor Pilot and Maintenance Test Pilot, Instrument Flight Examiner, and as an Army Aviation Safety Officer. CW5 Langewisch has deployed to Implementation Force (Bosnia and Herzegovina), Stabilization Force (Bosnia and Herzegovina), Operation Desert Storm, and Operation Iraqi Freedom (OIF 07-09 and 08-10). He is qualified in the AH-64A/D, OH-58A/C, and the UH-1. CW5 Langewisch has 29 years of service.

Acronym Reference

15G - Aircraft Structural Repair Soldiers
AED - Aviation Engineering Directorate
CBM - conditioned based maintenance
CCAD - Corpus Christi Army Depot
CFSR - contract field service representatives
CPCCoE - Corrosion Prevention and Control Center of Excellence
DOTD - Directorate of Training and Doctrine
LARs - logistics assistance representatives
NCO - non-commissioned officer
P4T4 - problem, people, parts, plan, tools, time, training, technical Inspector
PMO - project management office
RCM - reliability centered maintenance
SSA - supply support activity

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MAINTENANCE

A GREEN TAB RESPONSIBILITY

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Aviation Brigade
Fort Campbell, KY

TOO MANY TIMES I have heard platoon leaders place the blame for a poor operational readiness rate on the battalion maintenance officer. The real reason for the platoon leader's woes may be as close as the nearest mirror. Take a look in that mirror, lieutenant, and ask yourself if you have taken ultimate responsibility for maintaining the fleet. If you are not sure, this article should start you in a direction that cannot fail to improve the level of maintenance in your platoon.

Maintenance is a green tab responsibility. Leaders at all levels must be aware of their maintenance posture because it represents the unit's capability to sustain combat operations. Even the best tactically trained unit will not be around for the final victory without proper maintenance. The battalion maintenance officer is there to assist in repairs. He is not responsible for the aircraft status and level of maintenance within your platoon. To operate a good maintenance program there are, as a minimum, three keys—caring, forecasting and performing.

CARING

Caring involves taking a personal and genuine interest in all aspects of the maintenance process. Soldiers have a keen sense for recognizing when

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a leader truly cares about the business of maintenance.

First, take steps to personally know key players affecting your maintenance program. Talk with your platoon sergeant and noncommissioned officers (NCOs). Their experience and expertise in maintenance is one of your most valuable assets. Especially, key on your platoon sergeant. He should know about and supervise every maintenance activity within the platoon. Share your ideas with the key NCOs, listen to their recommendations and then make plans, but remember that you are in charge. Next talk to the battalion maintenance officer, production control personnel, quality control personnel and maintenance test pilots. Finally, meet as many aviation intermediate maintenance (AVIM) personnel as possible, because they will become helpful in special repair missions. When a problem surfaces you will know who to call on for help.

First-line maintenance belongs to the crewchiefs. Care about the crewchiefs because they actually perform the business of maintenance. Ensure they are given every opportunity to excel. Give them guidance when needed and always ensure they have the assets required to accomplish the mission. Sometimes it can be beneficial to assign an aircraft to each crewchief and pilot within the platoon. Pride of ownership is a powerful tool when used properly. A crewchief who takes pride in his aircraft will want to keep it clean, will keep the logbook in order, and will want people to inspect his aircraft to see how squared away it is. Assigning an aircraft to each pilot gets him involved in the maintenance process. Because it is his aircraft, he will want to see it in top condition and will genuinely become interested in the maintenance activities. Also, the pilot can help expedite the maintenance process as needed. The pilot must remember, however, that he is not the mechanic.

Realize that no one loves your aircraft as much as you and your people do. Showing that you care will leave a favorable impression on those people and will demonstrate that maintenance is truly important to you.

FORECASTING

Forecasting is making a calculated estimate of the scheduled maintenance requirements and the coordination effort required to successfully maintain the platoon's aircraft. It is essential for the platoon leader to continuously coordinate with the platoon sergeant, especially in forecasting. Coordination with the platoon sergeant ensures that the absence of the platoon leader will not hinder the forecasting effort. Upon analyzing the platoon's mission requirements and flying hours, the platoon leader is prepared to begin planning for maintenance on phases and major services, routine inspections and services, and time-before-overhaul (TBO) items.

The first rule of maintenance forecasting is to not over-extend your resources. Plan to fly aircraft so that phases and services on separate aircraft are not required to be performed simultaneously. Then when time for a phase or major service nears, plan maintenance efforts so all resources (people, parts, tools, etc.) are available to complete the maintenance activity in a timely manner. Planning will pay great dividends in the form of man-hours saved and aircraft availability.

Next, become intimately familiar with each aircraft and the routine services and inspections found on Department of the Army (DA) Form 2408-13 and DA Form 2408-18. Do not let an overlooked service or inspection be a problem in your maintenance program. Develop a system that collectively tracks all routine services and inspections for the platoon's aircraft. The tracking system you develop will aid in supervising and backing up the maintenance efforts of the platoon sergeant. For example, one of the most neglected items on the AH-1 Cobra is replacing explosive cartridges for the wing stores. A good tracking system will alert the platoon leader of the replacement requirement far enough in advance to have the explosive cartridges available when needed.

Finally, know when TBO items are required to be replaced. Normally, the quality control (QC) section of the aviation unit maintenance (AVUM) company maintains a consolidated tracking list for TBO items. The QC section usually orders these items automatically. Development of a consolidated tracking system for TBO items will help the platoon leader back up the QC section and avoid an embarrassing moment if a TBO item is not available when needed.

Forecasting is an essential element in any successful maintenance program. Work closely and

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coordinate all efforts with the platoon sergeant, develop a tracking system and then execute. Time spent forecasting maintenance will be well worth the effort as the aircraft availability rate of your platoon becomes the best in the battalion.

PERFORMING

The final key to a successful maintenance operation is performing the mission of maintenance. Performing means doing it and doing it correctly. In order to perform maintenance activities correctly, the platoon leader must plan thoroughly and ensure the plan is carried out.

Before any tool is raised to perform maintenance, some degree of planning must be accomplished. One method of planning, developed by Lieutenant Colonel Richard Cody, which works well, is the formula P^3T^2. The formula P^3T^2 stands for: problem, parts, people, tools (special) and time available.

The first P, *problem,* involves evaluation of the problem. Before doing anything else, check to ensure a problem actually exists. Seek the advice of technical inspectors, test pilots and the battalion maintenance officer to determine exactly what the problem is, if any, and what maintenance action is needed.

The second P, *parts,* means acquiring all the parts needed to successfully complete the maintenance. Study appropriate technical manuals and consult technical experts within the battalion to help determine all parts that will be required to complete the mission. For example, when a main drive shaft repack is due on an OH-58C Kiowa, the platoon leader should ensure that major parts are on hand as well as supporting parts such as packing and plates that may be needed for an entire rebuild of the main drive shaft. If possible, have a main drive shaft already prepared to be installed. In short, always plan maintenance for the worst case.

The third P, *people*, entails identifying all key players who will be needed while performing the maintenance operation and ensuring those people will be available during the process. Using the main drive shaft repack on an OH-58C as an example, the required personnel will be the crewchief to perform the work; the platoon sergeant for supervision; a technical inspector to inspect the work and installation process; and a qualified pilot to run-up the aircraft for ground testing.

The first T in P^3T^2 stands for special *tools*. Many routine maintenance activities require the need for special tools such as torque wrenches, jack stands, JET-CALs, VIBREX, etc. These tools normally are maintained at AVUM or AVIM level and are in high demand. Without some degree of coordination to obtain special tools, they will not be available when you are ready to perform maintenance.

The final T in P^3T^2 stands for *time* available. First determine the amount of time required to complete the desired maintenance. Remember to plan for the worst case and perform the maintenance when it will create the least amount of downtime on the aircraft. For example, the worst case (most time required) for a main drive shaft repack on an OH-58C may be an entire day. Therefore, it would not be wise to begin this maintenance on a Friday afternoon unless coordination has been made to carry out the maintenance through completion.

The planning performed using P^3T^2 will be worth little unless the platoon leader ensures his people are doing the work correctly. Make sure the crewchief is properly supervised and is using the correct manuals. Continuously check the progress of the work. Learn as much as possible about the maintenance being done without becoming a hindrance. Then, when the mission is successfully accomplished, pat your crewchief on the back, buy him a soda or use him on the maintenance test flight if one is required. Some recognition will help ensure that motivation toward maintenance remains high.

Every platoon leader wants his platoon to be the best in the battalion. Unfortunately, there are few visible discriminations that clearly set one platoon ahead of the others. One of the most visible discriminators of a platoon's performance is its level of maintenance reflected by the operational readiness rate. Maintenance gives the platoon leader a unique opportunity to be innovative and resourceful and to distinguish his or her platoon. Form a system of aircraft maintenance around the keys of caring, forecasting and performing, and your platoon will maximize its potential. There is no substitute for a good maintenance program because it will sustain combat operations and ultimately will pay off in victories on the battlefield.

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By LTC Henry "Hank" C. Perry and MAJ Brian Hummel

How do you train for a mission you have never executed? Where do you start? These are some of the questions posed to senior leaders of 4-227th Attack Reconnaissance Battalion (ARB), 1st Air Cavalry Brigade upon learning of their future deployment in support of Operation Enduring Freedom - Kuwait (OEF-KU) and Operation Spartan Shield (OSS). After initial mission analysis and coordination with units down-range, the senior planners and leaders of 4-227th ARB decided that a new and unique approach to training would be necessary, as there was no specific task in the universal mission essential task list (METL) that addressed maritime operations as it pertains to an ARB. The battalion leaders settled on a "gate" training strategy that incorporated U.S. Forces Command (FORSCOM) and U.S. Central Command (CENTCOM) training guidance, as well as training principles outlined in the applicable regulations. The battalion's operations section started this process by creating a new METL task, Conduct Maritime Security Operations, with three sub-tasks - Conduct Over-water Familiarization, Conduct Over-water Gunnery, and Conduct Deck Landing Qualifications. Developing these tasks as goals, leaders developed the "gate" training strategy outlined in Figure 1.

Major components of this strategy include Helicopter Over-water Survival Training (commonly referred to as Dunker/HOST), maritime contingency operations academics, utilization of the Longbow Crew Trainer (LCT) to familiarize aviators with over-water flight operations, over-water emergency extraction training, over-water familiarization, and finally, deck landing qualifications (DLQs). The intent behind the "gate" training strategy was to ensure aviators complete each successive "gate" prior to moving to the next, as tasks increase in complexity and become more resource-intensive.

Gate 1: Dunker/Helicopter Over-water Survival Training (Dunker/HOST)

Army Regulation 95-1 states that Dunker/HOST qualification is a requirement for over-water flight if the flight occurs further than glide distance from the shore. The battalion, therefore, began Dunker/HOST training as the first milestone in support of preparing for maritime contingency operations at Fort

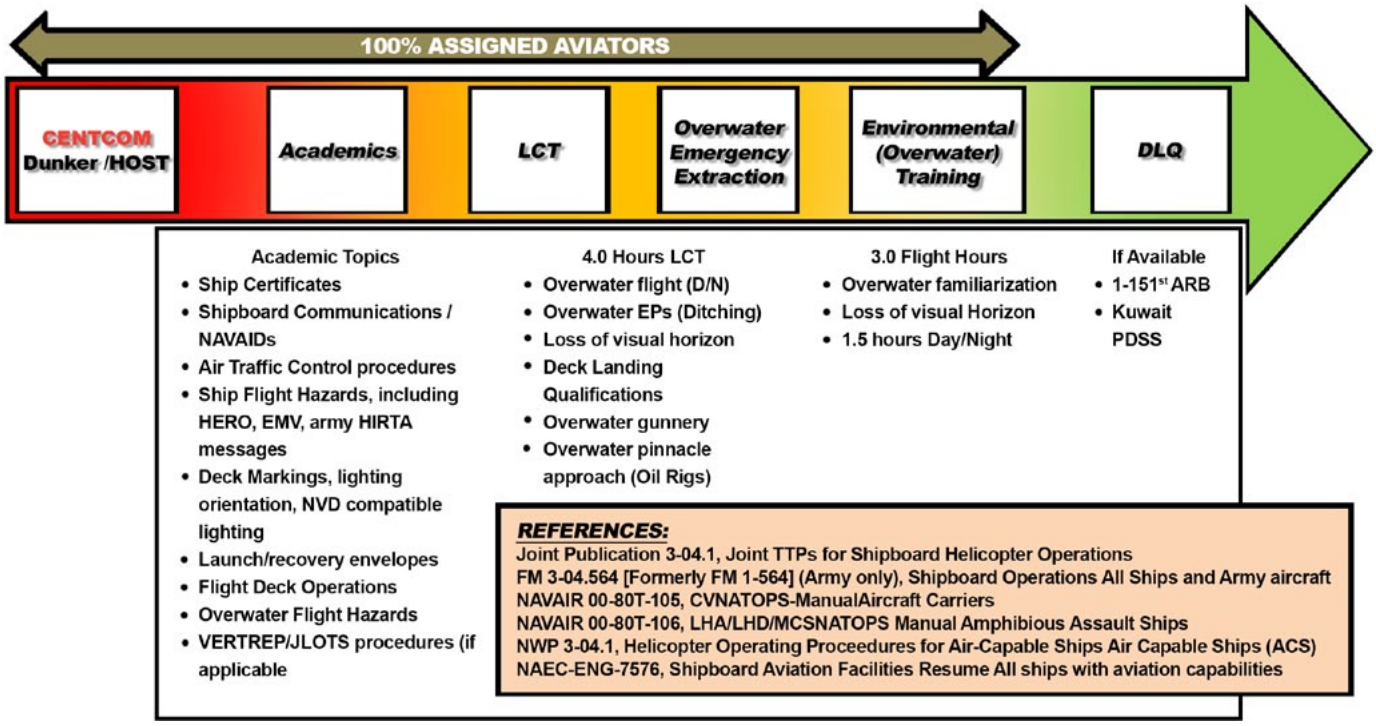

Figure 1: 4-227th ARB Maritime Contingency Operations "Gate" Training Strategy

Rucker's Dunker/HOST facility. Critical skills such as over-water crash escape and survival, use of the over-water aviation life support equipment (ALSE), including the use of the life preserver unit (LPU-40), over-water gear carrier, and emergency breathing apparatus. Aviators cycled through confidence building exercises in order to properly egress different types of aircraft during over-water crash sequences both with and without the assistance of the emergency breathing apparatus. Aviators also trained on over-water survival skills as crews and in groups to simulate flight over water as passengers in utility or cargo aircraft.

A "Guns Attack" aviator is rescued via hoist from a UH-60A MEDEVAC aircraft from 2-227th GSAB.

Gate 2: Maritime contingency operations academics

Battalion and company standardization instructor pilots were responsible for researching applicable regulations and training manuals to develop relevant and applicable classes for aviators. These classes addressed topics such as over-water weather characteristics, over-water flight planning, shipboard operations (with a focus on DLQs), flight during low illumination, and flight during the loss of a visible horizon. The 1-151st ARB, South Carolina Army National Guard, who had just returned from OSS support, shared maritime operations lessons learned and the Houston Air Station U.S. Coast Guard (USCG) presented classes on over-water flight characteristics and rescue operations.

Gate 3: Maritime operations in the Longbow Crew Trainer (LCT)

With an academic foundation of the operations they would conduct in theater, the 4-227th ARB moved to the LCT where crews would be required to conduct a minimum of four hours of over-water flight during day, night, flight in degraded weather without a visible horizon, and scenarios emphasizing tactics, techniques, and procedures (TTP). This was also the first time crews had the opportunity to conduct day and night over-water gunnery operations. Lastly, all aviators received instruction and practice on DLQ. Additional LCT flight time was made available to allow crews to gain confidence and increase deck landing skills.

Gate 4: Over-water Emergency Extraction Training: Operation Gun Rescue

The 4-227th ARB planned Operation Gun Rescue as our over-water emergency extraction training event. The battalion leadership designed this event to instill confidence in ALSE equipment and familiarize attack crews with medical evacuation (MEDEVAC) equipment and procedures in the event overwater recovery became necessary. The event also provided an opportunity for air mission commanders to assume the role of an on-scene commander

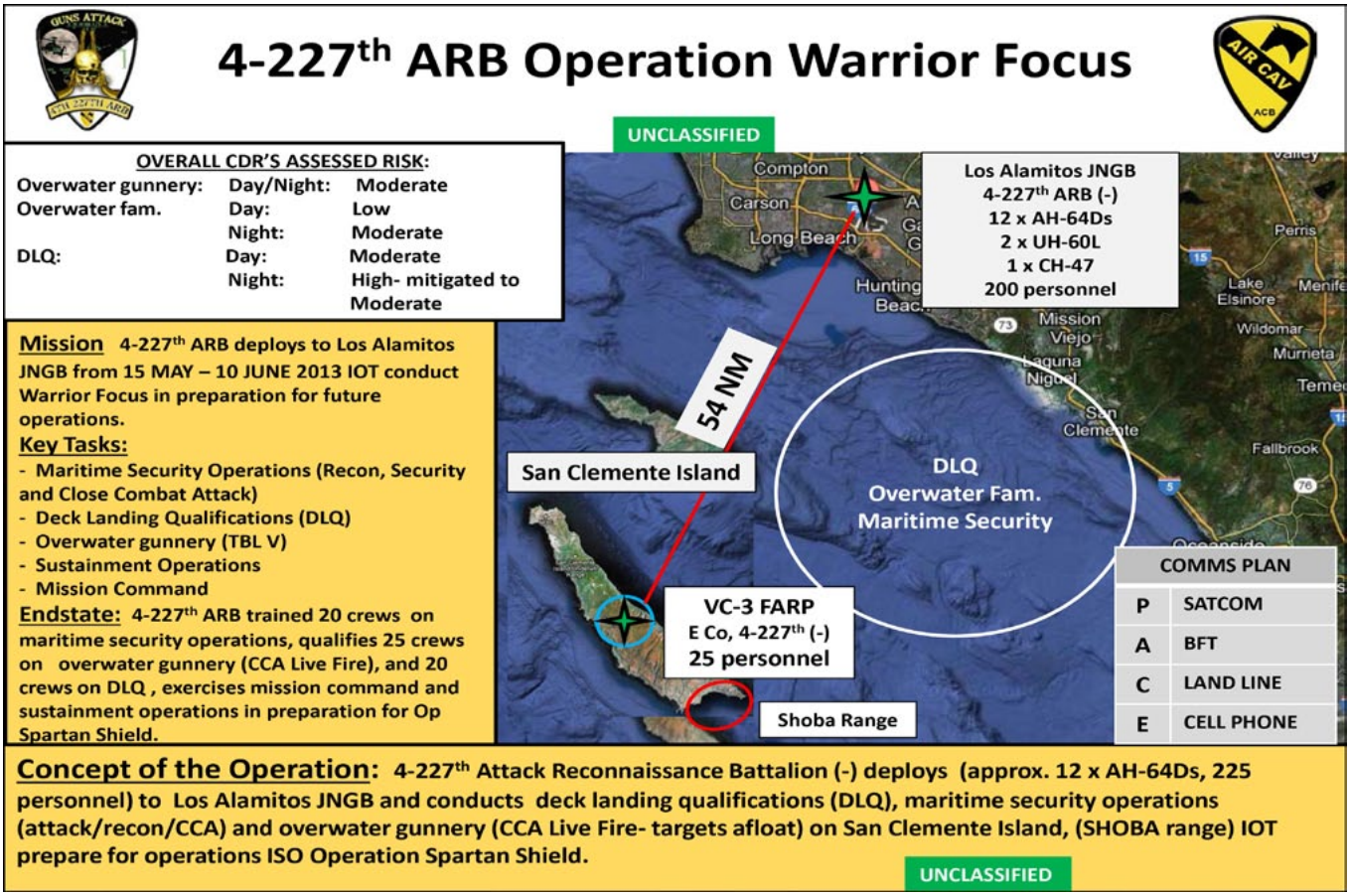

Figure 2: 4-227th ARB's Operation Warrior Focus Maritime Contingency Operations collective level training concept.

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in the event their wingman had to ditch. The event started with informational briefs from the USCG who re-iterated previous academics on over-water recovery TTP and recommended in-water survival techniques which could be used if isolated in the water for an extended period. Aviators were then presented a class by the Project Manager Air Warrior that detailed the use of the over-water ALSE kit components. The final extraction presentation was on the UH-60A MEDEVAC capabilities and proper use of the jungle penetrator and rescue hoist.

Three days were dedicated for these hands-on exercises employing the knowledge and skills gained from the previous emergency extraction classes. Aviators were paired as a crew and after deploying their LPU-40, were dropped off by boat in Lake Belton on Fort Hood to simulate a ditching scenario. An AH-64D, role playing the downed aircraft's wingman, assumed the function of on-scene commander to coordinate rescue efforts with the 4-227th ARB tactical operations center. When the MEDEVAC aircraft arrived, each crew member was extracted with the jungle penetrator and rescue hoist. This scenario was repeated until all aviators had the opportunity to develop proficiency with overwater ALSE, the jungle penetrator, and as on-scene commander from the wing aircraft.

Gate 5: Environmental (Overwater) Training: Operation Warrior Focus

A collective level training event called Operation Warrior Focus followed the academics, hand-on demonstrations, and practical exercises. Warrior Focus was to bring all new knowledge and skills together in a practical exercise involving over-water gunnery and finally, DLQ. Figure 2 outlines the concept of training that was coordinated in support of Operation Warrior Focus.

We initially coordinated with the Navy, USCG, and the Army Reserve at Los Alamitos to conduct this portion of training off the coast of California near San Clemente Island. Everything was set to include overwater gunnery against fixed land based and seaborne moving targets; however, because of the operational tempo of the supporting Navy's 5th Fleet, we would not be able to complete the deck landing portion of the exercise. Although we were not able to complete these tasks as initially planned because of the 5th Fleet's operational requirements, the coordination for the exercise was in place and the supporting elements are now familiar with Army Aviation's requirements. This remains a viable option to units planning these tasks in the future.

In lieu of the west coast option, an alternative training location was identified and focus shifted to completing the actual hands-on portion of over water flight operations in the Gulf of Mexico. 4-227th ARB deployed their tactical command post , five AH-64s, two HH-60As from the 2-227th General Support Aviation Battalion (GSAB) and a limited maintenance and sustainment package to Ellington Field, Houston, TX with approximately 45 personnel in order to conduct maritime operations in the Gulf of Mexico. The unit coordinated flight operations with the Federal Aviation Administration in order to conduct realistic training both in and outside of territorial waters along the Gulf Coast.

Aviators flew realistic missions over the Gulf of Mexico, while maintainers performed specific salt water maintenance such as anti-corrosion checks, exterior aircraft washes, and internal engine flushes in addition to keeping up with normal maintenance operations. Flight operations personnel conducted mission command via satellite communications radios and monitored mission aircraft location with blue force tracking. The tactical operations center communicated directly with the USCG to ensure timely and accurate location updates of unit aircraft positions over the Gulf in the event the USCG was required to respond to an actual aircraft ditching. Battalion and company instructor pilots focused their instruction on maritime weather conditions, loss of visual horizons, and utilizing the aircraft systems while flying over-water. When unit leaders were satisfied mission objectives were met, the unit transitioned to the final training event - Gate 6: Deck Landing Qualification.

Gate 6: Deck Landing Qualifications

Capitalizing on lessons learned from units with previous maritime operations experiences, the 4-227th ARB teamed with mentors from the 1-151st ARB South Carolina Army National Guard. Planners from both units attended the U.S. Naval Forces Central Command Quarterly Ship Scheduling Conference in Norfolk, VA to coordinate "deck time." 1-151st ARB instructors conducted DLQ academics and field deck landing practice at McEntire Joint National Guard Base near Columbia, South Carolina for 4-227th ARB instructors (train the trainers). Final DLQ was completed on Naval vessels while operating from Naval Air Station Oceana.

Deployment

4-227th ARB deployed in support of OEF-KU confident of their ability to support maritime operations. The final "Gate" of the 4-227th Commander's training plan; however, required compliance with CENTOM training requirements involving relief in place of the 4-501st ARB and completion of a joint training exercise involving theater DLQs with U.S. Navy assets in the North Arabian Gulf.

This was the final stepping stone of the unit's Maritime Contingency Operations gated training strategy. 4-227th ARB aviators currently conduct Maritime Contingency Operations in support of OEF-KU, and maintain DLQ currencies through partnerships with the United States Navy.

Maritime Operations: The Way Ahead

Recently, Major General Kevin Mangum,

A 4-227th ARB AH-64D Apache Helicopter conducts deck landing qualifications on the USS Ponce (AFSB(I)-15) during a Joint Maritime training mission in the Northern Arabian Gulf (NAG) in support of Operation Enduring Freedom- Kuwait (OEF-KU). Photo taken by MAJ Randall Stillinger, 36th Combat Aviation Brigade PAO.

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the Commander of the United States Army Aviation Center of Excellence (USAACE) indicated:

> "Why does the Army Aviation branch exist? The answer to that question forms the basis of what we do (or should be!) and how we do it. The "why" we came up with is Army Aviation is relentlessly focused on and dedicated to honoring a sacred trust with Commanders and Soldiers on the ground. That is the essence, the reason for our existence. From that we derived the why the Army Aviation Center of Excellence exists. We exist to develop Aviation professionals and indispensable Aviation capability to those same commanders and Soldiers on the ground. The Chief of Staff of the Army (CSA) has asked us to look at the capability of Army aviation operating from naval vessels. The intent is not to replace Marine capabilities, but to augment, to increase capacity, or to provide unique capabilities not resident in the other services. Our initial analysis and brief back concluded Army aviation is capable of maritime operations in scalable and tailorable configurations."

A 4-227th ARB AH-64D Apache Helicopter aboard the USS Ponce (AFSB(I)-15) during a Joint training exercise in the North Arabian Gulf (NAG) in support of Operation Enduring Freedom- Kuwait (OEF-KU). Photo taken by SGT Mark Scovell, 36th Combat Aviation Brigade PAO.

4-227th ARB continues to refine and develop cutting edge TTPs in support of the United States Army's initiative to conduct maritime operations. Located on the front lines of maritime operations, 4-227th ARB is conducting new initiatives in order to improve capabilities and increase capacity by providing Joint assets with our unique capabilities. 4-227th ARB conducts the Maritime Operations Working Group at Camp Buehring, Kuwait designed to bring key players in the maritime operations spectrum together to further refine new TTPs, incorporate enablers such as the addition of unmanned aerial systems, and further increase our capabilities by making Army aviation better prepared to execute missions in support of Joint maritime operations.

LTC Henry "Hank" C. Perry is the Commander 4-227th Attack Reconnaissance Battalion "Guns Attack." Previous duty positions include 159th CAB Deputy Brigade Commander, 159th CAB Operations Officer, assault battalion task force executive officer, attack battalion task force S-3, attack and HHC commander. LTC Perry has deployed to Bosnia, Herzegovina in support of Stability Force (SFOR), Operation Iraqi Freedom I and II, Operation Enduring Freedom 9-11 and 11-12, and Operation Enduring Freedom Kuwait 13-14.He has 17 years' service. LTC Perry is qualified in the AH-64A/D.

MAJ Brian Hummel is the Executive Officer of 4-227th Attack Reconnaissance Battalion "Guns Attack." Previous duty positions include Future Plans Aviation Officer for Combined Joint Task Force -1, AH-64D company commander and platoon leader. He has deployed on Operation Enduring Freedom VI and 11-12, Operation Iraqi Freedom 07-09, and Operation Enduring Freedom-Kuwait 13-14. MAJ Hummel has 12 years' service. He is qualified in the AH-64D.

Acronym Reference

ALSE - aviation life support equipment
ARB - attack reconnaissance battalion
CENTCOM - Central Command
CSA - Chief of Staff of the Army
DLQs - deck landing qualifications
Dunker/HOST - Dunker/Helicopter Over-water Survival Training
FORSCOM - U.S. Forces Command
GSAB - General Support Aviation Battalion
LCT - Longbow Crew Trainer
LPU-40 - life preserver unit
MEDEVAC - medical evacuation
METL - mission essential task list
OEF-KU - Operation Enduring Freedom - Kuwait
OSS - Operation Spartan Shield
TTP - tactics, techniques, and procedures
USCG - U.S. Coast Guard

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AH-64D Fire Control Radar Success - in Decisive Action Training

By CPT Lucas J. Kennedy

Since the introduction of the fire control radar (FCR) with the AH-64D Apache Longbow helicopter in 1997, the FCR has experienced periods of fluctuating use in attack reconnaissance battalions (ARB). Units discovered early on during Operations Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) that crucial weight could be saved by leaving the FCR off of the aircraft in order to maintain necessary power while operating in "high and hot" environments. Additionally, the OEF and OIF operational environments and enemy were not consistent with the intended use for the FCR due to the nature of the threat in OEF and ground clutter in OIF. With minimal use over the last ten years, many FCRs have remained tucked away in shipping containers. There has been limited effort by ARBs to install the FCR on aircraft during different phases of the Army force generation and deployment periods. Some units have installed the FCR during the train/ready phase while others have elected to put them on during more environmentally restricted periods of time down-range. While these efforts to test and use the FCR have been moderately beneficial, they have been limited, usually to noting whether or not the unit is operational and conducting "refresher" training for aircrews in conjunction with the mission. After a short period of usage, the FCR is removed and returned to the storage container. Minimal use of this valuable piece of equipment has led to decreased proficiency of attack aviators. Lack of FCR use has resulted in component failure or degradation resulting in FCRs that now require a significant number of parts and time to be invested in order to make them fully mission capable. With current and pending budget restraints it may be a challenge to fund the parts necessary to get this valuable piece of equipment back in the fight.

Revalidating the FCR as a necessary piece of equipment in attack reconnaissance operations is a key catalyst in the reestablishment of the FCR as the lethal weapon system it was designed to be. Determining whether or not the FCR will regain the role of an enabler in the future is quickly becoming a closely observed technique at the National Training Center (NTC). As Operations Group and the NTC transition from counter insurgency (COIN) centric training rotations to the decisive-action training environment (DATE), the "Eagle Team" monitors FCR employment by rotational unit aviation task forces. While DATE rotations still include some of the familiar COIN-based mission readiness training exercise components such as; insurgencies, para-military elements, and criminal threat networks; it also gives units the opportunity to train for operational adaptability to deploy against a near-peer conventional force with combined arms maneuver. In the DATE, all of these components are combined in order to train brigade combat teams to operate in the joint interagency, intergovernmental and multinational environment as regionally aligned forces. Wide-area security and combined arms maneuver operations against a near-peer force in an austere environment such as the West-Mojave Desert of the NTC allows attack aviators the opportunity to employ the FCR as it was designed to be used. These operations give the aircrew the capability to identify, classify, prioritize, and track targets to the maximum range of the Hellfire weapon system and allows them to use the radio frequency interferometer to detect, identify, and display radar systems in conjunction with FCR targeting information.

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While FM 3-04.126 goes into great detail about engagement area (EA) development and direct fire planning, it leaves much to be desired in the way of direction in the effective use of the FCR in the EA and direct fire fight. FCR employment has mostly been left up to the development and instruction of tactics, techniques, and procedures by training programs such as

the AH-64D Aircraft Qualification Course at the United States Army Aviation Center of Excellence and the Unit Fielding and Training Program conducted by the 21st Cavalry Brigade, Air Combat.

One key training consideration for successful employment of the FCR is home station training. Units that have seen success using their FCRs at the NTC have reported increased training at home station before arrival to the NTC. Live and virtual training through gunnery in the Longbow Crew Trainer, and the Aviation Combined Arms Tactical Trainer have greatly enhanced crew-member familiarity and skills with the FCR, which has directly translated to greater success at the NTC. Continued use and funding of both of these critical tools is highly encouraged as another tool to keep attack aviator skills current and their skills sharp.

Initial issues with employing the FCR at the NTC have ranged from limited knowledge and practical use of the FCR by junior crew members to determining which terrain sensitivity setting and schemes to use. As mentioned earlier, maintenance of the FCR has declined and many units arrive with non-mission capable FCRs that require considerable parts and time to repair. Fully mission capable FCR permitting, crews have found that the best terrain sensitivity setting for the NTC is "Desert/Scrub Tight" in conjunction with the "Moving Vehicles" priority scheme. These settings have optimized the FCR performance and therefore, provided the crews better situational awareness and target identification on the battlefield. Once these settings were refined, the teams and platoons were better able to aide their supported ground unit, ultimately enhancing mission success.

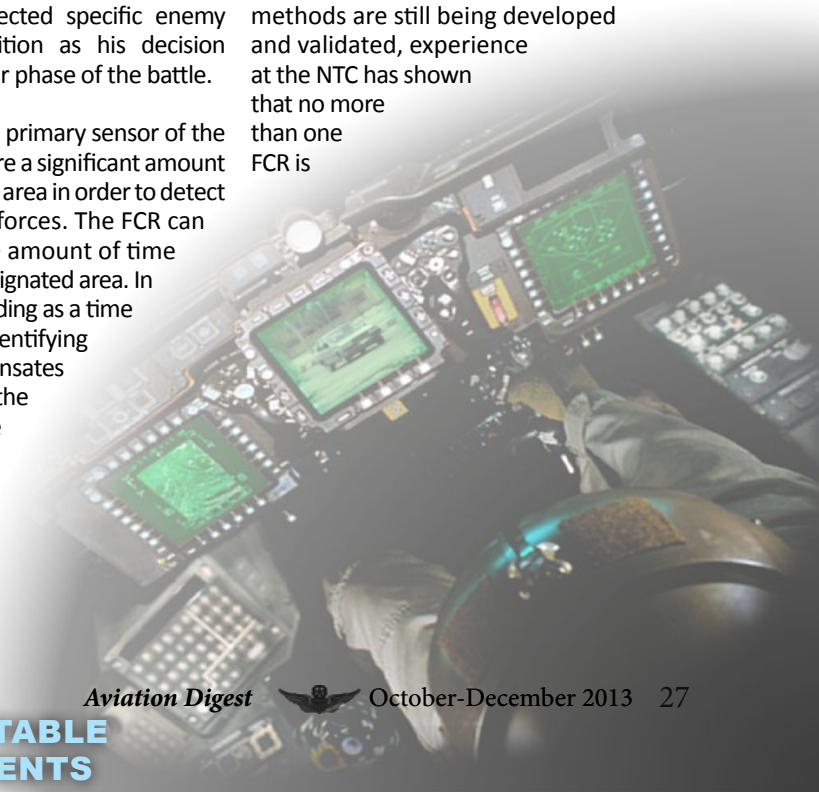
The FCR can improve the scanning area of an attack reconnaissance company (ARC), helping the commander or air mission commander (AMC) to visualize the engagement area and validate or alter his pre-planned fire distribution technique to employ within the EA. Additionally, the FCR can aide in the prevention of overkill within the EA.

Scanning and Visualizing the Engagement Area

During multiple DATE rotations at the NTC, observations have been made that support the usefulness of the FCR in broadening the scanning area within an ARC's assigned sector of the engagement area. Teams and platoon sized elements have been able to use the FCR in order to provide early identification of enemy forces maneuvering on the supported ground unit, providing early warning and trigger identification. FM 3-04.126 states that in a deliberate attack, with prior planning time available, the commander can initiate the fight with a trigger. A trigger can be an event, such as enemy crossing a terrain feature, which would start the direct fire plan. The FCR is not normally the final sensor used to identify a trigger. When linked with the target acquisition and designation sight (TADS); however, it has helped teams narrow the search and therein the time used to identify a trigger when the brigade combat team (BCT) or supported battalion commander has selected specific enemy vehicles or composition as his decision point to enter another phase of the battle.

While the TADS is the primary sensor of the AH-64D, it does require a significant amount of time to scan a large area in order to detect and identify enemy forces. The FCR can greatly decrease the amount of time required to scan a designated area. In addition to the FCR aiding as a time saving measure for identifying targets, it also compensates for the limitations of the TADS in the decisive action environment. Going back to the "old school" way of operating from attack by fire positions, the aircrews using only the TADS are forced to completely expose the aircraft when searching for targets in a high threat environment. This factor limits the time that the TADS can be effectively used. An aircraft with only the FCR exposed can make-up for the limited use of the TADS to acquire targets. For this reason, rotational units have found success in using the FCR as a critical planning factor in their EA development process as a primary means of detection. When employed in both attack and defense operations, the FCR has allowed teams to scan an area of approximately 16 square kilometers in less than three seconds. This quick scan of the battlefield provided the AMC the ability to quickly assess the situation, visualize the battlefield, and pass information to the ground commander. While conducting force on force operations at the NTC, ground commanders have capitalized on the wealth of information aircrews have provided and were made more timely and accurate through the use of the FCR. Once the AMC has a clear visualization of the battlefield, he is then able to either validate his pre-planned fire distribution technique or alter his plan according to the picture of the battlefield that the FCR has provided him.

The total number of FCRs required to effectively scan and visualize the EA in an operation is determined by the commander or AMC. Three FCRs are allotted to each ARC per the table of organization and equipment. Four ship platoon-sized missions are the largest team that has been employed in the DATE thus far at the NTC. A platoon mission rarely calls for all three company FCRs to scan the EA. While best-case employment methods are still being developed and validated, experience at the NTC has shown that no more than one FCR is



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needed on each platoon-sized team to accurately assess up to two EAs effectively.

Validating the Pre-Planned Fire Distribution Technique

During the planning phase of major operations at the NTC, attack units most often use the quadrant method to distribute fires in the EA. The quadrant method is commonly used because of its simplicity and the ability to easily depict it in the aircraft on the tactical situation display. Units have seen great success through the use of the FCR to both validate and adjust their fire distribution technique. FCR information overlaid on the tactical situation display provides the AMC the ability to quickly determine where the majority of enemy forces are located within the EA and if he needs to alter the planned fire distribution. Once that determination is made, those targets can quickly be passed to sister ships and ground forces, allowing for the rapid engagement of the enemy with devastating effects well ahead of the friendly force's main body.

Prevention of Overkill

FM 3-04.126 states that the avoidance of overkill is more important than any other factor in the principles of fire control as it increases the probability of kill of the helicopter's primary precision guided weapon. Prevention of overkill has been greatly aided by the FCR in recent DATE rotations at the NTC. Directly tied to effective fire distribution, overkill is easily avoided by using the FCR to clearly establish where the enemy is on the battlefield and which platforms will engage specific enemy targets. The clear delineation that the FCR provides gives crews an equally clear picture of which targets they are and are not responsible for engaging.

Threat Avoidance

In addition to its usefulness in the EA, the FCR has proved a good threat avoidance measure. Crews using the FCR for both attack and reconnaissance missions have typically exercised more standoff from the enemy. This application of using the FCR to increase standoff (more often seen employed during periods of darkness) has significantly lowered the number of aircraft shoot-downs. The FCR also provides aircrews improved threat avoidance by decreasing the overall time that the aircraft is unmasked. Through the use of terrain masking and unmasking techniques, aircrews are able to unmask only the FCR in order to visualize the battlefield and determine a fire distribution plan before unmasking the entire aircraft in order to engage the enemy. This ability to limit the aircraft's exposure time has greatly decreased the number of aircraft shoot-downs for units employing the FCR in the DATE.

Current trends at the NTC show that the FCR is an effective tool for ARCs when used properly in the DATE. The FCR significantly increases the team's ability to support the ground commander by allowing crews to

quickly scan the EA, make rapid adjustment to the attack team's fire distribution technique, and prevent overkill. In addition to these factors improving success in the EA, the FCR continues to offer aircrews increased survivability in the way of threat detection, recognition, and avoidance. The FCR is, and should continue to be, a key enabler for attack reconnaissance operations well into the future; giving our Army the capability and versatility to prevent conflict, shape the environment, and decisively win our nation's wars.

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ARB - attack reconnaissance battalions
AMC - air mission commander
ARC - attack reconnaissance company
BCT - brigade combat team
COIN - counter insurgency
DATE - decisive-action training environment
EA - engagement area
FCR - fire control radar
NTC - National Training Center
OEF - Operation Enduring Freedom
OIF - Operation Iraqi Freedom
TADS - target acquisition and designation sight

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Scramble the Egg

The Argument for Forming and Training Aviation Battalion Task Forces.

By MAJ Jacob A. Mong

"An Army is a team; lives, sleeps, eats, fights as a team. This individual heroic stuff is a lot of crap."

~ General George S. Patton

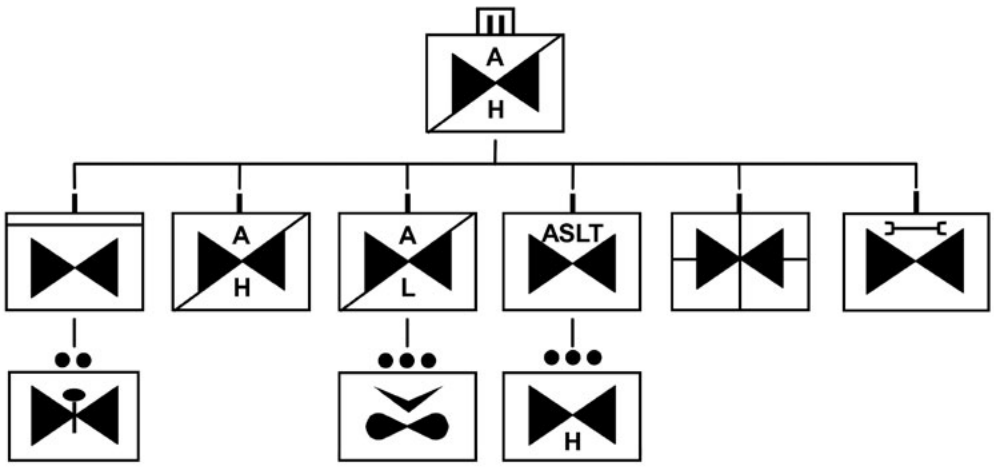
The Army is a lethal fighting machine. In terms of operations, training, and experience for our Soldiers, aircrews, and leaders, the Army Aviation branch stands at the same threshold as it did following the close of the Vietnam War. As Iraq and Afghanistan take their place in the history books, the question has to be asked "Now what do we do?" In light of the current draw down, we face an era of declining budgets and fewer deployments that occur following every major conflict. Unless we actually learn from the experiences of aviation operations over the past ten years, we can expect our organizations to morph into a resurgence of the 1990s where aviation battalions typically trained and operated as table of organization and equipment (TOE) pure units with little interaction across the aviation brigade. Such a status can be expected to result in fewer opportunities to train as combined aviation teams in the form of aviation battalion task forces (ABTFs). In an attempt to retain the lessons learned from Operation Iraqi Freedom and Operation Enduring Freedom (OIF/OEF), aviation brigades should make deliberate efforts to form and operate ABTFs as part of an ongoing Army Force Generation (ARFORGEN) or annual unit training plan process regardless of deployment requirements. The benefits gained from operating as an ABTF outweigh the challenges of maintaining and training these units. This article will explore the benefits and concerns that ABTFs offer the aviation brigade, and the Army and make recommendations for forming and operating ABTFs.

There are many who will disagree with the concept of forming and conducting operations as an ABTF and focus only on the advantages of a pure TOE formation. These include massing battalion level combat power on an objective (phased, continuous, maximum destruction attack), reaching a higher level of collective training proficiency through training focus, less complicated maintenance and sustainment considerations with a one aircraft fleet, and the basic and increased level of individual training in pure organizations as they are focused on aircraft specific tasks. However strong the argument appears for retaining aircraft integrity, there are also advantages to forming the ABTF.

The ABTF has been the formation of choice to provide the varied capability of selected airframes to the fight during OIF/OEF operations and have provided the aviation and ground force commander the full array of aviation capabilities under one battalion level headquarters. Elements of the ABTF plan and brief together as an autonomous team and as a result have a better understanding of each other's capabilities and limitations.

The ABTF configuration simplifies the supported ground unit access to aviation assets. Air and ground units training and operating together in this capacity makes preparing and deploying a battalion level task force to support an armor, infantry, or Stryker brigade combat team on short notice easier and more effective. A habitual relationship between an ABTF and ground unit provides the ground force commander single-point access to all required aviation support.

The ARFORGEN/unit training template also facilitates the new Regionally Aligned Focus for 2015 and later. An example may include an infantry brigade combat team (IBCT) focused on the Pacific Command region deploying with a direct support ABTF with whom it has habitually trained and operated. This initial maneuver/aviation package is similar to the deployment ready brigade concept used in the past by



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the 82nd Airborne Division as part of the Global Response Force. This approach has training and regional relevance regardless of whether the units deploy or not.

Another direct benefit of task force operations and training is development of the aviation Soldier's skill and knowledge. As Soldiers, aircrews, leaders, and staff personnel with diverse skill sets operate together, shared knowledge and experience occurs that enhances the development of everyone. Attack/reconnaissance (AH-64/OH-58) personnel will learn lift/heavy capabilities and limitations and lift/heavy helicopter (UH-60/CH-47) personnel will understand reconnaissance tasks and requirements better. All personnel will better understand unique aeromedical evacuation (HH-60) requirements. Use of other supporting elements/units such as air traffic control, pathfinders, transportation, U.S. Air Force weather teams, and contractors additionally provide experiences that exponentially increase Soldier development, potential, and utilization. These experiences are difficult to share across the brigade in TOE pure units that operate in a vacuum to their own ends.

We should train as we expect to fight. When aviation units deploy to environments that require decentralized execution, they often form ABTFs to support the ground force commander in order to maximize aviation support over a large area of operations. Since these formations are how we often organize for combat, why not train in these formations regardless of whether an aviation brigade is on a Deployment Expeditionary Force (DEF) or Contingency Echelon Force (CEF) ARFORGEN cycle? Forming these task forces will provide Soldiers the realistic experience of the team and mission sets that Soldiers may be expected to face in the event of deployment. In light of this, some units have even elected to remain in the ABTF task organization after redeployment to home station. Additionally, the practice of forming these task forces will force units and Soldiers to deal with and overcome the inevitable challenges that are present when these multi-functional aviation task forces (MFATFs) are formed. This requires units to work together as a team in order to bring the full application of aviation combat power to bear on the enemy.

Forming the ABTF is not painless. Certainly there will be challenges and hurdles to overcome in the process. One of those challenges is command and support relationships between non-organic/TOE units. Will units be assigned, attached, operational control (OPCON), or tactical control (TACON) and for what duration? While individual brigade training scenarios preclude a standard answer to this question, the command relationship of task forces can either strengthen or weaken teamwork within the new unit. If the duration of the task force mission is six months or greater, then assignment of units to the task force should be considered.

Other challenges to forming ABTFs are personnel issues that the selected command relationship generates. Key personnel may not be available based on authorizations within the pure battalions and brigade. For example, fire support officers are not authorized in assault battalions or general support aviation battalions. Personnel shortages may also complicate placing the right leaders and Soldiers in battalions to make the ABTF concept work; however, a potential solution may be to attach key personnel for short durations and assign them as necessary for deployments through coordination within the brigade and the fires brigade. Making difficult decisions on personnel early will set the stage for battalion and brigade level success. Collaboration and creativity is essential for reaching a solution to this issue.

Supporting the logistics and maintenance requirements of a combination of different mission, design, and series aircraft may be the single greatest challenge to the recommendation for forming an ABTF. The need to divide aviation maintenance capabilities (D company/aviation intermediate maintenance capabilities) in order to support operations in other task forces, while maintaining a unit level phase and unscheduled maintenance capacity, can be a less than reasonable option to maintenance leaders. However, OIF/OEF operations have shown the operational concept of the ABTF effective and maintenance at least sustainable. As significant as this particular issue is, many of the maintenance related detractors could possibly be resolved (or the efficiency dramatically increased) by gathering and evaluating the experiences and recommendations of brigade, ABTF, and maintenance organization commanders who have deployed and dealt with the unique maintenance issues of the ABTF. The combined experiences of these leaders may provide insight that could render maintenance issues involved with the formation of the ABTF insignificant.

Despite the challenges, there are options for how task forces can be implemented. Use of the ARFORGEN cycle template or a well defined unit training plan, regardless of deployment requirements, can assist in this process. Units can organize and train as pure TOE organizations during the reset phase and then task organize in the train/ready phase when appropriate.

For a deploying brigade, the task organization can happen as early as nine months prior to deployment based on unit training requirements. The duration of the task force organization should include time at home station, the deployment, and reintegration after the deployment. A task organized formation would be best suited for field exercises and combat training center rotations where collective skills need to be developed and refined. Gunnery, environmental training, or other types of training intended to build individual or aircrew skills, would be better suited in aircraft pure unit configuration prior to MFATF formation. The key consideration is to ensure that the MFATF has time to form, train, and operate as a unit prior to deployment/mission.

As the withdrawal from Iraq and Afghanistan continue, we can expect reduced deployment experiences across the Army

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Aviation branch. It is critical, that while we still have aviators with extensive combat experience, we prepare for future conflicts in the decisive action environment by drawing on the wisdom and experience of the previous ten years. Despite ABTF challenges that have never been fully resolved, the ABTF functionality has served us well by providing the ground commander with a responsive and extensive array of aviation capabilities within easy reach. Training and operating in ABTFs should remain commonplace in Army Aviation regardless of the requirement to deploy. The benefits provided by an ABTF only increase the effectiveness of Army Aviation operations.

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Acronym Reference

ABTFs - aviation battalion task forces
ARFORGEN - Army Force Generation
CEF - Contingency Echelon Force
DEF - Deployment Expeditionary Force
IBCT - infantry brigade combat team
MFATFs - multi-functional aviation task force
OIF - Operation Iraqi Freedom
OEF - Operation Enduring Freedom
OPCON - operational control
TACON - tactical control
TOE - table of organization and equipment

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Operation SERVAL: Victory in Mali

By LTC Eric Merck

Mali began to get out of control in the beginning of 2012. The National Movement for the Liberation of Azawad (NMLA), a Tuareg independence movement, with an Islamic offspring led by Tuareg rebel forces, managed to take control of the main towns north of the Niger River that cut this landlocked country in two different sides. Jihadists of Al Qaeda in the Islamic Maghreb (AQIM) joined the rebel forces almost immediately. By summer, AQIM seized the Northern portion of Mali and implemented an extreme version of Shariah law and destroyed local Sufi shrines.

Malian President Amadou Toumani Touré, was ousted by a coup d'état in March 2012 and interim President, Dioncounda Traoré was in a very weak position. The international community watched helplessly, with United Nations Resolution 2085 (November 2012) calling for an African-led force to help the Malian army restore the territorial integrity of its country under civilian rule.

At the beginning of January 2013, the jihadists moved large columns of pickups south of the Niger River toward Bamako, the Malian capital. They seized Konna on 10 January after routing the Malian Army and clearing access to Bamako . The Malian President asked France to intervene to prevent the takeover of Bamako. France's response came in the form of a first strike delivered by a Special Forces aviation unit stationed in Burkina Faso that destroyed the head column of jihadists' pickups on 11 January. French elements from Chad, the Ivory Coast, and Senegal were already arriving in an emergency reaction to secure Bamako. A quick reaction brigade from France was delivered with the logistical support of U.S. and Canadian Air Forces. The heaviest reinforcements of the brigade were brought by sea by the French Navy. Pre-deployed troops in Africa and the quick reaction force from France were regrouped in Mali in less than 10 days. Three weeks later, a French brigade seized the Malian towns of Timbuktu, Gao and Kidal, combining ground movements, aviation strikes, airdrops, and air assaults.

In March, with the reinforcement of Chadian troops and intelligence provided by U.S. unmanned aerial systems (UAS), French joint and combined maneuver forces began clearing the terrorist sanctuary in the Ifoghas Mountains. Coalition forces then moved to clear terrorists from major cities and to reinforce infrastructures from attacks by terrorists.

In June, the European Union Training Mission began training a new Malian Army. In July and August, the first trained Malian battalion was ready to begin operations to resume the control of the country. French forces then began to disengage, allowing

a multinational African Force under UN command (IFISMA) to take control of the area of operations.

In August, a democratic presidential election occurred and a new government is expected to be functioning normally by November.

We are able to claim Victory in Mali for several reasons:

Freedom of Mali has been restored. A democratic presidential election was held in August 2013. A military situation that seemed desperate in January under the threat of Islamic terrorists as they moved to seize Bamako (capital of Mali) and control all of Mali is inverted in less than six months. It is a tactical victory for the French armed forces against terrorist forces that had the only choice between fleeing or being destroyed. It is a political victory because it gave back the control of Mali to the democratically elected Malian government. Where other countries balked at commitment, this victory was also possible because the French political system permitted the President of the French Republic, as the Supreme Commander, to make the decision to engage our armed forces immediately.

If France did not have pre-positioned forces in Africa and rapid reaction forces to send in emergency, Bamako would have been seized by the terrorist alliance jumping on Mali's capital like a cloud of locusts. These forces were organized as a rapid reaction force to block the road to Bamako and forbid the Jihadist to seize the capital city. Unfortunately the terrorist groups were heavily armed against helicopters. Several ZU-23-2 air defense weapons mounted on pickups from former Libyan Kaddafi Forces were found in Mali. Their range allowed them to engage our Gazelles resulting in the death of one of our team leaders. French armed forces still remain in Africa based in Gabon, Ivory Coast, Chad, and Djibouti.

The main lesson learned from Operation Serval may be that the international community should be able to react without any notice to this kind of event where and when a democratic country is threatened by terrorists. It means that we must have pre-positioned forces ready to immediately engage and regain control of the country. These pre-positioned forces must include aviation to be able to react at extended distances to deliver ground forces in strength with short notice. In fact, at least one company of attack helicopters and one company of utility helicopters must be included in each pre-positioned location in order to outmaneuver and defeat enemy forces. Infantry was the key component of this campaign. All the knowledge and lessons learned from Afghanistan were very useful to fight under very high temperature (above 120° F in the Ifoghas Mountain) and in the middle of rocky desert. The level of initiative of infantry platoon leaders was very high and the company commanders were used to maneuvering in cooperation with aviation assets and artillery support. This close cooperation between Infantry and aviation was the uppermost focus of aviation team leaders during all the operation.

The French forces designed their maneuver in 3 dimensions (combined arms involving infantry, artillery, and aviation) and used their flexibility to reinforce all ground maneuver. The Army was organized as combined operational task forces at battalion level for this mission. These task forces were mainly made up of infantry and armor but artillery, with the Caesar gun detachment, and aviation, with TIGER attack helicopters, were integrated in the tactic at the beginning. One aviation task force was also organized to give speed to the maneuver and to ensure that direct fire support was available where and when needed.

The mobility of Caesars 155mm howitzer trucks and the precision of its powerful shells allowed the French forces to deliver fires on any detected enemy on short notice. Cooperation and deconfliction between the air strikes, Army aviation close combat attacks (CCA) and artillery were a key point to ensure the superiority of French forces against a concealed enemy. Army aviation team leaders performed on-scene coordination.

French tactics allowed the maneuver forces to control the key points on the ground by combining the element of surprise, quick movement, and deception in conjunction with the tactical autonomy given to the battalion and company commanders within the overall scheme of maneuver. Out maneuvering the terrorists was the motto of the operation. The use of aviation and airborne assets in air assault operations where Tigers ensured the safety during the insertion and initial movements was critical. Airmobile operations also permitted rapid reinforcement of ground troops in contact in order to restore a favorable strength ratio while rapid movement of troops by helicopter allowed the troops to outmaneuver and destroy the enemy. Cooperation between conventional and special operations aviation enhanced the effectiveness and efficiency of Operation Serval aviation assets.

The Tiger is a long endurance attack helicopter that enables covering long

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distances fully set in ammunition with enough remaining time on target to satisfy mission requirements. With this capability, a team of Tigers could engage the enemy through CCA and deliver very accurate fires close to friendly troops. The Tiger binocular helmet mounted sight display allows day or night target acquisition with direct view optics, night vision goggles, or thermal imagery targeting systems. Its 30mm gun is very accurate and is capable of engaging the enemy with friendly forces in close proximity.

Operation Serval was the sum of a multitude of coherent fighting operations conducted at a very high pace. From the beginning when French Special Forces were committed from Burkina Faso to stop the terrorist raid on Bamako, the operations were thought and fought in 3D. Army aviation was omnipresent on this commitment. Tigers, Pumas, Caracals, and Gazelles were hit daily by light infantry munitions. Due to the primarily flat terrain in the southern portion of the area of operations, French helicopters had little cover and were exposed to high level of ground fire. Terrorists used a tactic referred to as the "ball of fire" in which all the light infantry fires would concentrate on the nose of the helicopter at the same time.

Operation Serval was also a very tricky logistical operation. Five thousand miles from France, in a landlocked country which extends 1,500 miles from northeast to southwest, on roads that are sometimes little more than trails in the desert, the logistical lines had to move daily though the desert and deliver to more than 5,000 soldiers: 4,500 meals, 10 tons of ammunition, 45,000 liters of drinkable water, 30,000 liters of gas and 200,000 liters of kerosene just to allow the force to keep its high pace of actions. Aviation assets were also used to escort logistical convoys and conduct reconnaissance to prevent convoy ambushes.

The French command gave significant leeway to commanders at the lower echelon in respect of the general order. This philosophy allowed us to fight a very flexible enemy that was difficult to locate and block. The use of UAS was particularly necessary to get accurate up-to-date information on enemy positions. As soon as the enemy were located, the local commander maneuvered assets to block and engage. Aviation assets were used extensively as the preferred means of quickly repositioning ground forces to stop the enemy.

Airborne operations were used to encircle airports and cities such as Goa and Timbuktu to forbid the enemy from fleeing into the desert. The enemy would be dealt with later when the full brigade would rejoin the operation to engage the enemy in strength. These airborne operations were secured by the Army aviation task force. Tigers and Gazelles provided the necessary firepower to cover paratroop night operations. At sunset, the first paratroop platoons were able to seize bridges or roads controlling the main towns trapping the terrorist inside the towns. Pumas and Caracals allowed short notice aeromedical evacuation to Bamako where patients were transported to Paris.

Maneuver and supporting fires were used when the enemy was concealed in Ifoghas Mountains. Continuous air bombing and accurate aviation engagements coordinated with artillery precision support covered every movement of the infantry. French Army lost eight soldiers in this operation.

Why was it so critical to win in Mali?

Mali is in a critical location providing access to numerous West African nations. Had the Islamist jihadists been able to gain control of Mali, it would have become a sanctuary for Al-Qaida and a base for seeding Islamic extremism throughout West Africa. Africa must be confident that their allies are committed to their defense. Operation Serval demonstrated international resolve to preserve democracy and take action against Islamic extremism.

LTC Eric Merck is presently serving as the French Liaison Officer to the United States Army Aviation Center and Fort Rucker. Previous assignments include Deputy Director Directorate of Training and Doctrine and Director of Simulation; Chief J3 Air Helicopter Operations in Sarajevo, Bosnia; Commander of the French Helicopter Squadron of the United Nations Protective Force in Bosnia; and Commander 1st Attack Gun Gazelle Helicopter company, 7th Combat Helicopter Regiment. LTC Merck has deployed to Senegal, Mauritania, Croatia, and Bosnia in support of United Nations and North Atlantic Treaty Organization operations. He has 32 years military service. LTC Merck is qualified as an attack aviator in the Gazelle.

Staff Rides for Army Aviators: "Old School" Professional Development

By LTC Charles R. Bowery, Jr.

"Read military history . . . to meditate unceasingly on your profession."
-Prince Eugene of Savoy to Frederick the Great

As the U.S. Army disengages from combat in Afghanistan and refocuses its garrison activities toward training and preparation for the next conflict, our leadership continues to emphasize the commander's role in unit training. Applying the principles of mission command to the training environment means that commanders publish intent and end state (commander's key tasks to be trained) via training guidance, and give subordinate leaders "white space" to train at echelon to meet unit goals. Individual and collective training is then nested and synchronized to achieve unit proficiency in those key tasks. All unit members, whether line or staff personnel, must train to execute wartime tasks. In the resource-constrained environment of the foreseeable future, the onus will be on unit commanders to demonstrate initiative and creativity in training management while maximizing return on investment of time and money. In the return to a garrison environment, we may have less of the latter, but more of the former, providing the opportunity to return to some traditional training and education methods. The staff ride is one such vehicle for individual, staff, and unit training.

The staff ride has a long history in the western military tradition. Its first recorded use was in eighteenth-century Prussia, when Frederick the Great designed massive peacetime army maneuvers and kriegsspiele ("war games") to train soldiers of the line, subordinate commanders, and staff officers. These war games consisted of directed study of military history, practice preparation of orders and campaign plans, map exercises without troops, command post and sand table exercises, and terrain walks. In the late nineteenth century, the Prussian General Staff conducted annual "staff rides" of the country's defensive lines on horseback, reviewing war plans and wargaming potential enemy invasion routes, an important consideration for a country surrounded on all sides by real or perceived adversaries.

In the United States, staff rides came into use in the early twentieth century, as the U.S. Army sought to model itself on the Prussian Army. The Army General Service and Staff School at Fort Leavenworth, forerunner to today's Command and General Staff College, executed its first-ever staff ride in 1906 over the Chickamauga battlefield in northern Georgia. A school instructor, Major Eben Swift, took twelve of his students, with horses and equipment, to Georgia by train. The group spent several days riding the battlefield, reading firsthand accounts and after-action reports by the Union and Confederate combatants, and evaluating the decisions of commanders on both sides. The staff ride enjoyed significant popularity up to World War II, but fell out of favor during the Korea and Vietnam years. It enjoyed a renaissance of sorts in the early 1980s, as the Army reflected on its experiences in the wars of the twentieth century and considered how to plan for victory over the Warsaw Pact. September 11th and resulting overseas contingency operations have limited operating force units' time and ability to execute staff rides as training events, but they have remained a feature of professional military education (PME) to varying degrees across the Army.

This article will outline the planning and execution of a unit staff ride, and will highlight specific staff ride venues within one day's drive of Army Aviation operating locations in the Continental United States, Hawaii, Korea, and Germany.

Staff Ride 101

The starting point for any unit action officer looking to plan a staff ride is the William G. Robertson's 1987 Center of Military History publication, The Staff Ride, available in pdf format at https://www.us.army.mil/suite/doc/41229101. This short guidebook lays out the basics of staff ride planning, preparation, and logistics.

As with any training event or operation, it's critical to begin with establishing commander's intent. For a staff ride, commander's intent should specify:

- Event leadership- who will direct the ride and facilitate preparation and discussion.
- Event audience- who is to be trained? Is this staff ride for the entire organization, junior officers, staff officers, or NCOs? There are many possibilities, but the size and composition of the audience should help to refine the content and objectives of the staff ride.
- Length of the staff ride.
- Participant requirements and level of interaction. It's important to remember that a staff ride in the classic definition relies on extensive study and preparation by the participants, often focusing on specific individual figures, and the presentation of information on the ground itself. If the unit does not have the time to devote this level of preparation to the event, consider instead a tour-like staff ride, where a small number of leaders present information and facilitate

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discussion at various stops. This is much easier on the audience, because all they have to do is show up to the staff ride. It is, however, much more difficult for the event leaders.

• Specific campaign, battle, or event to study, or in the absence of these things, specific objectives on which to focus study and discussion. For example, the commander might want to focus on combined arms maneuver, specific doctrinal concepts, logistics, small unit leadership, critical command decisions, Army history and unit traditions, or simply the experience of combat.

• Is team-building via social and recreational events part of the commander's intent? If so, plan these events in the same detail you plan the rest of the staff ride.

Once the action officer has established the staff ride site and received commander's intent, the Preliminary Study phase begins. During this phase, staff ride participants should gain familiarity with the "5Ws" of the campaign or event: who, what, when, where, and why. If funds are not available to purchase study materials, sufficient information on the recommended sites is available through various sources on the internet. Staff ride assistance is also readily available through the history departments at West Point, the U. S. Army Command and General Staff College, the Combat Studies Institute (CSI) at Fort Leavenworth, and the Army Center of Military History (CMH). The CMH website has several staff ride guides available for free download in PDF format. Depending on individual participation, you can schedule briefings or in-progress reviews to cover background information. Also during this phase, the event leadership should execute a site visit and rehearsal on the ground to be covered, if time and other requirements permit. This phase ends with a final coordination briefing to the entire group, covering conduct of the staff ride and any associated logistical details (transportation, meals, lodging if applicable).

The Field Study Phase involves the execution of the staff ride itself. The group moves through a succession of stopping points, or "stands," to cover events or actions at a given point in time. The staff ride leader builds an itinerary of these stands based on the "METT-TC" factors outlined above - commander's objectives, time available, and participant interaction. It is generally best to cover events in chronological order, building enough time into the schedule to allow for impromptu discussions or "sidebar" moments. At the stands, individual attendees will often read the results of their study of a particular action or element of the campaign, or will read a vignette from a firsthand account of the action. It's important to rehearse the timing and sequencing of these presentations so that they complement the overall themes of the staff ride and hold the group's interest and attention from stand to stand. If the group uses a van or bus to move from stop to stop, it should be equipped with a microphone or public address system, allowing the leader to use movement times to cover additional information.

The Integration Phase is a critical, but often overlooked, part of a good staff ride. This phase is designed to allow the participants to discuss and reflect on what they have learned, making larger connections to the commander's themes and key tasks. It is during the Integration Phase that much of the long-term "learning" of a staff ride occurs. The staff ride leaders should plan and prepare it as they would the rest of the event. Interaction between the attendees and the leaders is very important as well; a technique is to have the group nominate "most valuable players," key decisions, or turning points that led to the outcomes they have learned over the course of the event.

Suggested Staff Ride Venues for Army Aviation Units

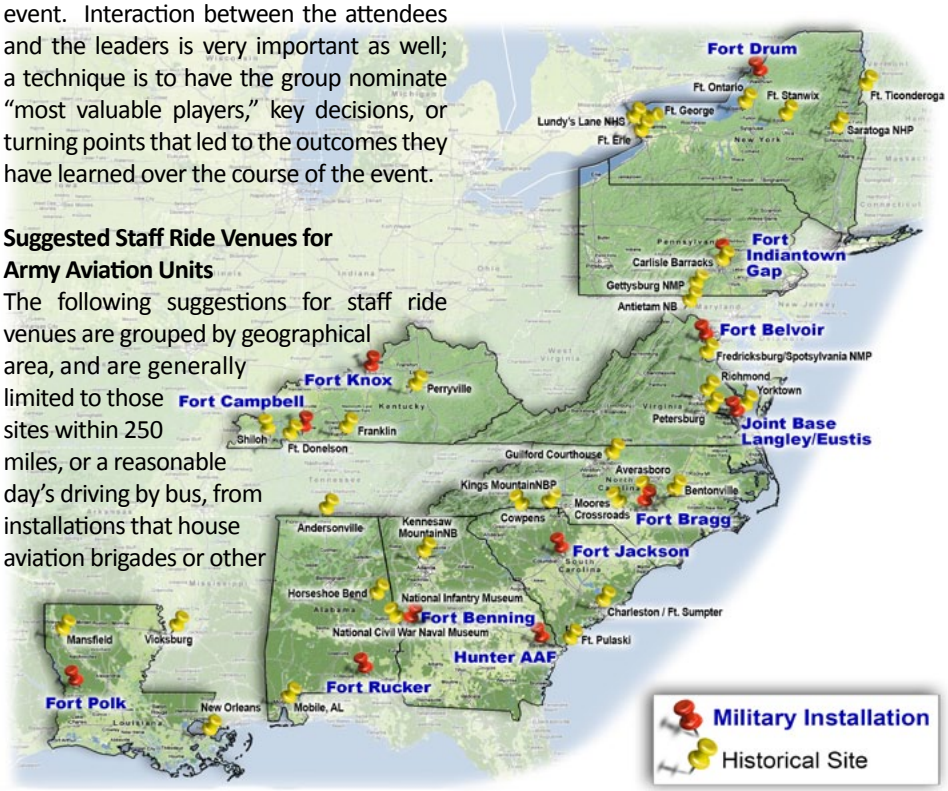
The following suggestions for staff ride venues are grouped by geographical area, and are generally limited to those sites within 250 miles, or a reasonable day's driving by bus, from installations that house aviation brigades or other large concentrations of aviation personnel. Where possible, these staff rides visit facilities maintained by the National Park Service. Mileage figures noted are approximate for planning purposes.

Eastern United States

Fort Drum, New York has a variety of sites from the French and Indian War, American Revolution, and War of 1812 within driving distance. Some of these include: Fort Ontario Historic Site (Oswego, NY) 69 miles; Fort Stanwix (Rome, NY) 75 miles; Saratoga National Historic Park (NHP) (Saratoga, NY) 165 miles; Fort Ticonderoga National Historic Site (NHS) (Ticonderoga, NY) 186 miles; Lundy's Lane NHS (Niagara Falls, Ontario) 230 miles.

Fort Indiantown Gap, Pennsylvania, is close to Gettysburg National Military Park (NMP) (Gettysburg, PA) 65 miles as well as other historical sites, such as: Carlisle Barracks / Army Heritage and Education Center (AHEC) (Carlisle, PA) 40 miles; and Antietam National Battlefield (NB) (Sharpsburg, MD) 110 miles.

Fort Belvoir, Virginia and the National Capital Region (NCR) have several American Revolution and Civil War battlefields within easy driving distance. Here are just a few suggestions; Carlisle Barracks / AHEC (Carlisle, PA) 40 miles; Fredericksburg/Spotsylvania NMP (Fredericksburg, VA area), 45 miles; Gettysburg NMP (Gettysburg, PA) 65 miles; Antietam NB (Sharpsburg, MD) 110 miles; Richmond NB (Richmond, VA area) 90 miles; Petersburg NB (Petersburg, VA area) 110 miles; and Yorktown NBP (Yorktown, VA) 150 miles.



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Joint Base Langley/Eustis, Virginia is also well-situated for Revolution and Civil War staff rides. Some locations to note are: Yorktown NBP (Yorktown, VA) 11 miles; Richmond NB (Richmond, VA area) 90 miles; Petersburg NB (Petersburg, VA area) 110 miles; Fredericksburg/Spotsylvania NMP (Fredericksburg, VA area) 114 miles.

Fort Bragg, North Carolina has a battlefield from the 1865 Carolinas campaign within its training area, and is close to other Civil War battlefields. Kings Mountain, Cowpens, and Guilford Courthouse, from the American Revolution's southern campaign, would make an excellent one-day campaign staff ride. Moore's Crossroads battlefield (located in R-5311); Averasboro battlefield, 35 miles; Bentonville State Historic Site, 48 miles; Guilford Courthouse National Battlefield Park (NBP), 97 miles; Kings Mountain NBP, 156 miles; Cowpens NBP, 165 miles.

Fort Jackson, South Carolina is within easy reach of: Charleston, 124 miles; Fort Sumter, 132 miles; Kings Mountain NBP, 134 miles; Cowpens NBP, 140 miles.

Hunter AAF, Georgia is within reach of Charleston and has Revolutionary-era fortifications in Savannah. These fortifications are: Savannah, Fort Pulaski; and Charleston, Fort Sumter (115 miles).

Fort Benning, Georgia has two museums nearby in Columbus, and is within driving distance of Andersonville NHS and Horseshoe Bend, a Creek War battlefield. Kennesaw Mountain, the culminating battle of Sherman's 1864 Atlanta Campaign, is well-preserved, and the entire Atlanta Campaign, from Chattanooga, TN to Kennesaw, makes an excellent campaign staff ride. These locations are excellent options: National Infantry Museum; National Civil War Naval Museum; Andersonville NHS, 57 miles (contains Andersonville Prison site and National Prisoner of War Museum); Horseshoe Bend NB, 78 miles; and Kennesaw Mountain NBP, 136 miles.

Fort Rucker, Alabama is also relatively close to Andersonville and Horseshoe Bend (138 and 145 miles, respectively), and is within range of multiple historic sites related to the 1864-65 campaign for Mobile (172 miles). Kennesaw Mountain NBP, is 230 miles, and with a slightly longer trip, USAACE personnel can reach Chickamauga NBP in north Georgia.

Fort Polk, Louisiana offers staff rides to Mansfield and Vicksburg, from the Civil War, and is within range of New Orleans. Driving distances are: Mansfield, 85 miles; Vicksburg, 200 miles; and New Orleans- Chalmette Battlefield, National WWII Museum, 230 miles.

Fort Campbell, Kentucky is within driving distance of several of the key battles of the Civil War's western theater. Some of these are: Fort Donelson, 34 miles; Franklin, 83 miles; Shiloh, 150 miles; and Perryville, 199 miles.

Fort Knox, Kentucky sites include Perryville State Historic Site, 76 miles and Fort Donelson, 195 miles.

Western United States

Fort Hood, Texas is located within driving distance of several sites from the Texas War of Independence. Two of these are: the Alamo NHS (San Antonio, TX) 175 miles; and San Jacinto State Historic Site (SHS) (near Houston, TX) 200 miles.

Fort Bliss, Texas personnel can reach Columbus, the site of a raid by Pancho Villa on U.S. soil in 1916, as well as Valverde, a little-known Civil War engagement in Confederate Arizona, now New Mexico. Columbus, NM is 87 miles away and Valverde, NM (south of Socorro, NM) is 170 miles away.

Fort Leavenworth, Kansas lies close to several Trans-Mississippi theater Civil War battlefields, including Wilson's Creek, one of the war's first large battles. From Fort Leavenworth, Westport, MO is 45 miles; Lexington, MO is 72 miles; Mine Creek, KS is 96 miles; and Wilson's Creek, MO is 218 miles. Pea Ridge National Military Park is slightly outside the radius at 268 miles, but well worth the trip. The School of Advanced Military Studies does regular Vicksburg staff rides.

Fort Riley, Kansas is within range of several battlefields from the Indian Wars, some of

which are described in CSI publications (see map). Just a couple were Hancock's War and the Cheyenne War (OK).

Fort Carson, Colorado staff ride options are limited to one Civil War battle, Glorieta (NM).

Fort Lewis, Washington has access to several sites from late nineteenth-century Indian campaigns in the Pacific Northwest. Some of these are: Yakima War 1855-56; Modoc War; Nez Perce War; Bannock War 1872-1878 - all in vicinity of Spokane, WA 320 miles.

Schofield Barracks, Hawaii staff ride options are limited to Pearl Harbor. Pearl Harbor National Monument (NM) is 20 miles.

Fort Irwin, California is not well situated for staff rides, but the city of San Francisco (440 miles) contains numerous sites developed for coastal defense. CSI has developed a homeland defense staff ride for the San Francisco area.

For Korea staff rides, the Eighth U.S. Army Historian's Office has written several very useful staff ride guides for Korean War battles, with maps and primary source accounts. These battlefields all lie within three hours' drive of Camp Humphreys. Task force Smith sites

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are only a matter of minutes north of Camp Humphreys in Suwon, and battles for the Busan Perimeter, Chipyong-Ni, the Inchon Landings, and Gloster Hill are within reach.

Germany staff rides cover the gamut from early eighteenth-century wars, to the Napoleonic Wars, to the World Wars, depending on your desired travel times. The following distances are from Katterbach Kaserne; Eckmuhl lies much closer to Hohenfels Training Area. Blenheim (Blindheim)/Donauworth, sites from Fredrick the Great's campaigns, are 70 miles south of Ansbach. Eckmuhl, site of an 1809 Napoleonic battle, is 100 miles away. The start point of the Hammelburg Raid, launched by Patton in early 1945 to attempt to rescue his son-in-law from a German prison camp, is 110 miles west at Aschaffenburg (near Frankfurt-am-Main); the site of the Stalag that was the raid's objective is now a Bundeswehr kasern near Hammelburg. The Jena-Auerstadt area, site of two Nepoleonic battles, is 160 miles north. Longer trips are: Verdun 4 hours, Market-Garden battlefields 5-6 hours, Normandy battlefields 8-9 hours.

U.S. Army Historical Organizations and Staff Rides

Several Army organizations offer the capability to conduct unit staff rides. Travel (transportation, lodging, and per diem) for the guest staff leaders is normally funded by the requesting unit. The Department of Military History and the CSI, both at Fort Leavenworth, frequently respond to unit requests for staff rides, and CSI maintains study materials available for loan on the topics indicated in Figure 1.0. The Department of History at the U.S. Military Academy and the (CMH) in Washington conduct unit staff rides on an as-requested basis. This method is an excellent option if the unit has TDY funds available.

LTC Charles R. Bowery Jr. is a Rotary Wing Requirements Analyst with the Joint Staff, J8. He is an AH-64D aviator with over nineteen years of service and three deployments to Iraq and Afghanistan. He has served in aviation units at Fort Bragg; Camp Eagle, Korea; Katterbach, Germany; and at Fort Hood. From 2009 to 2011, he commanded 1st Battalion, 4th Aviation Regiment, and deployed the battalion to Afghanistan for a year of combat operations in direct support of SOF, and he served as Chief of the USAACE Doctrine Division from 2011-2013.

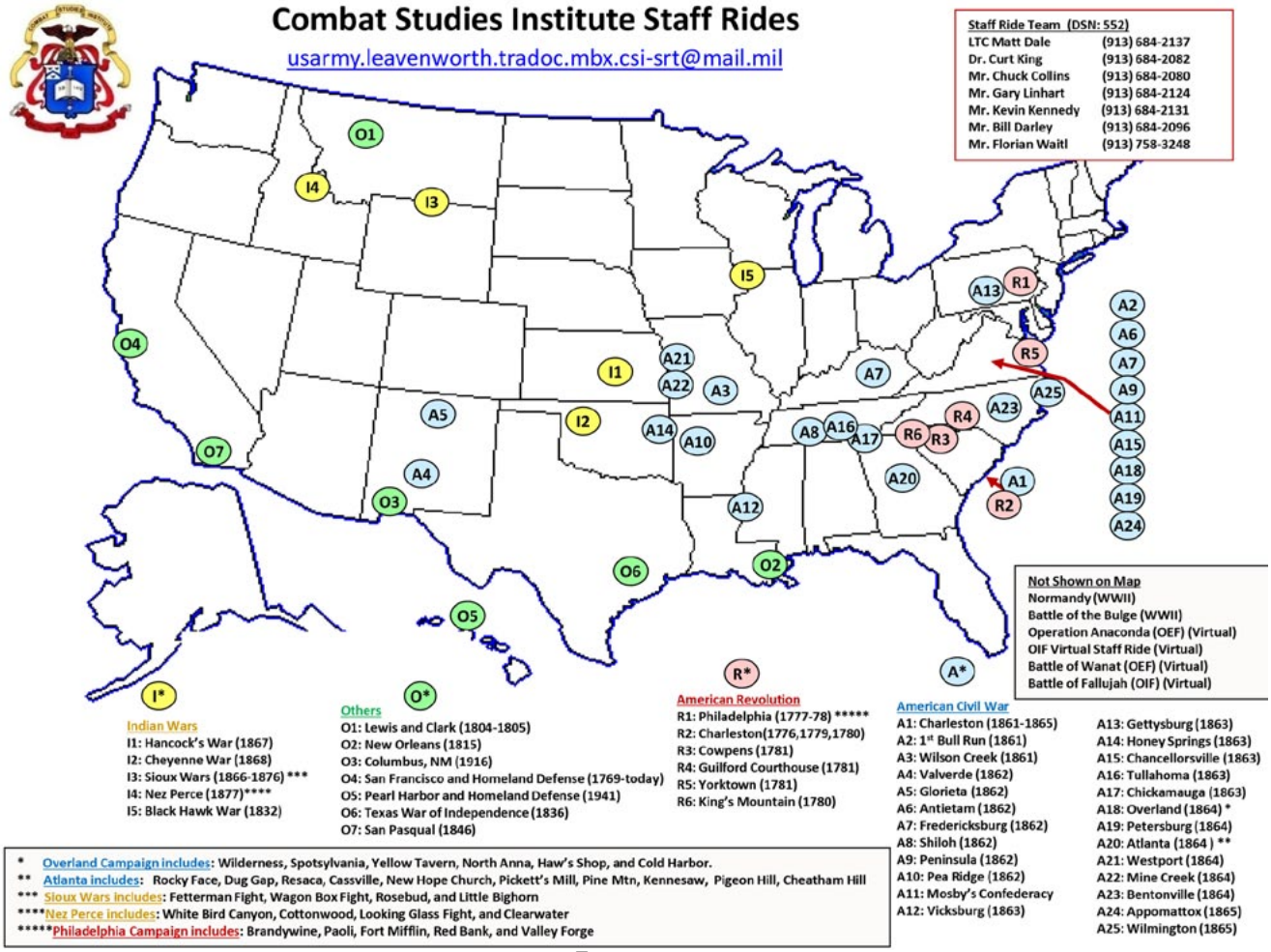

Figure 1.0

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The Case for Speed, Range & Endurance

WHY NOW IS THE TIME FOR FUTURE VERTICAL LIFT

By LTC Marcus Gengler

The current U.S. Army fleet of helicopters has delivered extraordinary results during their life cycle and is projected to be in service well into 2040 and beyond. The CH-47 design dates back to the early 1960s and the UH-60, AH-64, and OH-58 are the by-products of 1970's research and development. Looking ahead there are currently no aircraft designs identified to replace these proven airframes and unless steps are taken soon to look at available alternatives we are destined to see our grandchildren flying Apaches, Blackhawks, and Chinooks. The Army is investing millions of dollars to upgrade and modernize our current fleet of aircraft (UH-60M, AH-64E, CH-47F, and OH-58F) to keep pace with current aviation survivability equipment, avionics and navigation equipment, and sensors but the basic capabilities (speed, range, and endurance) of these aircraft have seen little improvements since their inception. Because the acquisition and development process for a program of this size and complexity can take upwards of 15 to 20 years, it's time that we take a serious look at what's required to posture our aviation fleet to fight and win on future battlefields—it's time for future vertical lift (FVL).

The future of our post Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) Army is uncertain, the defense budget is going to shrink and the number of Soldiers in the active force is projected to go below 500,000. As we redeploy our forces from overseas, the strategic focus is beginning to shift towards a more Continental United States (CONUS) based, expeditionary force that is capable of distributed cross domain operations in a joint, multi-national environment. These new global complexities will require Army Aviation to continue to support widely dispersed forces across the entire threat spectrum. In order to meet these diverse and complex threats, an effort must be made to advance the need for a new vertical takeoff and landing (VTOL) aircraft that can revolutionize the way that Army Aviation supports ground maneuver units and not just modernize old designs. Time is of the essence; the longer that we wait to address this future need, the longer we will continue to rely on the capabilities of the past to fight our future conflicts. The opportunity cost of not investing in a new aircraft design today must be weighed against the increasing operational and maintenance costs that are the natural consequence of an aging fleet, as the age of the fleet rises, so do the costs associated with upgrading and maintaining them.

What should the requirements for a future aviation platform look like?

Future aviation formations will face many unique threats. Potential adversaries are likely to exploit our reliance on points of entry to build combat power and establish initial staging bases (ISB) at airfields and ports, by adopting a strategy of anti-access, area-denial (A2AD). Army Aviation's current reliance on Air Force and Navy assets to position aircraft and equipment within the area of operation will be significantly degraded in an A2AD environment and will dramatically restrict our ability to get into the fight. Increased range capabilities would mitigate this shortcoming, allowing ISBs to be farther from the area of operation.

Despite continuous upgrades, much of our current fleet is underpowered when operating in high, hot environments, which puts our pilots at greater risk when operating in these conditions. A study conducted by the Concepts, Experiments, and Analysis Directorate at Fort Rucker determined that aircraft that only had enough power to hover out of ground effect (HOGE) at 4,000 feet and 95° F are unable to conduct 24-hour operations on average 66 days per year due to environmental limitations in certain parts of the world. However, if an aircraft can HOGE at 6,000 feet and 95 degrees then it is only limited by environment factors five days per year, so power margins in a future aircraft will need to be capable of operating in these more unforgiving environments. Extensive analysis and input from the Army Aviation and Missile Research Development and Engineering Center, Training and Doctrine Command Capability Managers, Joint partners, and the United States

Army Aviation Center of Excellence senior leaders has resulted in a list of proposed capacities that are being prepared for an initial capabilities document (ICD) for the FVL program. These include the ability to fly between speeds of 170–300 knots, a range with internal fuel of 435 kilometers (km) and still have 30 minutes of loiter time, the ability to HOGE at max gross weight in 6,000 feet/95 degree conditions, and have a self deployment range of up to 2,100 nautical miles. These capabilities, if delivered to the aviation fleet, would represent not just an incremental improvement over current capabilities but a revolutionary change that would redefine how we would fight and fly in future conflicts. There is technology that exists today that can deliver many of these capabilities; however, the cost associated with many of these requirements begs the obvious questions "Is it worth the cost?" and "How much better can I perform the mission if I have greater speed, range and endurance?" In this article, I hope to make the case that increased speed, range, and endurance is worth the investment and that now is the time to begin developing the FVL.

Speed

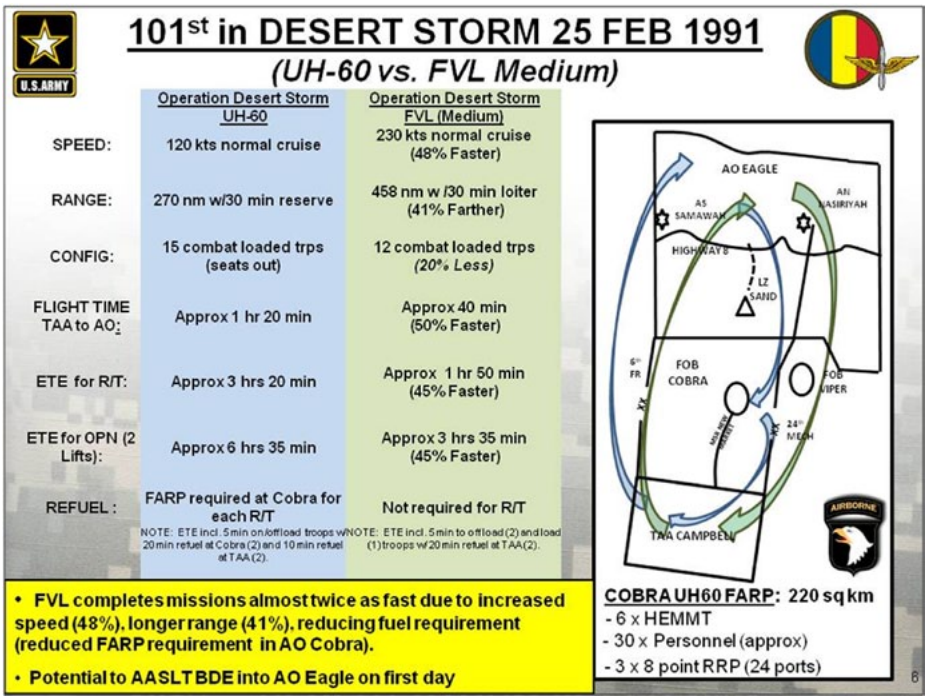
The speed of our current aviation fleet is largely limited due to retreating blade stall and other aerodynamic factors. As technology evolves so does the prospect of changing that paradigm and providing the aviation community with an increase in speed that would significantly impact the way we fight and maneuver vertical lift assets in the future. However, let's face it, despite the increased capability for faster speeds, some missions may be better performed at current airspeed capabilities. Does the cost required to acquire these speeds justify the investment?

Analysis performed at the Air Maneuver Battle Lab at Fort Rucker has shown that there are some very distinct advantages to increased speed in several mission profiles. For example, during an air assault operation, increased speed would allow for more rapid movement of combat power onto an objective area. At the same time, increased speed would allow aircraft and crews to do more turns/missions in less time thus increasing the productivity of a mission duty day. When applying this theory to a historical vignette if a FVL ICD capable aircraft were available during the 101st Division's air assault in Operation Desert Storm, the mission would have been completed 45 percent faster. A forward arming and refueling point (FARP) would not have been required, allowing for the operation to be performed up to 24 hours sooner.

Greater speeds would offer increased flexibility in planning and provide more options for ground commanders. It also allows for more rapid response times during unplanned missions such as close combat attacks (CCAs), medical evacuation, and quick reaction force (QRFs) operations as well as improved survivability by decreasing the time the enemy has to engage aircraft in route to its objective area. In an article published in the February 2013 Army Aviation Magazine, MG Mangum summed it up best when he said that "Increased speed will allow us to conduct operations from fewer operating locations and cover extended distances…providing supported commanders with responsive and flexible mobility and lethality."

operating in an area as large as 300km X 300km. With such a wide area to cover and a current fleet of aircraft that are limited in reaching one side of this operating environment to the other (approximately 424km) without refuel, the need for greater range capability has never been greater. One of the obvious advantages of increased range is the reduced reliance on jump FARPs or aerial refueling for extended range operations, freeing up those assets to conduct more efficient operations from a consolidated tactical assembly area (TAA). Increased range would also give ground commanders greater flexibility with the utilization and placement of TAAs and ISBs within their operating areas, thus enabling greater freedom of maneuver.

Increased range capabilities also have the potential of allowing aircraft to self-deploy to regions of the world that are currently inaccessible and that require Air Force and Navy assets to position close to the fight. With the right combination of speed and fuel, a self deploying aircraft would reduce the requirement for Air Force and Navy



Range:

Increased range for aviation assets is a function of greater speed and fuel carrying capability. Widely distributed forces and expanded areas of influence will see brigade combat teams responsible for an area as large as 150km X 150km and divisions support as well as increase the mission availability rate of aircraft that land and are combat configured upon arrival into an area of operation. Applying this theory to a historical vignette, if an FVL ICD capable aircraft were available during the 2010 Haiti Earthquake Response, Army Aviation

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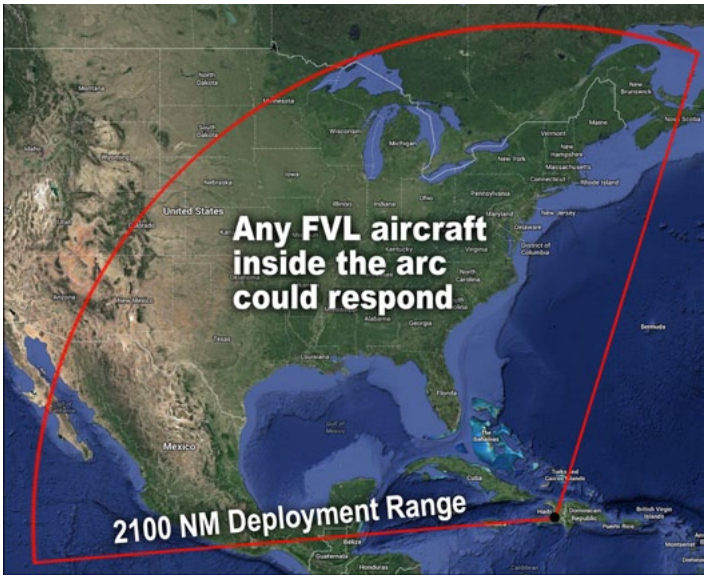
assets could have arrived in Port-au-Prince from CONUS a full day ahead of Navy assets and almost two weeks ahead of the first Army Aviation assets that were deployed.



These forces could have been ready to support humanitarian relief efforts immediately upon arrival, been able to support first responders and key leader movements, and been able to distribute vital aid to the point of need.

Endurance:

The need for increased endurance differs from speed and range as speed and range refers to the time it takes an aircraft to reach its destination, while endurance focuses on the amount of time between one fuel stop to another. Greater endurance enables aircraft to remain airborne longer to conduct missions with fewer refuel stops, decreasing unproductive time sitting in a FARP. Missions that would most benefit from increased endurance include attack, reconnaissance, and command and control missions. During our most recent conflicts in OEF/OIF, the requirement for timely and responsive CCA and QRF support was crucial in defeating the Taliban and Saddam Hussein; however, that support was not always available due to a lack of aircraft with station time (endurance). Increased endurance would allow for scout and attack weapons teams to remain close to the point of need and provide maximum flexibility for commanders to employ them where they could influence the fight more rapidly (airborne versus on the ground). When applied to a reconnaissance and command and control role, greater endurance would allow for a more persistent presence in the area of operations and would reduce the need for FARPs outside the tactical assembly area, all of which reduces risk and improves responsiveness for the onsite commander.

Why do we need the future vertical lift now?

While increased speed, range, and endurance all have an extremely attractive upside, and would greatly enhance our ability to support ground commanders, the question that looms large in any discussion about a new aircraft is: Can we afford it? When the aviation community designed the UH-60 and AH-64 to replace the UH-1 and AH-1 following the Vietnam War, they were faced with many of the same challenges we face today, a shrinking force, budget concerns, and global uncertainty, but they found a way to keep these programs alive. History has shown that the increased capabilities brought about by these new aircraft during Grenada, Operation Desert Storm, and OEF/OIF were worth the investment. I am not suggesting that during this period of fiscal uncertainty and pending budget cuts that we pour all of our resources into this effort, since there is still a fleet of over 4,400 manned aircraft to sustain and maintain. What I am suggesting is that we sustain the momentum that has been achieved in research, development, design and experimentation to ensure that the FVL program does not suffer an early demise.

The current acquisition process, known as the Joint Capabilities Integration and Development System, is designed to move a program from concept development to prototyping, through engineering and initial manufacturing, and on to production and fielding. For a project of this magnitude, size, and scope this process could take decades. Current projections from Army senior leaders is that FVL may not be ready for fielding until the mid-2030s; in other words, the current crop of 2LTs and WO1s will be COL and CW5 decision makers within our branch before this capability is ultimately brought into the force. Our legacy to these junior aviation officers and Soldiers is to provide them a pathway for obtaining a future VTOL system that will revolutionize the way we currently support ground maneuver forces.

LTC Marcus Gengler is Commander,1-145th Aviation Regiment at Fort Rucker. Prior to taking command, LTC Gengler served as the Experimentation Chairman in the Air Maneuver Battle Lab in the Concepts, Experiments, and Analysis Directorate at Fort Rucker. He has deployed in support of Operation Iraqi Freedom and Operation Enduring Freedom with the 1st Air Cavalry Brigade. LTC Gengler is a Senior Army Aviator with 18 years' service and is qualified in the UH-1H, OH-58A/C, and UH-60A/L.

Acronym Reference

A2AD - anti-access, area-denial
CCAs - close combat attacks
CONUS - Continental United States
FARP - forward arming and refueling point
FVL - future vertical lift
HOGE - hover out of ground effect
ICD - initial capabilities document
ISB - initial staging bases
km - kilometers
OEF - Operation Enduring Freedom
OIF - Operation Iraqi Freedom
QRFs - quick reaction force
TAA - tactical assembly area
VTOL - vertical takeoff and landing

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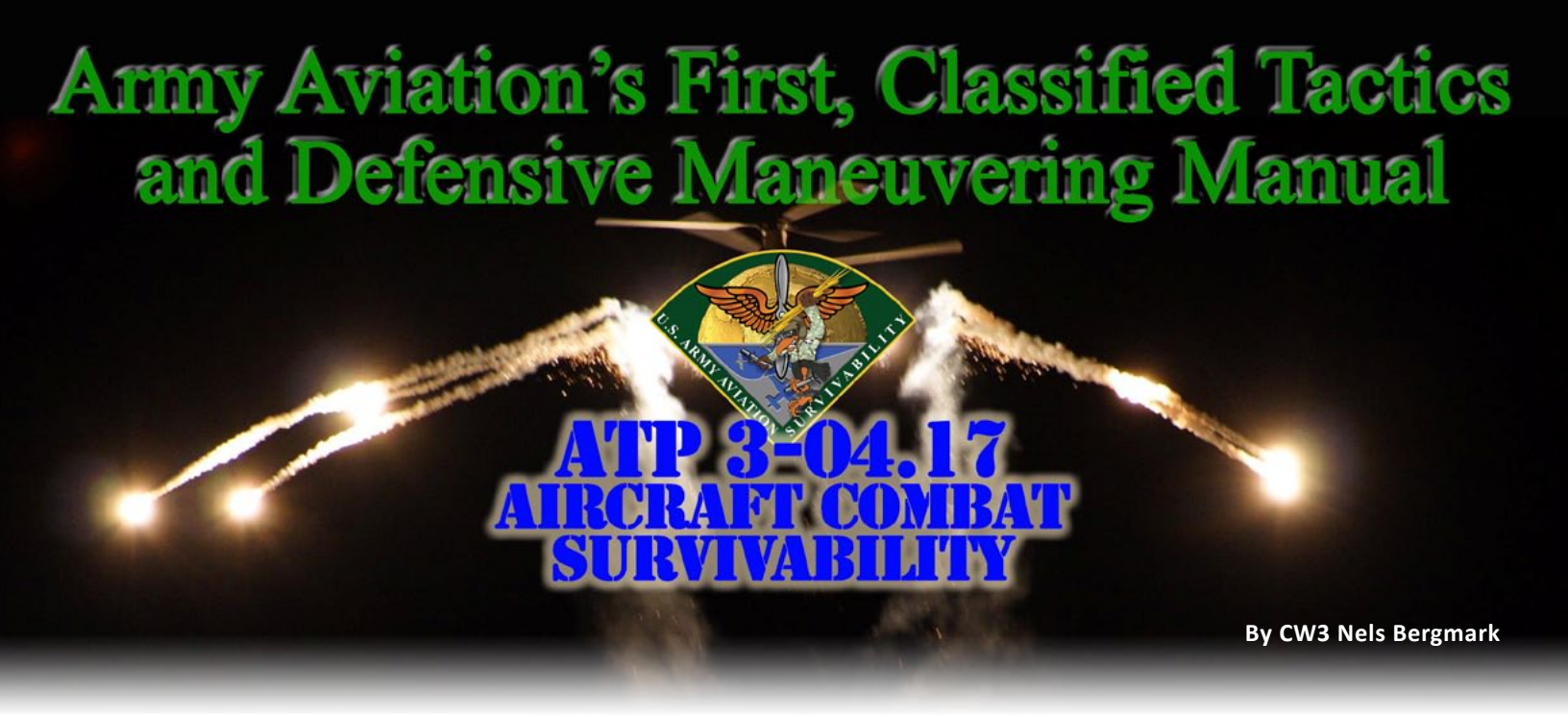
Army Aviation's First, Classified Tactics and Defensive Maneuvering Manual



By CW3 Nels Bergmark

The Directorate of Training and Doctrine's (DOTD) Aircraft Survivability Development and Tactics (ASDAT) Branch is preparing Army Training Publication (ATP) 3-04.17, Aircraft Combat Survivability, as Army Aviation's first classified tactics and defensive maneuvering manual. While Army aviation faced a deadly threat in Iraq and Afghanistan, it has been a relatively unsophisticated air defense threat. What was encountered in the counterinsurgency fight over the past 11 years is not representative of what Army Aviation will encounter against sophisticated, near-peer adversaries in the decisive action environment. To date, specific tactics, techniques, and procedures for defensive maneuvering were found in individual aircraft aircrew training manuals, unit standing operating procedures, or passed by word-of-mouth within the unit. Usually, critical detail was lacking because of classification concerns. ATP 3-04.17 will compile ASDAT (formerly the Aircraft Shoot Down Analysis Team) analysis, aircraft survivability expertise, industry scientific evaluation of aircraft survivability equipment performance and threat systems, joint tested and vetted tactics, and defensive maneuvers against known threats to maximize the survivability of aircrews and mission success across the spectrum of aviation operations. The Aviation Combat Survivability manual will be the foundation for Army Aviation to maximize survivability and lethality in any threat environment.

ATP 3-04.17 will have six chapters. Each chapter enhances aviation operations by significantly increasing crewmember threat systems and aircraft survivability equipment (ASE) tactics, planning, and employment guidance and providing a foundation for advanced flight training to enable successful aircraft employment in a high threat environment.

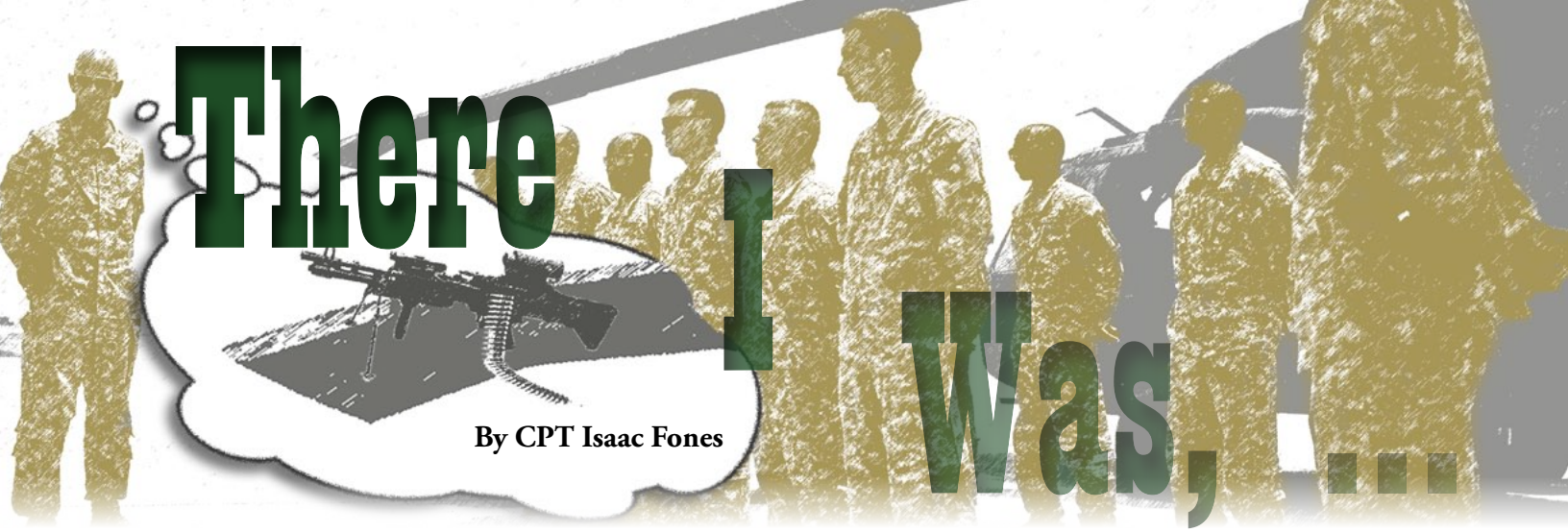
Chapters one through three will provide aviation mission survivability officers information to assess and brief commanders and staff on mission threat. Threat system functionality is described in sufficient detail to allow mission planners and aircrew members at all levels to understand operational strengths and limitations of those systems. Aircraft survivability equipment capabilities are also dissected to provide in-depth knowledge of ASE employment against the air defense threat. A detailed understanding of the hardware on both sides of the air defense equation will provide mission planners and aircrews essential knowledge to exploit threat limitations, while avoiding its strengths, and maximize the effectiveness of the aircraft's ASE.

Chapter four describes tactics and defensive maneuvers derived from industry technical specifications and, more significantly, from a joint service effort in effective defensive maneuvers and countermeasure employment. These shared tactics and defensive maneuvers will be the driving force behind aircrew training and aircraft employment.

Aircraft survivability equipment discussion is continued in Chapter 5 and primarily focuses on known issues and circumstances of the ASE to detect or decoy threat air defense. A practical discussion of an aircrew's ability to deny or delay the effectiveness of a given threat and whether it is feasible to disable/destroy specific threat systems is also presented.

The final chapter will contain weaponeering data and information not found in any other doctrine due to scope or classification.

ATP 3-04.17 will consolidate aircraft survivability knowledge by providing a single source of information on detailed strengths and limitations of threat and ASE and the tactics and defensive maneuvers to capitalize on those strengths and weaknesses to ensure aircrew survivability. The ATP will change frequently to address new threats, advanced systems to defeat the threat, and to reflect new TTP that evolve from practical experience in the operational environment. ATP 3-04.17 Aircraft Combat Survivability is a critical asset long overdue. It will be as essential to the education of all Army aviators as are their aircraft operator's manuals and aircrew training manuals.



There I Was, ...

By CPT Isaac Fones

There I was, commanding an assault helicopter company in Afghanistan. The draw-down was well under way, deliberate operations were drying up, and so was the money. After less than one month in-country, the President of Afghanistan, Hamid Karzai, declared that he may not renew contracts for private security companies. With the insider threat increasing as green-on-blue attacks appeared regularly in intelligence summaries and on the news, the need for security at U.S. Army combat outposts and forward operating bases had never been higher.

The day after President Karzai's announcement, my task force S-3 (Operations Officer) told us to prepare to provide our own base security. Immediately I began to ask myself if my Soldiers and warrant officers were ready to man towers, checkpoints and, if necessary, repel an attack by a determined enemy force. We had completed the rigorous pre-deployment training back in the states. We had conducted our own ranges and focused on physical training to prepare for the elevation and climate of Afghanistan, but were my Blackhawk crew chiefs and pilots truly ready to occupy hasty battle positions? How did high altitude mountain environmental training strategy train my crew members to use the egress kits on their M240H machine guns? How were dozens of dust landings going to help my pilots-in-command direct small arms fire while under fire? How does an accurate performance planning card prepare me to make a good sector sketch from my observation post?

We spent endless hours learning about holistic wellness. We listened to speakers talk about financial readiness. We all became experts on sexual harassment/ assault response and prevention. We even spent a little time (not nearly enough) learning how to protect classified information from the enemy. But who taught my Soldiers how to defend an assault company command post from

a suicide bomber? Who taught my "air warriors" how to conduct quick magazine changes on their M4s while communicating with their battle buddy?

Enter the company first sergeant. When I was a cadet, the only thing I learned about non-commissioned officers was that they were going to know more than me. Looking back I believe that may have been the best officer professional development I ever received. My immediate plan for mounting a company defense revolved around attaching M240s to the tip caps of our rotor blades with infinite ammo belts, cranking the engines, and then huddling everyone inside the cabins of all ten helicopters with 7.62 flying everywhere. It briefed well in my head. Luckily, my 1SG spent a couple years "on the trail" and knew a thing or two about training those who might be less familiar in the ways of an infantryman on how to do things like react to contact, react to indirect fire, occupy a patrol base, and other such things that don't readily spring to mind when thinking about flying a helicopter.

We set to work at the small arms range at our airbase, conducting reflexive fire drills, practicing magazine changes, and freshening up on the details of "interlocking fields of fire." I spent time with platoon leaders showing them how to draw sector sketches and how to select observation posts that gave the best view on high speed avenues of approach. The 1SG made a guard duty roster that matched our more tactically-inclined folks with those who had spent their whole career in aviation. By the time I had to report back to the S-3 that we were in fact ready to defend ourselves, I was actually able to answer the question, "who prepared my Soldiers for this?".....we did.

You must be wondering if we have put our training to use and fended off waves of attacking Taliban. Fortunately for the Taliban, President Karzai renewed the contracts with private security companies, and my company was able to continue the fight from the skies of Afghanistan. But thanks to my 1SG, we all now know a little bit more about defending ourselves, and are better Army aviators for it.

CPT Isaac Fones is a UH-60L Pilot in Command with six years of aviation service. Following flight school he was assigned to 4-6 Air Cavalry Regiment, Fort Lewis, WA where he served as troop executive officer, assault troop platoon leader, and squadron assistant S-3. CPT Fones is presently assigned as Commander, A Company, 3-501 Aviation Regiment ,1st Armored Division Combat Aviation Brigade and currently deployed with Task Force Apocalypse in Regional Command West, Afghanistan.

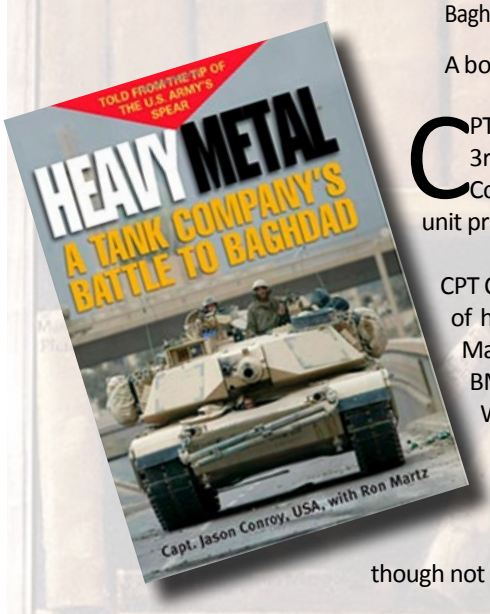
TURNING PAGES

~ book reviews of interest to the aviation professional

Heavy Metal: A Tank Company's Battle To Baghdad

By CPT Jason Conroy with Ron Martz. Potomac Books, Inc., 22841 Quicksilver Drive, Dulles, Virginia 20166. Available in hardcover, paperback, and Kindle at http://www.amazon.com/Heavy-Metal-Companys-Battle-Baghdad/dp/1574888579#_

A book review by CPT Timothy Simmons



CPT Jason Conroy commanded C Company, Task Force 1-64 of the 2nd Brigade Combat Team, 3rd Infantry Division during the invasion of Iraq in 2003. A former Apache crew chief, CPT Conroy wrote Heavy Metal with the assistance of Ron Martz, a reporter embedded with the unit prior to and through the opening months of Operation Iraqi Freedom.

CPT Conroy opens the book with a summary of what he feels is the most important operation of his company's deployment—a tank on tank battle at point blank range in the town of Mahmudiyah. Within five minutes, Charlie Company destroyed seven T-72 tanks and two BMPs. This was the first time U.S. armored forces engaged in an urban tank battle since World War II. It was not a scenario for which they had trained. The remainder of the book provides a chronological narrative from pre-deployment preparation through the thunder run into Baghdad and redeployment. This detailed account focuses on the details of company command, tactical operations throughout the push, and the transition to stability and support operations. A recurring theme throughout the book, though not its focal point, is the benefit to U.S. forces provided by embedded reporters.

CPT Conroy describes intense training in Kuwait, almost of all of which focused on conventional tank operations—open area and long range tactical engagements. This reveals a fundamental oversight on the part of the planners to prepare the Soldiers for any sort of dismounted or stability operations. CPT Conroy tellingly notes that gaining "any sense of the people or the customs of the region was out of the question for us—we had little time to do anything but tend to our tanks."

While logistics difficulties were inevitably encountered, the movement to Baghdad proved unexpectedly successful. However, even during this push, Charlie Company troops were already forced to improvise and perform tasks for which they had not trained. Iraqi fighters were blending into the civilian population and civilians were omnipresent on the battlefield. CPT Conroy and his Soldiers set up checkpoints, distributed aid, and gathered intelligence, all while maneuvering through enemy territory with minimal support. Their success in an urban environment during the initial "Thunder Run" into Baghdad, as a show of force, prompted division leadership to make the final push to Baghdad, an apparent instance of tactical success driving strategic decision-making. After taking Baghdad, even the task force commander, LTC Schwartz, observed that, at least with respect to securing buildings and sorting through potential intelligence documents, "we've gotten in a little over our heads here."

Perhaps the most visible operation that Charlie Company took part in was securing the Iraq National Museum. CPT Conroy seems reluctant to emphasize this operation and writes defensively about the role of his company in defending Iraqi antiquities from Iraqi looters. Fighters used the museum as a fighting position and weapons cache, complicating the issue of security. This was clearly a reactionary operation after international media attention blamed the U.S. for what turned out to be exaggerated reports of looting. It reveals a lack of manpower and of planning.

CPT Conroy raises interesting questions without answering them satisfactorily, perhaps because these questions still have no satisfactory answers. Was the invasion justified? Were American Soldiers doing the right thing? That the successes of his company and others like it led to a 9-year occupation with what remains an uncertain outcome reflect failures of strategic planning far above the company level. Officers and Soldiers at all levels can learn a great deal from his account. At times a love letter to the M1A1 Abrams tank and a tribute to the courage and service of his Soldiers, Heavy Metal chronicles an important piece of history as it happened.

feedback FORUM

Your Articles and Feedback Compel Thoughts and Actions

Aviation Digest's Feedback Forum is where readers can see the results of the author contributions and the professional discussions that followed. It is an essential part of our commitment to the continuous advancement of the Aviation Branch.

Intelligence Support to Army Aviation Is Broken…Does Anyone Care? By MAJ Corby Koehler and Christopher Tatarka, PH.D.
Volume 1 / Issue 2 *Aviation Digest* (Apr-Jun 2013, p 30)

The authors contend that S-2 sections in the combat aviation brigades (CABs) and subordinate battalions lack formal aviation-related intelligence training and qualification as a trained dual-track aviation and intelligence professional. The authors also maintain that Army Aviation suffers from inadequate manning levels needed to provide high quality intelligence support to aviation.

Letters to the Editor. In response to this article, the *Aviation Digest's* Readers Respond received two alternative viewpoints from 1LT Charles Hoffman (Jul-Sep 2013, p5) and CPT Russell Hartley (Oct-Dec 2013 p5) to MAJ Koehler and Dr. Tatarka's position.

Aviation Branch Response:
The original article prompted dialogue between MG Mangum, Commanding General for Aviation Center of Excellence and MG Ashley, Commanding General for Intelligence Center of Excellence. This dialogue generated working groups across the Aviation Enterprise and actions at the Intelligence Center of Excellence to address some of the more salient issues from the perceived lack of intelligence support to and within CABs. These working groups reviewed the table of organization & equipment for a CAB S-2 section as well as looking at ways to improve 15C35 training and subsequent employment based not only on input from within the Army, but also on how other services utilize their equivalents. Each of these studies address how to more effectively process, exploit, and disseminate data. Later this quarter, general officer-level discussions will consider proposals for modifying doctrine, adjusting force structure, and streamlining communications architectures to sufficiently satisfy division and other supported commander's intelligence requirements; including those of a CAB.

Stability Through Partnership
By MAJ Randall M. Stillinger
Volume 1 / Issue 3 *Aviation Digest* (Jul-Sep 2013, p 8)

As the strategic focus shifts to the Pacific Theater, there is an increase demand for Army Aviation in the maritime environment. Army Aviation has a unique role and the capability of the helicopter makes it a force multiplier in this complex environment.

Aviation Branch Response:
Army Aviation is moving in parallel with Navy, Marine, and Army SOF aviation to develop the tactics, techniques, and procedures (TTP), and lessons learned to support maritime operations. This effort includes input to TC 3-04.95 Maritime Operations and TC 3-04.45 Aviation Gunnery to reflect overwater operational considerations including developing aircrew gunnery skills for proper weapon selection and TTP for engaging waterborne targets.

The USAACE Directorate of Training and Doctrine (DOTD) is collecting and assessing information from units with experience in performing this mission. We are currently working on developing a draft Training Support Package (TSP) plan to help streamline and standardize training for units in the future.

A Hard Lesson Learned: The Need for Weapons and Tactics Instruction in Army Aviation
By MAJ Jamie LaValley
Volume 1 / Issue 3 *Aviation Digest* (Jul-Sep 2013, p 39)

MAJ LaValley maintains that Army Aviation weaknesses in our tactical training program have been evident in both Iraq and Afghanistan. He feels that Army Aviation must revamp its tactical flight training program to parallel the Marine Weapons and Tactics Qualification Course in order to be prepared to effectively respond to future threats.

Letters to the Editor. In response to this article, CW3 David Caudill agrees with the requirement for more detailed tactical training but argues the role of weapons tactics instructor should fall to the Aviation Mission Survivability Officer. *Aviation Digest* Oct-Dec 2013, p5.

Aviation Branch Response:
MAJ LaValley's article pointed out several areas of current focus within the Gunnery, Survivability, and Flight Training Branches of the DOTD. We are working to address these issues through various initiatives such as the push to complete final staffing of TC 3-04.45 Aviation Gunnery to include refining engagement techniques and the expansion of the Aviation Mission Survivability (AMS) program to include focus on crew and collective survivability training.

Beginning in January 2013, the transition of the TACOPS officer to the AMS Officer began. At the same time, updates to doctrine focused on the preservation of aviation combat power and overall mission survivability. Near term solutions have been identified and some projects have been completed. The Man-portable Aircraft Survivability Trainer (MAST) was fielded to CTCs select units for home-station training. Updates have been made to the AVCATT to include more realistic threat and hostile fire signatures and indicators. Additionally, a classified CBAT program, CBAT-C, is now available to facilitate in-depth classified discussions on ASE capabilities, limitations, and survivability considerations.

Proponents from across the Aviation Enterprise continue their efforts to develop challenging, realistic crew and collective training solutions in order to enhance aircrew survivability skill sets.

https://us.army.mil/suite/page/usaace-dotd

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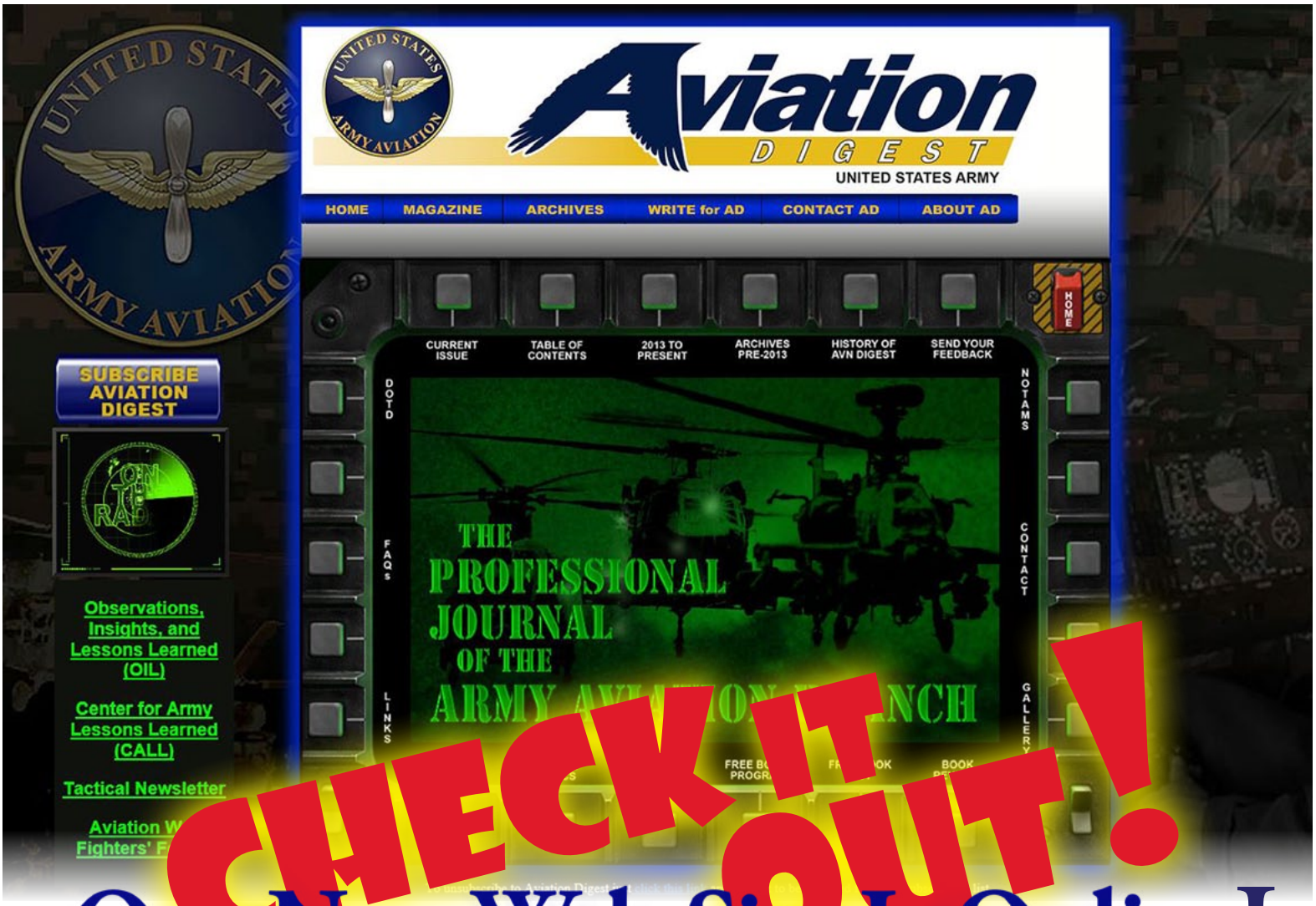

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Gold is one of the colors of the Republic of Vietnam, and of the shoulder sleeve insignia of the U.S. Military Assistance Command, Vietnam and U.S. Army, Vietnam, the Commands under which the Brigade was formed and served in armed conflict. The hawk in flight preparing to strike its prey symbolizes aviation's impact on modern ground warfare.

1ST AVIATION BRIGADE

Blue and golden orange are the colors of Army Aviation. The gold of the hawk and the red of the sword handle are the colors of the Republic of Vietnam, and of the shoulder sleeve insignia of the U.S. Military Assistance Command, Vietnam and U.S. Army, Vietnam, the Commands under which the Aviation Brigade was formed and under which it first served in armed conflict. The hawk in flight preparing to strike its prey is symbolic of Army Aviation's impact on modern ground warfare. The hawk was adopted as the symbol of the new capabilities of Army Aviation during the initial phase of Air Assault concept testing in 1963. The crusader's sword is taken from the shoulder sleeve insignia of the U.S. Military Assistance Command, Vietnam and identifies the origin and mission of the Aviation Brigade in Vietnam. The rapid and quantum increase in the Army Aviation units in Vietnam dictated formation of an Aviation Brigade for command of multiple battalions Army Aviation organizations.

The 1st Aviation Brigade was activated in Vietnam on 25 May 1966 where it served until March 1973. At its peak strength, the brigade was the single largest Army aviation command in the world with 15 aviation battalions and three air cavalry squadrons. It consisted of 1,900 rotary and fixed-wing aircraft accounting for 40 percent of the Army's helicopter assets and 100 percent of its fixed-wing assets with 25,181 officers, warrant officers, non-commissioned officers, and enlisted men assigned for duty.

While in Vietnam, the Golden Hawks took part in practically every operation during the conflict. Of note for their large air assault operations were Sanctuary Counteroffensive (1 May 1970-30 June 1970) concerned with the Allied incursion into Cambodia and Counteroffensive, Phase VII (1 July – 30 June 1971) of which Lam Son 719 was the most significant operation during this campaign.

Respect for the Golden Hawks actions in Vietnam can be summarized in Lieutenant General John J. Tolson's book Vietnam Studies. Airmobility 1961-1971.

> In Southeast Asia, the Army aviator had become the sine qua non of combat operations. No major plan was ever considered without first determining the aviation assets available to support it. Nowhere was this better exemplified than in the 1st Aviation Brigade.
>
> On the second anniversary of this unit (1st Aviation Brigade) back on May 25 (1966), General Abrams, Deputy Commander, U.S. Military Assistance Command, Vietnam summed up the feeling of non-rated officers this way: "It has always been interesting for me to note that the aviators and men of this Brigade have been taken into the brotherhood of the combat arms. Not by regulation, not by politics, but they have been voted in by the infantry, who are the chartered members of that secluded club, the combat arms."

Upon withdrawal from the Republic of South Vietnam, the 1st Aviation Brigade was sent to Fort Rucker, Alabama as the Army Aviation Center Troop Brigade. The Army Aviation Center Troop Brigade was later re-designated as the 1st Aviation Brigade to carry on the linage and colors of the 1st Aviation Brigade.

Campaign Participation Credit

Counteroffensive
Counteroffensive, Phase II
Counteroffensive, Phase III
Tet Counteroffensive
Counteroffensive, Phase IV
Counteroffensive, Phase V
Counteroffensive, Phase VI
Tet 69/Counteroffensive
Summer-Fall 1969
Winter-Spring 1970
Sanctuary Counteroffensive
Counteroffensive, Phase VII
Consolidation I
Consolidation II
Cease-Fire

DECORATIONS

Meritorious Unit Commendation (Army), Streamer embroidered
VIETNAM 1969-1970
Meritorious Unit Commendation (Army), Streamer embroidered
VIETNAM 1970-1971
Meritorious Unit Commendation (Army), Streamer embroidered
VIETNAM 1971-1972
Meritorious Unit Commendation (Army), Streamer embroidered
VIETNAM 1972
Republic of Vietnam Cross of Gallantry with Palm, Streamer embroidered
VIETNAM 1966-1967
Republic of Vietnam Cross of Gallantry with Palm, Streamer embroidered
VIETNAM 1967-1968
Republic of Vietnam Cross of Gallantry with Palm, Streamer embroidered
VIETNAM 1969-1970
Republic of Vietnam Cross of Gallantry with Palm, Streamer embroidered
VIETNAM 1970-1972
Republic of Vietnam Civil Action Honor Medal, 1st Class, Streamer embroidered
VIETNAM 1971-1972

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