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COMBINED ARMS MANEUVER & WARFIGHTING SKILLS

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ABOUT THE COVER

Images depict planning for and engaging in combined arms maneuver training.

The Command Corner

In this issue, we focus on the role of Army Aviation in joint-combined arms maneuver. Chief of Staff of the Army, General Mark A. Milley reminded us at the 2016 Association of the United States Army annual conference that our potential adversaries have studied our doctrine, tactics, equipment, organization, training, and leadership in order to develop their own capabilities to counter our strengths and exploit our weaknesses. We know that current and future conflict will occur across multiple domains including space and cyberspace, and that our enemies will employ anti-access and area denial (A2AD) techniques to challenge our ability to effectively employ combat power. While such a conflict with a near-pear threat will challenge our warfighting capability to the fullest, it would be a grave error to witness these developments and conclude that the Army and the Joint Force will not need and demand that we bring our branch's unique advantages to the combined arms team. Make no mistake—when the nation calls upon the Army, Army Aviation will rise to the challenge as an integral part of the joint combined arms team. We must be ready to meet any adversary, at any time, at any place, and fight, win, and be ready to fight again.

Developing the tools and the collective mindset to accomplish this substantial task requires in-depth examination of our branch's current strengths and capability gaps, and bold leadership to make the necessary changes to adapt. I am proud of the thought and work that so many individuals are applying to make our branch and the Army better—asking tough questions, seeking critical feedback, and striving to anticipate future challenges. Technology offers us many tools, but it is the great work our people are doing that will enable us to win in an increasingly complex world.

This issue of Aviation Digest is one way in which we aim to capture and retain the hard-earned lessons from the last fifteen years of counter-insurgency (COIN) operations while we rebuild collective proficiency in the decisive action (DA) environment. Our competence to effectively move from COIN to DA across multiple domains is inextricably linked to our ability and willingness as Aviation leaders to develop and share innovative solutions. Some of the ideas in this issue discuss areas where we need to improve and challenge aviation leaders to develop and share innovative solutions. This is a healthy and necessary process for a learning organization—we must never stop questioning the ways that Army Aviation can best contribute to the combined arms and joint warfighting teams. One of the topics addressed here is Aviation's role to counter emerging A2AD challenges that we may face. It is this type of forward-looking initiative that will enable us to develop solutions for the tough realities that we will face as a military.

Although much of the conjecture about our future adversaries' capabilities may paint a daunting picture, we are fully capable of meeting this challenge, and better equipped to do it by approaching the challenge with our eyes wide open. Now and always, leadership matters—through strong leadership and realistic training we can harness the hard-won lessons from recent conflicts and set conditions now to overcome the challenges of tomorrow.

Above the Best!

William K. Gayler
Major General, USA
Commanding

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Fighting the CAB in Combined Arms Maneuver

By COL Robert T. Ault

The last 14 years showcased Army Aviation's ability to apply its fundamental principles of flexibility, speed, security, and precision to operations in Iraq and Afghanistan. As the Army refocuses to deter and defeat a peer or near-peer competitor, it's important to think through what fighting the combat aviation brigade (CAB) will look like.

Decisive Action Construct

The Army conducts decisive action as an independent maneuver force or as part of an integrated joint or combined force during unified land operations. The Army is decisive as it conducts globally integrated operations via offense, defense, stability, and defense support to civil authorities. Due to the nature of the operating environment, Army forces may find themselves conducting these missions simultaneously in multiple locations.

The Army's core competencies include shaping the security environment, setting the theater - establishing lodgments and preparing a theater for follow-on phases of conflict (seize the initiative, dominate), projecting national power, combined arms maneuver (CAM), wide area security (WAS), cyber operations, and special operations. Recent operations conducted in Iraq and Afghanistan demonstrate examples of WAS whereas operations such as Desert Storm and the Iraq Invasion of 2003 demonstrate examples of CAM. While the majority of combat operations over the last 14 years have certainly been dangerous, the intensity of those actions was generally at the company or platoon level and below.

Recent WAS operations against the Taliban or Al Qaeda are markedly different than expected CAM operations against peer or near-peer forces. Emerging hybrid threats pose a more symmetrical threat and will field capable formations with significant offensive capability and integrated air defense systems in conjunction with enabling capabilities such as cyber and, most importantly, the logistics capable of sustaining operations. Due to the nature of future conflict, the CAB must to be able to conduct missions across the entire range of military operations. However, fighting the CAB as a maneuver element in CAM is a task that must be trained from the company upward to enable success.

Army operations may range from having a linear and contiguous operational environment, with a discernable front and back, to having a non-linear and noncontiguous operational environment which has no discernable boundaries between what is considered the deep, close, and support areas. It is significant that today the operational environment demands the ability to conduct offensive, defensive, and stability operations simultaneously. Combat aviation brigades will find themselves conducting these operations across their formations multiple times as they maneuver as part of a division or higher organization.

The nature of future missions and the anticipated operational variables dictate the tactics to be used in either CAM or WAS. For recent operations, Army

Aviation has conducted team maneuver with battalion-level mission command. This is evidenced in the majority of missions that required a team of AH-64s to respond to troops in contact or that of two or three CH-47s air assaulting a battalion of infantry. Specifically in relation to counter insurgency, the nature of WAS demands the small precise use of force, applied through several levels of leadership. Leaders must apply this force with centralized intent and dispersed execution through disciplined initiative, which are central aspects of mission command. In this manner, combined arms maneuver is significantly different, but the underlying principles of mission command still apply.

The level of integration and capability associated with a near-peer threat in CAM demands that companies and battalions maneuver within the parameters of higher mission command echelons. This necessity can be seen in the warfighter training events set in the decisive action training environment. When facing a near-peer competitor, division, corps, and joint task force commanders may conduct maneuvers at a unit level in order to either gain the initiative or a position of advantage. The threat demands tactics that balance protecting friendly forces while maximizing the probability of gaining that advantage. It is significant that CAM demands the ability to maneuver and fight collectively at all levels. This need to conduct unit maneuver changes how commanders must think about readiness and synchronizing and integrating all members of a joint or combined arms team.

What Does Readiness Look Like in Combined Arms Maneuver?

Readiness represents the ability of a unit to fight and execute its war time missions under the national military strategy. These missions contain tasks known as mission essential tasks which make up a unit's mission essential task list (METL). As the Army moves to standardize and objectively assess the unit METL from brigade down to company level, readiness will begin to be expressed in terms of repetitions and results. A standardized METL and objective assessments of readiness will force unit commanders, at all levels, to measure themselves against the ability to conduct battalion level maneuver with brigade mission command. This is significantly different than subjectively assigning readiness objectives. Setting T1 (85% or greater of a unit's METL assessed as fully trained during the last 180 days) against this unit collective level capability standard will add much needed rigor not only in training but in assessing what level of capability or readiness units are able to attain.

Army Aviation as the Supporting Formation versus the Supported Formation

Fighting in the decisive action construct demands aviation formations that understand both timing and simultaneity in combat operations. When applying combat power through the WAS core competency, Army Aviation units will conduct enabling operations as a supporting formation to other units such as an infantry company. In these cases, aviation may appear to operate as a fires-like platform, conducting precise and discriminately lethal operations against an enemy attempting to blend into the civilian population. For example, an attack weapons team operating on the fires net controlled by a joint terminal attack controller engages a target as part of a "troops in contact" battle drill. Army Aviation units are most likely to conduct these type of supporting operations as part of WAS while performing the role of a maneuver force during CAM; however, CAM may demand a higher level of risk versus reward analysis by the division or corps commander and his staff.

The results of this analysis cause three key characteristics to change the role of aviation units to supported formations as the level of enemy capability drives the commander to fight in the deep, close, and support areas of the operating environment during CAM. The first characteristic is the presence of follow-on enemy forces not in contact with friendly troops, but outside the main battle area. The critical nature of shaping operations against the force not yet in contact sets the conditions for subsequent or simultaneous operations. Second, the levels of risk associated with both shaping operations and the commitment of formations against high risk, high payoff targets (such as brigade level air assaults or division attacks) demand that leaders understand both the risks and rewards. This is also true in terms of what assets, like division fires or the CAB, are missioned against versus what they are not. In other words, an attack reconnaissance battalion that is direct support to a brigade combat team in the close fight will be unavailable to decisively support the division fight in the deep area. This determination of risk to mission versus risk to force must be done at the senior levels of the division or corps leadership.

Lastly, the required level of synchronization essential to conduct CAM is absent from the WAS fight. For example, suppression of an integrated air defense system in order to conduct shaping operations against forces not yet in contact is usually accomplished above the brigade level in order to deconflict and synchronize indirect fires and aviation maneuver. Additionally, the regeneration of combat power after such a mission, cannot be accomplished without a significant synchronized logistics effort by the higher headquarters.

Army Techniques Publication (ATP) 3-94.2 Deep Operations addresses these characteristics and reintroduces the importance of the deep area and the fundamental responsibility of division and corps to shape conditions for subordinate units in the close area. With the shift in focus from WAS to CAM, it is imperative that our doctrine provides a foundation to respond to emerging near-peer threats.

Implications for Training

Clearly, to fight as an integrated member of a combined arms team, units must train at a collective level beyond what is traditionally thought of as readiness for counter-insurgency operations. Objective readiness criteria will help leaders accurately assess and articulate their unit's ability to execute mission essential tasks. While individual training will always remain the bedrock for building readiness, fighting a near-peer competitor means units must be able to effectively maneuver at echelons above the team level. Combat aviation brigades must be agile and flexible in order to execute mission command for multiple units maneuvering in CAM and WAS simultaneously. Leaders must not be content merely with individual or team readiness. Instead, platoon, company, and battalion commanders must fight to train their units and mission command their subordinates.

In order to facilitate this paradigm shift, Army Aviation, as described in Field Manual 3-04, must help leaders at all levels to assess the ability of their subordinate leaders to execute decentralized operations under stressful and demanding conditions. Training Circular 3-04.11, Commander's Aviation Training and Standardization Program will mandate that battalion, company commanders and platoon leaders be pilots in command. These leaders will be evaluated by their higher commander for their ability to plan, prepare, execute, and assess those tasks associated with conducting unit METL tasks.

Conclusion

The Army must not fall victim to recent combat deployment experiences and take the wrong lessons about decisive action. While the experience of small unit tactics is indeed invaluable and applicable against a hybrid enemy, we must redefine our understanding and application of CAM. Combined arms maneuver demands battalion level maneuver with brigade-level mission command. Synchronized, high risk operations against a near-peer opposing force will demand aviation leaders and formations that can thrive in the uncertainty and complexity of the operational environment and in and out of the CAM and WAS imperatives simultaneously. Deliberate collective training and leader development are critical to the ability to deter and defeat the threats in the next conflict.

Colonel Robert T. Ault is currently serving as the United States Army Aviation Center of Excellence (USAACE) Chief of Staff. Previous assignments include Director, Directorate of Training and Doctrine and Commander, 4th Infantry Division Combat Aviation Brigade. COL Ault is a graduate of the National War College.

Acronym Reference

ATP - Army techniques publication	**METL** - mission essential task list
CAB - combat aviation brigade	**WAS** - wide area security
CAM - combined arms maneuver	

Cavalry Planning: How to Plan in a Time Constrained Environment

By MAJ (P) Brian Hummel

Cavalry organizations tasked to conduct reconnaissance and security early and continuously throughout a brigade combat team's (BCT) operations often find themselves short on available time for planning. The nature of the missions they conduct, combined with the requirements driven by the enemy they anticipate, require proficiency in the military decisionmaking process (MDMP) and knowing how to abbreviate it when mission timelines dictate.

Most Cavalry organizations conduct reconnaissance pull operations early in the BCT's planning cycle in order to answer the commander's critical information requirements (CCIR) and build situational understanding for the BCT commander and staff. While conducting parallel planning with the BCT, Cavalry organizations find themselves in mission execution before the BCT publishes warning order (WARNORD) 3. The information the Cavalry squadron provides helps "pull" the BCT towards a course of action, while helping develop an increased level of certainty about the enemy or operational environment in the BCT's area of operations. Field Manual (FM) 6-0, *Commander and Staff Organization and Operations* states:

> "Quality staffs produce simple, flexible, and tactically sound plans in time-constrained environments. Any METT-TC [mission, enemy, terrain and weather, troops and support available, and civil considerations] factor, but especially limited time, may make it difficult to complete every step of the MDMP in detail. Applying an inflexible process to all situations does not work."[1]

The Air Cavalry Leaders Course (ACLC) at Fort Rucker, Alabama, working in conjunction with the Cavalry Leaders Course (CLC) at Fort Benning, Georgia, developed a technique for heavy attack reconnaissance squadron (H-ARS) and attack reconnaissance battalion (ARB) staffs and commanders to plan in time constrained environments. The Reconnaissance and Security Planning Process (RSPP) is taught and exercised in both courses. Despite minute variances accounting for differing capabilities between air and ground cavalry organizations (most notably aviation station time limitations), the principles taught in each course are nested with each other to achieve similar outcomes. The RSPP combines planning techniques outlined in FM 3-55, *Information Collection*; FM 3-98, *Reconnaissance and Security Operations*; and FM 6-0, *Mission Command*. The table below outlines the steps of the RSPP for H-ARS and ARB staffs.

Air Cavalry Leaders Course
Reconnaissance & Security Planning Process

Key Input	Abbreviated MDMP (FM 3-55)	R&S Steps (ACLC TTP)	R&S Key Output
❑ BCT WARNORD 1 ❑ Initial CDRs Planning Guidance	Step 1: Receipt of Mission	Step 1: Receipt of Mission	❑ WARNORD 1 ❑ Initial CDRs Planning Guidance
❑ 2 levels up HQ plan and products ❑ SQDN CDR's planning guidance ❑ SQDN CDR's risk guidance ❑ SQDN CDR's Focus ❑ Initial CCIR ❑ SQDN Task Organization ❑ External unit support relationships ❑ BCT CCIR and NAIs with LTIOV BCT WARNORD 2 and/or Annex L	Step 2: Conduct Mission Analysis (Concurrently with BCT staff)	Step 2: Conduct Mission Analysis (Concurrently with BCT staff)	❑ Terrain and weather considerations (MCOO) ❑ Enemy (ORBAT), HVTs, courses of action (SITEMP), capabilities and limitations ❑ IC asset availability ❑ Initial CDRs Recon & Security Guidance PIR Matrix with indicators
		Step 3: Develop Reconnaissance Objectives	❑ NAI overlay (Event Temp, Event Matrix) ❑ Initial IC Matrix ❑ WARNORD 2
❑ BCT Specified Tasks to SQDN ❑ BCT mission ❑ SQDN mission ❑ SQDN CDR's Tempo	Step 3: Course of Action Development	Step 4: Task Information Collection Assets	❑ Specific Information Requirements (SIR) ❑ Final Information Collection Matrix ❑ Refined CDRs Recon & Security Guidance ❑ Scheme of Maneuver ❑ Operational timeline
❑ Refined BCT PIR ❑ CDRs Reconnaissance/Security Guidance	Step 4: Course of Action Analysis	Step 5: Synchronize Warfighting Functions	❑ Fire support plan ❑ Sustainment plan ❑ Mission Command plan ❑ Sequels and branch plans ❑ High Payoff Target (HPT) List ❑ Decision Support Matrix ❑ Synchronization Matrix ❑ WARNORD 3 WARGAMING
	Step 5: Orders Production	Step 6: Orders Production	Compile Matrices & Graphical Overlays Squadron OPORD w/Annexes

Color Key
BCT ORDERS SQDN ORDERS R&S Matrices

Similar to the MDMP and the planning process outlined in FM 3-55, RSPP starts with Step 1, Receipt of Mission. This step's critical output is the initial commander's planning guidance in WARNORD 1. This guidance focuses the staff, gives initial information to subordinate units, and serves as the initial commander's intent and early development of the commander's reconnaissance or security guidance. At a minimum this guidance should address the following items:

- The initial planning timeline/ information collection timeline
- Initial CCIRs
- Focus of reconnaissance or security operations

Immediately after WARNORD 1 is published, the staff transitions to Step 2: Mission Analysis. FM 3-55 states:

> "Properly synchronized information collection planning begins when the IPB [intelligence preparation of the battlefield] (threat characteristics, enemy templates, enemy courses of action [COA] statements, and, most importantly, an enemy event template or matrix) is developed and updated."[2]

Cavalry staffs working within strict time constraints must quickly analyze the terrain and develop the modified combined obstacles overlay (MCOO) while simultaneously evaluating the threat's characteristics. The staff develops the enemy order of battle (ORBAT) and determines high value targets (HVT). Enemy COA are developed, resulting in detailed enemy situation templates (SITEMP) for each anticipated enemy action. Consolidated SITEMPs are utilized during Step 3: Developing the Reconnaissance Objective, to develop the event template, one of the most critical IPB products. The priority intelligence requirements (PIR) matrix with developed indicators is vital input for Step 3. The PIR are developed to answer critical gaps in information on enemy, terrain, time, weather, or civil considerations. As the commander gains a better understanding of the mission, he also updates his commander's planning guidance to include the following:

- Revised CCIR
- Tempo for reconnaissance and security operations
- Engagement/disengagement criteria
- Displacement criteria
- Acceptable risk
- Initial commander's intent- focus on key tasks

Steps 3-5 of the RSPP account for the most notable changes in techniques for planning in a time constrained environment. Field Manual 6-0 states:

> "the commander decides how to adjust the MDMP, giving specific guidance to the staff to focus on the process and save time. Commanders shorten the MDMP when they lack time to perform each step in detail."[3]

The staff begins Step 3 by considering the mission, commander's intent/guidance, and the gaps in information for the mission to develop the reconnaissance objective. The staff assigns geographical locations (named area of interest/target area of interest [NAI/TAI]) to direct assets for information collection (IC). The S-2 adds the anticipated enemy actions, specifically, the time/distance analysis or timed phase lines, which results in the event template. The staff then correlates each location with the PIR, its indicators, any anticipated HVTs, and a specific enemy COA to complete the event matrix. A thoroughly developed event matrix will help ensure the success of any reconnaissance operation. This product is the foundation for the most critical product for reconnaissance and security operations: the IC plan. At this point, WARNO 2 is ready to be published.

Cavalry commanders challenged by time constraints assume risk by forgoing Steps 5 and 6 of the traditional MDMP. Time constraints often prevent staffs from developing, analyzing, and comparing multiple friendly COA. In lieu of multiple COA, Cavalry commanders will use the information developed in Steps 1-3 of the RSPP to give a directed friendly COA and use the time saved on wargaming during Step 5.

Having already identified IC assets available, the S-3 considers the mission analysis from the S-2 via the event matrix and initial IC matrix and begins Step 4: Task Information Collection Assets. This

step lays the groundwork for developing the overall scheme of maneuver. During this phase, the commander refines the commander's reconnaissance or security guidance, commander's intent, and the operational timeline. Intelligence and operations planners convert PIR to specific information requirements (SIR) and task them in accordance with asset capabilities (such as the radar or aircraft survivability equipment capabilities of the AH-64D/E) for IC. Commanders and S-3s must keep the fundamentals of reconnaissance in mind during this phase.

The rest of the warfighting functions update their running estimates and refine their plan in support of the overall scheme of maneuver to initiate the transition to Step 5: Synchronize the Warfighting Functions. Field Manual 6-0 also states:

> "Staffs can use the time saved on any step of the MDMP to refine the plan more thoroughly, conduct a more deliberate and detailed war game, consider potential branches and sequels, and focus more on rehearsing and preparing the plan."[4]

Wargaming the directed course of action is essential to addressing initial planning shortfalls and to ensure coordination and synchronization throughout the operation. Wargaming addresses enemy reactions to friendly maneuver and allows the commander and staff to develop and refine decision points and branch and sequel plans. Wargaming is the most crucial step of the process to mitigate risk accepted by the commander's directed COA. Planners refine locations of control measure such as observation posts, passage points, and engagement areas in anticipation of enemy movement. The staff also ensures the locations and operational timing of critical enablers like fires, retransmission sites, and forward arming and refueling point locations meet the demands of the scheme of maneuver. Lastly, wargaming assists in identifying the high-payoff target (HPT) list to further refine the fires plan. The outputs of an exhaustive wargame are a thoroughly synchronized plan and completed synchronization and decision support matrices.

The final step in the RSPP is Step 6: Orders Production. This step is nested with the traditional Step 7 of MDMP and completes the overall process. Units should ensure dissemination of all critical annexes and products with a heavy focus on the IC matrix, synchronization, and decision support matrices.

Finally, it is important to keep in mind that the RSPP was not developed to replace the traditional MDMP. However, this process is a technique by which commanders and staffs can use to plan in time constrained environments. As previously mentioned, the process is nested with current doctrine and outlines important steps to focus on while conducting both reconnaissance and security operations. Units can start with the RSPP and continue to refine the process with their own standing operating procedures, further enhancing their abilities to conduct reconnaissance early and continuously throughout the BCT's operations, often in time constrained environments.

[1] U.S. Department of the Army, Commander and Staff Organization and Operations, FM 6-0 (Washington D.C.: U.S. Department of the Army, May 2014), 9-44.
[2] U.S. Department of the Army, Information Collections, FM 3-55 (Washington D.C.: U.S. Department of the Army, May 2013), 3-1.
[3] U.S. Department of the Army, Commander and Staff Organization and Operations, FM 6-0 (Washington D.C.: U.S. Department of the Army, May 2014, 9-44.
[4] Ibid.

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Acronym Reference

ACLC- Air Cavalry Leaders Course	**IPB** - intelligence preparation of the battle field
ARB - attack reconnaissance battalion	**LTIOV** - latest time information of value
BCT - brigade combat team	**MCOO** - modified combined obstacles overlay
CCIR - commander's critical information requirements	**MDMP** - military decisionmaking process
CLC - Cavalry Leaders Course	**NAI/TAI** - named area of interest/target area of interest
COA - course of action	**ORBAT** - order of battle
FM - field manual	**PIR** - priority intelligence requirements
H-ARS - heavy attack reconnaissance squadron	**RSPP** - Reconnaissance and Security Planning Process
HTP - high-payoff target	**SIR** - specific information requirements
HVT - high value target	**SITEMP** - situation templates
IC - information collection	**WARNORD** - warning order

U.S. Army Europe:

Decisive Action Combined Arms Integration Training with Allied Partners

By CPT Jared M. Wiggins
and 1LT Tyler S. Lamb

United States (U.S.) Army Aviation in Europe trains to fight as part of a combined arms team and often does so with allies and partner nations. Operation Strong Punch was one such exercise; however, unlike others that the U.S. Army has participated in, this was a German planned massive force on force exercise that pitted combined arms teams against each other in a large scenario comparable to what the U.S. military does at its combat training centers. The Germans do take part in exercises at the Joint Multinational Training Center in Hohenfels but this is a U.S. operated training center where the Germans seldom serve as mission command of a multinational team. The 36th Kampfhubschrauber Regiment extended an invitation to the 1-3rd Attack Reconnaissance Battalion, 12th Combat Aviation Brigade to participate in Operation Strong Punch following the success of several smaller informal exercises.

As we train to fight in an environment where we can expect to encounter a near peer threat employing sophisticated, technologically advanced weapons that include lethal air defense systems, combined arms integration and synchronization, especially with our allies, is critically important. But, one piece of that fight that a large portion of Army Aviation has neglected is the electronic warfare (EW) threat. Our adversaries are poised to challenge all military operations on the battlefield with their EW capabilities and Army Aviation will be especially affected. As we have become increasingly reliant on our electronic tools, our analog skills have atrophied (think paper map navigation), and we (Army Aviation) have limited resources to counter these systems as we move forward of the ground maneuver forces. We've seen the tremendous capabilities of our adversaries in Crimea and Syria where unmanned aircraft systems, jamming, sophisticated radio direction finding, and other EW players have expertly been integrated into their combined arms operations. Part of Operation Strong Punch tested, in limited capacity, the impact of electronic warfare on combat helicopters.

While Operation Strong Punch was not aviation centric, the exercise did incorporate aviation as an integral piece of the exercise. Several situational training exercises (STX) pitted U.S. Apache and German Tiger crews against Bundeswher air defenses, armor, infantry and electronic warfare assets. These STXs provided fascinating results, as both sides faced a thinking and reacting adversary, rather than rigidly controlled opposing forces in a scripted scenario.

The first Apache and Tiger STX involved conducting a deliberate attack against a mechanized infantry company defended by man-portable air defense systems and a single SA-8. The Apache-Tiger teams maneuvered to their target, with the aid of a German Typhoon aircraft simulating an unmanned aerial vehicle providing intelligence, surveillance, and reconnaissance (ISR) information. As the aircrews reached their battle positions near friendly troops, they were talked onto their targets by German joint terminal attack controllers (JTAC). The aircrews successfully destroyed their targets, providing the ground element freedom of maneuver to accomplish their mission, and then departed the area. The Typhoon which had previously served as a friendly ISR asset reverted to an aggressor role and initiated a search for the Apache and Tigers as they egressed the target area. We learned from earlier exercises that the Typhoon had difficulty detecting the helicopters from among background clutter with its targeting radar or its thermal or day TV targeting cameras while the helicopters flew at nap-of-the-earth (NOE) altitudes in trees and seldom could detect them at contour flight altitudes. German Army aviation does not place the same emphasis on terrain flight and is not as comfortable operating at these altitudes. They were, therefore, detected more often than the Apache crews. During the egress of the second iteration, one Tiger crew was detected and engaged by an SA-8 while the Apache crews were undetected.

Follow-on missions integrated EW into the fight. We flew similar missions against German troops equipped with newly fielded equipment mounted on a German Fox which could monitor radios and locate aircraft by direction finding.

During the first iteration of the mission, the aircrews turned off all potential sources of electromagnetic radiation (fire control radar (FCR), satellite communication, Blue Force Tracker, and radios) but left the doppler and radar altimeter on for safety. The crews flying the second iteration did not. Both teams were located by the surveillance radar, but the teams using their

radios were located earlier by the Fox while the ground unit monitored their radios with startling clarity. The AH-64's radio frequency interferometer (RFI) and the FCR proved highly effective during this fight. As the SA-8 and ground radars emitted, they were immediately located by the RFI. The crews were able to locate vehicles quickly with the FCR enabling targeting of those entities.

American-German attack crews planned their missions together, highlighting differences in doctrine and employment. Being more accustomed to flying by deliberate air mission requests and under the control of JTACs, our German counterparts did not emphasize the same aspects we did. Our careful selection of battle positions, ingress/egress routes, and radio architecture enabled the U.S. crews to fare better than our counterparts. This is not a reflection of pilot skill but highlights the importance of deliberate mission planning when not under the direct control of a JTAC or equivalent.

Another critical aspect of training is leader development. Empowering and training new air mission commanders and platoon leaders truly invests in the future of aviation. As technology improved and manned-unmanned teaming became a central piece of aviation in Iraq, general officers have literally, on multiple occasions, called shots miles away from the engagement that on-scene air mission commanders should have been making. Decentralizing decision making and empowering junior leaders to take disciplined initiative within the commander's intent enabled U.S. participation in this exercise. Apache aircrews under the leadership of a lieutenant fared better than their German counterparts while sparring with air defenses (we received 50% fewer notional aircraft shoot downs by the SA-8 emulator). This lieutenant managed the aviation maintenance, mission planning, and mission execution as the senior U.S. officer during Operation Strong Punch.

Aviation must continue to train as part of a combined arms team and whenever possible, we must do so against a thinking and reactive adversary if we are to stay relevant to the fight. We must be able to support our ground counterparts in contested airspace with the threat of hostile air, EW, and sophisticated air defenses. This exercise served to validate much of how we train and fight but also highlighted the dangers we face in such an environment. Additionally, we must continue to train alongside our ground counterparts so we know how best to support them and the ground force commander can train how best to employ aviation to accomplish the mission.

Lessons Learned

-Electronic warfare is a significant threat to aircraft. Radios can be detected, monitored, and the emitter located. Global Positioning System signals can be spoofed and jammed (though for safety reasons, this was not done during the exercise). To counter this, aircrews must do all that they can to maintain radio silence and rely less on electromagnet emitting devices in the aircraft during the infiltration. Relearn paper map skills, devise alpha-numeric flash cards for basic visual intra-flight communications, and be innovative in ways to reduce your flight's signature.

-Terrain flight is truly effective in avoiding detection by air defense artillery and fighter aircraft thermal, optical, and radar systems. Identify the EW training facilities available to your unit and make every attempt to use them – frequently. Perfect this skill.

-Deliberate mission planning makes a tremendous difference. Selecting good battle positions and alternate positions, as well as ingress/egress routes during mission planning really matters.

-Our allies are motivated, but don't have the institutional knowledge, combat training center experience, or actual combat experience that we have – that said, both sides can benefit from exchanging tactics, techniques, and procedures.

-The RFI array on the FCR is extremely effective in locating and engaging enemy air defenses. Additionally, the FCR provided aircrews with utterly invaluable situational awareness of where enemy vehicles were and was effective in locating and identifying radar emitters. Be extremely proficient in the use of these tools.

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Acronym Reference

EW - electronic warfare	**NOE** - nap-of-the-earth
FCR - fire control radar	**RFI** - radio frequency interferometer
ISR - intelligence, surveillance, and recconnaissance	**STX** - situational training exercise
JTAC - joint terminal attack controllers	**U.S.** - United States

Aviation's Cultural Change in the Combined Arms Fight

By CPT James "Beau" Robinson

The combined arms team has developed an interesting and multifaceted dependence on aviation. We are a combat multiplier with capabilities to shoot, move, and communicate more efficiently than anything on the ground. Nevertheless, the ground commander's scheme of maneuver rarely incorporates aviation decisively. Instead, the habits of 15 years of counterinsurgency (COIN) operations continue to be the mainstay of the ground commander's application of Army Aviation. We must achieve culture change in the combined arms community to maximize aviation maneuver capabilities as doctrinally intended and prevent aviation assets from becoming a COIN-like reactionary force in a possible future near peer conflict.

Where does aviation fall in the mix of combined arms maneuver? Air-ground operations under unified land operations (ULO) is the simultaneous or synchronized employment of ground forces with aviation maneuver and fires to seize, retain, and exploit the initiative. Army Aviation, with its inherent speed, mobility, and firepower is the optimal organization capable of doing this within the combined arms team. Doctrinally, aviation assets may be thought of as Strykers (UH-60 and CH-47) or Abrams M-1s (AH-64) capable of operating in the third dimension. Tracing Army Aviation's legacy back to Vietnam, air mobility embraced and embodied the modern day air-ground operations ideology. An infantryman could all but predict the specific tail number in which he would ride to and from battle. The aircraft in the division served no other purpose but to move troops and necessary equipment to and from the objective area. The infantryman's sole job was to ride into battle via the helicopter assigned to his unit, seize and retain key terrain, and destroy the enemy at the time and place of his choosing. Army Aviation's recent doctrine and structure evolved in many ways since the 1960s. Technology, the modern day operational environment, cost of aviation, and the general size of the U.S. Army have all lead us to the principles and organizational configuration we know today. We will likely never revert to the ideology reflected in the air mobility concept developed during the Vietnam or Cold War era, but Army Aviation's combined arms focus should closely mirror that philosophy.

September 11, 2016 marks the 15th anniversary of the Global War on Terror (GWOT). Our senior non-commissioned officers, field grade officers, and warrant officers are all products of the GWOT. Since the beginning of the COIN efforts in Iraq and Afghanistan, Army Aviation has been the cornerstone of the success enjoyed by the United States and our allies. Army Aviation demonstrated, again, the capability to be responsive, effective, and indispensable in its assigned tasks. A one-page concept of the operation containing grid, frequency, call sign, and timeline replaced detailed mission planning, integration with the ground unit commander, and "rehearse until you get it right" exercises. Aviation and ground unit personnel completed mission coordination with a phone call. Landing zone (LZ) selection consisted of a barrage of e-mail exchanges between the ground force commander, air mission commander, the aviation final mission approval authority, and any number of other parties within the chain of command until all agreed on the selection. Aeromedical evacuation crews remained in their "ready-up" room, caught off guard, as the execution of a large operation occured without their knowledge. Attack aviation crews arrived on station with ground force scheme of maneuver, grid, frequency, and call sign; they were excited to join the party with limited information because it was easy. Our increase on battlefield technology and the reliance on the "status-quo" replaced the basic mission planning and preparation essentials. These practices significantly reduced time and effort, appeased the aviation customer, and became the easy answer for everyone. With notable exceptions, time after time and mission after mission, this process somehow worked. Why? It worked because we were all professionals seasoned by 15 years of repetition, fighting with superior equipment and technology against an unsophisticated enemy. Will it work in our next conflict? Will it work when our technology is matched by our antagonists?

Current trends show that the ground commander looks at aviation as an enabler — frequently as a 9-1-1 afterthought — rather than as a maneuver force. They rarely integrate aviation assets into the brigade combat team (BCT) scheme of maneuver. In the direct action training environment, the Joint Multinational Readiness Center (JMRC) Falcon Team rarely observes the same success we have observed in the COIN environment. Army Aviation planners should not forget lessons learned from COIN operations in Iraq and Afghanistan because they will continue to be part of decisive action operations; however, old skills from the Cold War era are going to have to be relearned. On a symmetric battlefield against a near peer enemy, the COIN advantages experienced in the past 15 years all but disappear. Maintaining continuous and accurate situational awareness will be a challenge because of the dynamics of the battlefield. Units will be required to move frequently and the comforts and security of fixed based operations will go away. The air defense threat becomes an ominous reality and the familiar call to troops in contact will necessarily go unheeded as mission priorities require massed fires on a major armored offensive initiated by the enemy. Our technological superiority evaporates and we are left to match the enemies' maneuvers with skill and expertise derived from integrated training with our ground partners.

The scenario we most often observe at the JMRC is aviation not integrated decisively into the BCT's fight. The opposing force conducts a decisive and overwhelming attack on the BCT and an immediate 9-1-1 request for attack helicopter support comes in. Usually, one of two results play out. Either the attack crews rush in to save the day, fly into a chaotic firefight, and are killed by enemy air defense systems or small arms fire before they are able to identify friend or foe. In the other scenario, the crews bound towards the last known troop location, use tactical patience to develop the situation, and arrive face-to-face with the enemy after the BCT has been rendered combat ineffective. Aviation and ground mission planners rarely conduct analysis and detailed planning to identify attack helicopter battle positions to thwart an enemy's most likely or most deadly course of action. Seldom do BCTs utilize CH-47 or UH-60s for preplanned resupply or air assault of the reserve. Aviation leaders must train not only their own units but they must train the ground unit leadership on the proper integration and synchronization of Army Aviation well before the fight begins. How do we achieve this culture change in the combined arms community?

Two key elements will change the way aviation fights in future conflicts with our combined arms partners - building trust and establishing a tenacious liaison. Despite the fact that weather and maintenance are elements beyond our control, if we are not where we are supposed to be, when we are supposed to be there, and with the tools we are supposed to show up with, our credibility is indelibly damaged. Weather and maintenance often hinder aviation operations and despite that both are generally beyond our control, when we are unable to deliver our assets as rehearsed, it creates a significant trust deficit. It is essential that every individual within the aviation community do their part to educate their combined arms contacts about limitations associated with these two elements. When the possibility that these factors may affect an operation, aviation leaders must stand up to ensure that the ground commander has made alternative or contingency plans.

Establishing a continuous line of communication with the ground unit is critical. This is accomplished with the aviation unit sacrificing a knowledgeable, articulate, and aggressive liaison officer capable of selling (but not over selling) the unit's capabilities. The liaison officer is an essential link that can make or break the unit's reputation and determine the success or failure of the ground commander's operation.

Army Aviation has worked hard to demonstrate commitment to the Soldiers on the ground in the COIN fight in Iraq and Afghanistan. We are now in transition as the threat defines a significantly more dangerous environment and it is our responsibility to ensure the ground unit leadership and planners understand that the rules have changed. Whether the ground commander knows it or not, and as hard as it will be for us NOT to respond, 9-1-1 calls for troops in contact may no longer be the aviation unit's priority. This change will require Army Aviation to educate the ground unit commander and conduct more detailed planning and coordination with the ground forces we support if we are to survive to ensure the ground unit's success. It will also require a renewed education of aviation tactical skills not practiced since the Cold War training exercises, a knowledge of the ground unit maneuver capabilities, and it will require graduate level knowledge of aircraft survivability systems.

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Acronym Reference

BCT - brigade combat team	**JMRC** - Joint Multinational Readiness Center
COIN - counterinsurgency	**LZ** - landing zone
GWOT - Global War on Terror	**ULO** - unified land operations

Combined Arms Maneuver & Aviation Integration: A Joint Multinational Readiness Center Perspective

By MAJ Beau Rollie

Six decisive action training exercises at the Joint Multinational Readiness Center in Fiscal Year 2015-2016 proved the U.S. Army is re-learning effective air ground operations against near-peer threats. Throughout the learning process, aviation has struggled to establish itself as a fully vested partner on the combined arms team. Aviators experienced challenges at both the aviation task force (AVN TF) and brigade combat team (BCT) echelons. The challenges faced often resulted in aviation losses disproportionate to and exceeding the destruction inflicted upon the enemy. Aviation units are not killing enough enemy for the helicopters we are losing. The exercises in question witnessed 31 total aircraft downed by guided and un-guided weapons (see Figure 1), often without friendly forces achieving a decisive result.

This article will argue that both AVN TF and BCT commands are to blame for deficiencies in their employment of aviation assets. Improvements are required to limit aviation losses and capitalize upon the asymmetric advantages possible through massed usage of rotary-wing aircraft integrated with friendly infantry and armored forces. The primary way to realize the necessary improvements is engagement by aviation key leaders with subordinates in the AVN TF and counterpart key leaders at the BCT and division echelons.

"Combined arms maneuver is the application of the elements of combat power in unified action to defeat enemy ground forces… and to achieve physical, temporal, and psychological advantages over the enemy to seize and exploit the initiative."[1] There are few elements on the battlefield better equipped to achieve physical, temporal, and psychological advantages than Army Aviation. Army Aviation is ideal for exposing enemies to overwhelming combat power from unexpected directions as part of the combined arms maneuver team, but tactical mistakes made by air mission commanders, AVN TF commanders, and BCT commanders are inhibiting Aviation's combat multiplication effect.

At the AVN TF echelon, notable mistakes were made in many operations. Inadequate pre-mission planning by attack helicopter crews often failed to identify adequate numbers or quality of firing positions (FP). Poor and inadequate FP selection does not facilitate optimal

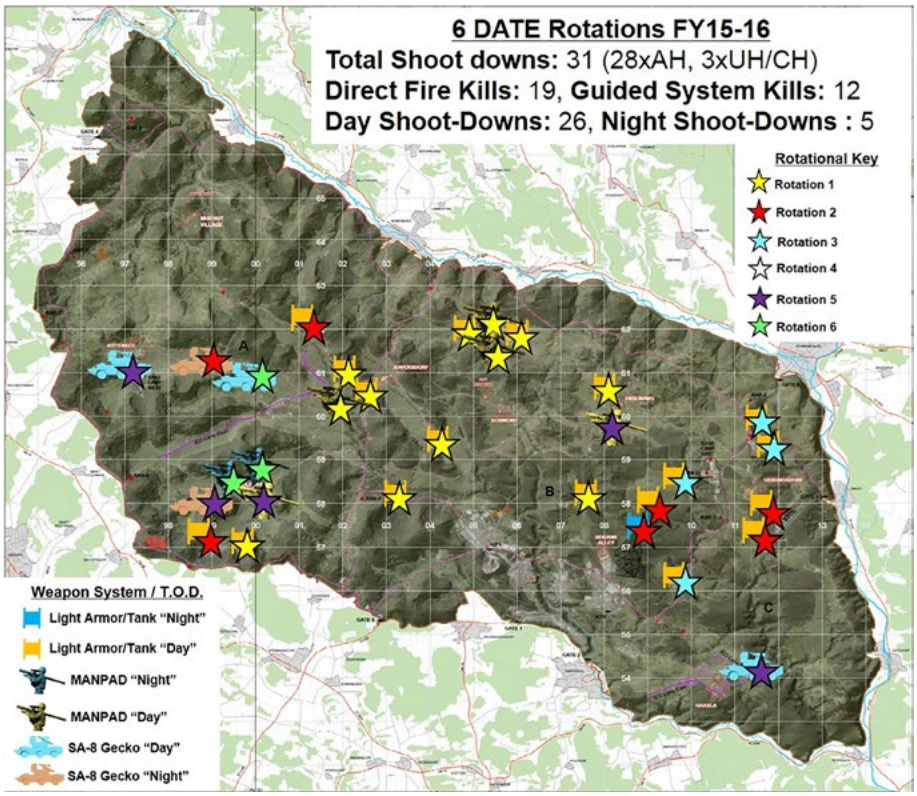

Figure 1.

standoff, target intervisibility, cover, and concealment. Poor position planning translates to attack aircraft being drawn into unanticipated, close quarter fights, thus surrendering inherent range and firepower advantages (resulted in 19 direct fire shoot-downs, see Figure 1). Faced with unsuitable pre-planned FPs, attack helicopter crews maneuvered to hasty FPs, often utilizing un-planned air routes.

Secondly, poor air route planning was responsible for many of the 31 shoot-downs. Lack of experience at deliberate air route planning and lack-luster ground maneuver integration forced the use of hastily selected or poorly planned air routes. Consequences included pilots who consistently flew through ground mobility corridors that should have been recognizable as high speed avenues of approach on BCT products such as a modified combined obstacles overlay. About half of the recorded shoot-downs occurred in enemy observed or guarded mobility corridors. These losses are especially distressing because we are not planning or applying other members of the combined arms team to mitigate risk to aircraft.

The third problem, a lack of integrated planning concerning unmanned aircraft systems (UAS) for manned-unmanned teaming (MUM-T) and suppression of enemy air defense (SEAD) missions contributes to poor aircraft survivability rates. A simple air-route reconnaissance by UAS with dedicated SEAD missions prior to landing zone (LZ) insertions are ways to mitigate tactical risk to aircraft. By failing to identify, suppress, and/or destroy enemy air defense artillery and direct fire threats near air routes, LZs, and FPs, the risk to aircraft was significantly increased. By failing to conduct detailed planning regarding air routes and FPs, we aviators are shooting ourselves in the proverbial foot by hindering our own effectiveness. We are, however, not the only ones failing to address tactical risks to aircraft. Our higher echelons bear responsibility as well.

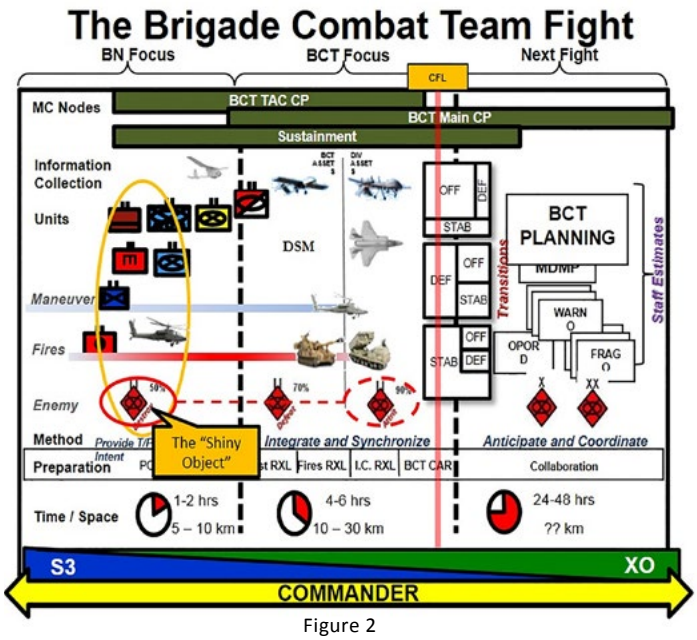

Figure 2

At the BCT and division levels, aviation assets are often planned and used in a reactionary way to address "shiny objects" (see Figure 2) including troops-in-contact. Attack and lift aircraft are often left in reserve as quick reaction forces to react to enemy actions, thereby relegating the most maneuverable assets the U.S. Army possesses to a reactionary role. Attack helicopter employment is usually planned in a fashion similar to close air support or fire missions and is not integrated into ground schemes as a maneuver asset. The BCT planners rarely maximize aerial maneuver capability of Army Aviation assault assets. Instead, planning air assault insertions is typically conducted at the company or smaller sized echelons which rarely produce decisive results. Lastly, aviation employment that is not integrated into the ground maneuver plan results in poor aircrew situational awareness regarding friendly positions and enemy maneuver leading to increased fratricide risk and greater incidence of aircraft shoot-downs.

The best way to overcome these common aviation employment problems is through Army Aviation leader engagement at the AVN TF, BCT, and division levels. The AVN TF commander needs to enforce better deliberate planning of air routes and FPs and include MUM-T and SEAD mission integration to increase aircraft survivability. The AVN TF and combat aviation brigade commanders must advocate aviation maneuver integration at the BCT and division levels with a focus on massing aircraft for decisive operations. Leader advocacy should also focus on facilitating the paradigm shift regarding Army perception of helicopters as enablers instead of maneuver elements. If the ground commander planned to use attack, utility, and cargo helicopters in a fashion similar to tanks and armored personnel carriers respectively, maneuver integration would increase. Aviation operations are inherently offensive[2] and if aviation leaders plan for and advocate helicopter usage to make the enemy react to us, we will limit aviation losses and achieve decisive results.

1 United States Department of the Army, *Operations*, Army Doctrine Publication 3-0 (Washington D.C.: U.S. Department of the Army, September 13, 2016),
2 United States Department of the Army, *Aviation Tactical Employment*, Army Techniques Publication 3-04.1 (Washington D.C.: U.S. Department of the Army, April 2016), xiii

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Acronym Reference

AVN TF - aviation task force	**LZ** - landing zone
BCT - brigade combat team	**MUM-T** - manned-unmanned teaming
FP - firing position	**SEAD** - suppression of enemy air defense
JMRC - Joint Multinational Readiness Center	**UAS** - unmanned aircraft system

ARB Support to the JAM-GC

By MAJ Tom McCarthy

"We must think anew, act anew. We must disenthrall ourselves from the past and then we shall save our country."[1]
-Abraham Lincoln

In 2009, the United States released the Air-Sea Battle Concept to counter the rising anti-access/area denial (A2/AD) threat posed by potential global competitors.[2] Despite the joint and multi-domain approach to counter A2/AD put forth in the concept, in practice, it led to a predominantly Naval and Air Force solution. The maritime nature of the United States Pacific Command (PACOM) area of responsibility, the intuitive evolution of AirLand Battle to contend with a maritime power, and the U.S. Army's preoccupation with wars in Iraq and Afghanistan led to the almost complete exclusion of land forces from the concept. In 2015, the Department of Defense leadership recognized the risk assumed due to this self-imposed limitation, ordered a revision to the concept, and renamed it the Joint Concept for Access and Maneuver in the Global Commons (JAM-GC). This revision to Air-Sea Battle Concept provides an excellent opportunity for new and creative approaches to the A2/AD challenge that incorporate the broad range of capabilities of Army Aviation within the joint force.

Army Aviation attack/reconnaissance assets provide capabilities that enable the cross-domain synergy that is foundational to JAM-GC and allows the joint force commander to present the enemy with multiple dilemmas to effectively achieve operational and strategic objectives. To properly discuss Army Aviation's role in JAM-GC, the discussion is broken down into six subtopics.

1. The strategy adopted by the People's Republic of China (PRC) will be used for this analysis to clearly frame the problem in the context of a near-peer competitor that currently presents the most complex A2/AD challenge.
2. The hierarchy of concepts encompassed by the overarching Joint Operational Access Concept (JOAC) in order to provide doctrinal context for this discussion.
3. The capabilities of Army Aviation attack/reconnaissance assets will be explored to provide background from which to assess the feasibility of employment.
4. A capability analysis and historical case studies will demonstrate Army Aviation capabilities that can support the JAM-GC concept.
5. To test the robustness of this thesis, the most likely counterargument that Army Aviation would simply duplicate capabilities already provided by the United States Marine Corps (USMC) and Naval Aviation is examined.
6. Finally, in closing, I will offer recommendations to Joint and Army planners for Army Aviation participation as the JAM-GC is developed and refined.

Anti-Access / Area Denial

Anti-access/area denial is a multilayered strategy consisting of two distinct but complementary efforts with the goal of preventing the United States from achieving its operational and strategic objectives. The anti-access effort "refers to those actions and capabilities, usually long range, designed to prevent an opposing force from entering an operational area."[3] The area denial effort "refers to those actions and capabilities, usually of shorter range, designed not to keep an opposing force out, but to limit its freedom of action within the operational area."[4] A broad spectrum of potential American adversaries, from non-state actors to near-peer competitors, have adopted some form of this strategy.[5] The gamut of A2/AD threats around the globe prohibit a one size fits all answer but the conclusions and recommendations drawn from the PRC threat can be scaled, refined, or serve as a starting point for further analysis against the spectrum of potential adversaries.

Two key capabilities that the PRC has developed to achieve an anti-access effort are long range precision strike and counter space weapons. Medium and intermediate range ballistic missiles (MRBM/IRBM), land attack cruise missiles (LACM), and anti-ship cruise missiles (ASCM) provide the bulk of the PRCs long-range precision strike capability. Reference the map on the following page for a graphical depiction of ranges. Chinese submarines and fighter/strike aircraft can extend the range of

LACM/ASCMs out to an estimated 2,100 nautical miles (nm). [6]

The Chinese have developed counter space capabilities and have tested anti-satellite missiles and, potentially, an anti-satellite satellite.[7] These technologies threaten the American Global Positioning System (GPS) and other systems reliant on the GPS such as communications, beyond line of sight, and unmanned aircraft system (UAS) operations.

To achieve the area denial effort, the PRC has developed a robust integrated air and missile defense system (IADS); precision guided rockets, artillery, missiles, and mortars (G-RAMM); and a large fleet of fast attack missile boats. The IADS extends out to 300 nautical miles (nm) from the Chinese coast and consists of early warning systems, fighter aircraft, and several surface-to-air missile (SAM) systems.[8] The PRC air defense artillery systems span the spectrum from the upgraded S-400 system with an effective range out to 200 nm[9] to the QW-1 family of man portable air defense systems with ranges out to 5 kilometers (km).[10] The PRC's current fourth generation fighters have a combat radius up to 750 nm and in development stealthy fifth-generation fighters could extend that range out to 1,000 nm.[11] China's KJ-2000 and KJ-500 early warning aircraft provide a "detection range well beyond [China's] borders."[12]

The PRC currently fields over 1,200 short range ballistic missiles with ranges less than 1,000 km, multiple rocket launchers with ranges out to 220 km, and over 7,900 artillery pieces with varying degrees of precision munition capability.[13]

The PRC's fast attack boat fleet comprises approximately 86 vessels, most of which are the Houbei-class missile boat, supplemented by 20 of the new and larger Jiangdao-class corvettes.[14] The majority of fast attack missile boats and all of the Jiangdao-class corvettes armament include ASCMs and SAMs.[15]

Doctrine and Capabilities

The JOAC is the overarching concept for addressing operational access in the context of the future operating environment defined by the Capstone Concept for Joint Operations.[16] The concept addresses how the U.S. will achieve operational access, defined as "the ability to project military force into an operational area with sufficient freedom of action to accomplish the mission."[17] It is a warfighting concept that addresses opposed access against multi-domain A2/AD challenges. Fundamental to the JOAC is the requirement for a greater level of integration across services at lower echelons than the joint force has operated at in the past. This central idea is termed cross-domain synergy and defined as the "complementary vice merely additive employment of capabilities in different domains such that each enhances the effectiveness and compensates for the vulnerabilities of the others—to establish superiority in some combination of domains that will provide the freedom of action required by the mission."[18] Underneath this broad concept for how the joint force will achieve operational access are eleven operational access precepts. The following five precepts are most relevant to the analysis:

- **Consider a variety of basing options.**
- **Seize the initiative by deploying and operating on multiple, independent lines of operations (LOO).**
- **Exploit advantages in one or more domains to disrupt enemy A2/AD capabilities in others.**
- **Disrupt enemy reconnaissance and surveillance efforts while protecting friendly efforts.**
- **Create pockets or corridors of local domain superiority to penetrate the enemy's defenses and maintain them as required to accomplish the mission.**[19]

Nested within this overarching JOAC are supporting concepts that deal with more

specific facets of overcoming the broad spectrum of A2/AD challenges. The Joint Concept for Entry Operations and JAM-GC are examples of two of these nested concepts. This outline provides the doctrinal framework for the following analysis.

Army Aviation Attack/Reconnaissance Assets in the JAM-GC

The JOAC breaks down gaining and maintaining operational access into two inextricably linked tasks: the combat task of overcoming the enemies A2/AD capability through the employment of combat power and the logistical task of the movement and support of that combat power.[20] Basing is critical to the logistical task of supporting combat power in the JAM-GC concept. Against the Chinese A2/AD threat, large mature land bases are at risk and the distances from these established bases to the objective area would be prohibitive for helicopter operations. There are several sea basing options for the AH-64D/E that would enable the movement required to extend the operational reach of Army Aviation and provide the logistical support necessary to sustain combat operations. To conduct maintenance in support of long duration operations, an Apache unit would require the maintenance capabilities found on larger ships such as amphibious assault ships, aircraft carriers, and potentially the Navy's mobile landing platform ship. Army Aviation units have proofed this concept and successfully trained and operated from most of these platforms for short durations, participating in major maritime training exercises such as the Rim of the Pacific Exercise.[21] As the situation permits, Apaches can also use traditional forward land basing options.

To further extend the operational reach and station time of the Apache, the Army relies upon forward arming and refueling points (FARP). In the maritime domain, smaller ships such as cruisers and destroyer could serve as FARPs. This construct would allow the larger, more vulnerable ships to maintain standoff from threat weapon systems while the smaller, less vulnerable surface combatants provide FARPs closer to the operational area. Alternatively, the aircraft could use conventional land-based FARPs such as the forward area refueling equipment system delivered by CH-47s or established facilities at tactical assembly areas, forward operating bases, or captured airfields.

While conducting its combat tasks, Army Aviation is dependent upon the precepts of JOAC and the cross-domain synergy achieved through support from multiple capabilities within all the services. Army aviation operations will be reliant upon and integrated into joint suppression of enemy air defenses (JSEAD), counter early warning, electronic warfare/jamming, and counter air operations.

The limiting factor for Army Aviation operations is crossing the vast ocean distances to reach the PRC's territory. Since PRC anti-access weapons systems put the joint force at risk well outside the range of Army Aviation, creating initial pockets or corridors of access to get within the operational range of the AH-64 will be a joint effort. Army Aviation can support the joint force in defeating and disrupting PRC anti-access capability once limited access is established through the use of traditional attack, reconnaissance, and security in support of land forces conducting raids or interdiction attacks; intelligence, surveillance, and reconnaissance (ISR) in support of joint targeting and maneuver; and the destruction of early warning systems and mobile missile launchers.

A traditional use of Army Aviation would be conducting reconnaissance, security, and attack operations in support of Special Operations Forces (SOF) or conventional forces conducting land counter A2/AD operations. History has shown from World War II to the landings at Inchon that major amphibious operation will include Army forces alongside the USMC. Army Aviation may be the correct choice to provide support if Army forces are used ashore because of their habitual direct support relationship.

The long-range precision strike capability of the PRC is dependent upon accurate ISR to provide targeting data. The PRC's mobile missile launchers also add complexity to the joint force's targeting challenge. The AH-64D/E can conduct reconnaissance to acquire mobile launchers and early warning systems to provide targeting data for other platforms, destroy them with organic fires, or enable the joint force to bypass the threat. The AH-64D/E provides several unique capabilities distinct from fixed-wing aircraft. Their maneuverability and ability to fly nap-of-the-earth allow them to mask behind terrain and utilize cover and concealment increasing survivability and complicating detection. Their proximity to the ground and ability to hover enables them to observe under some forms of overhead cover and concealment and acquire targets and indicators that fixed wing aircraft would be unable to perform due to altitude and airspeed. The AH-64's fire control radar

and radio frequency interferometer can provide detailed ISR of the battlefield. The Apache also provides a different type of persistence in the objective area than other platforms. Based upon the threat, availability and security of holding areas and tactical assembly areas, and the availability of FARPs, helicopters may be able to provide greater persistence closer to the objective area. Another consideration for planners when trying to achieve cross-domain synergy is weaponeering. In a high-intensity conflict, precision munitions will be a precious commodity and should be reserved for targets that are difficult to close with. At varying levels of risk, the same levels of precision and target effects is achievable with Army Aviation assets. Using the right platform and the right munition against the right target will vastly improve combat power and effectiveness.

In the event the PRC degrades GPS satellites, the Apache can laser designate for organic weapons to destroy targets thereby mitigating some risk from the loss of satellite guidance. Planners should expect improbable UAS operations beyond line-of-sight (LOS) if space assets are degraded or the electromagnetic spectrum contested. In such circumstances, level of interoperability (LOI) 4* control from the Apache would extend the operational reach of UAS beyond LOS of the UAS ground control stations, significantly increasing their effectiveness.

The AH-64D/E provides capabilities for the detection and destruction of mobile launch and early warning systems that complement other platforms and methods. The cross-domain synergy achieved forces the enemy to either spread its resources and defend against multiple threats or assume risk in a given domain. As disruption and destruction challenges the enemy's focus, more joint force assets will be able to gain access to the operational area compounding the problem for the enemy.

Task Force Normandy and the opening shots of Operation Desert Storm is an excellent historical case study of AH-64s operating within a cross-domain framework against an A2/AD capability. Joint planners determined that the Apache's armament, radar-evading nap-of-the-earth flight profile, and ability

to confirm battle damage assessment provided the best option to destroy the Iraqi radar.[22] Teamed with Air Force CH-53s for navigation, Task Force Normandy Apaches, modified with external fuel tanks to achieve the required range of over 700 nautical miles, destroyed the radar systems to open an air corridor for coalition air forces to conduct strikes against the Iraqi command and control infrastructure.[23] The success of this mission enabled the coalition air campaign that devastated Iraqi forces. This vignette provides an excellent example of creative and successful cross-domain synergy to achieve an operational objective.

The general concepts for operations against PRC G-RAMM and IADS would be similar to that of countering mobile missile launchers and early warning radars. The additional capability that the Apache would provide the joint force against the PRC area denial threat is protection from the PRC's fast attack missile boats. The Apache has demonstrated success in acquiring and destroying fast attack boats and operating against their infrared and radar SAM systems.[24] The Apache's sensors, survivability systems, armament, and most importantly, maneuverability, make it an excellent platform for acquiring and destroying small fast attack missile boats at standoff ranges from U.S. Naval surface combatants. Again, in the vein of cross-domain synergy, assuming this mission with the Apache would free up other joint force platforms to conduct mission sets more appropriate to their respective strengths.

As with any military concept, it is important to understand the risk that planners assume when utilizing Army Aviation attack/reconnaissance assets in the JAM-GC concept. The most catastrophic risk to the mission is that Army or AH-64D/E stakeholders attempt to make the mission fit the Apache rather than select the correct platform for the mission. This reasoning is antithetical to cross-domain synergy and becomes more likely when constrained resources breed inter-service rivalry and the perceived or real requirements to justify expensive platforms. As discussed earlier, the Apache is one platform among many that provide complementary and supporting capabilities when utilized within a cross-domain synergy framework in a fluid operating environment against an evolving threat. When used in isolation or used in the wrong mission sets, the outcome can be catastrophic. The 2003 Battle of An Najaf during Operation Iraqi Freedom provides a glaring example of this. Poor planning, ISR, SEAD, and integration with joint enablers, led to mission failure and for a time cast the future of Army Aviation into doubt.[25]

The most catastrophic threat to the force under this concept is the isolation of Army AH-64D/Es tasked against the anti-access threat. Penetrations of the A2/AD defenses place assets at risk of operating beyond their support structure. If AH-64D/Es are isolated from their logistics support they will become not mission capable due to fuel, armament, and maintenance requirements. The Apache's survivability will also be at risk if isolated from the joint enablers that provide the cross-domain synergy.

Counterargument

The most obvious counterargument against utilizing Apaches in the JAM-GC concept is that Naval and USMC Aviation, particularly the AH-1Z Viper attack helicopter, already provide these capabilities. Naysayers would argue that

* LOI 4 - Control of UAS flight path and payloads

the decision to incorporate Apaches stems from an inter-service rivalry to be included in the Department of Defense's Pacific Pivot rather than from a valid operational need. However, the Apache provides many unique capabilities and has vastly different sensor, targeting, armament, performance, and survivability characteristics than the Viper. Second, one of the precepts of JOAC is the ability to operate along concurrent LOOs. Incorporating Apaches with the cross-domain synergy approach provides more combat power to the joint force and enables multiple LOOs across a larger area. In a resource-constrained environment, the aviation assets available to the joint force are finite and to underutilize any would cause the joint force to assume unnecessary risk.

Conclusion and Recommendations

The employment of Army Aviation attack/reconnaissance assets in the JAM-GC concept enables cross-domain synergy that greatly increases the combat power of the joint force against the A2/AD challenge posed by nations such as the PRC. New and creative thinking will provide the joint force with additional options and capabilities while at the same time adding complexity to the dilemmas faced by the enemy. This analysis provides examples, insights, and frameworks for the employment of Army Aviation attack/reconnaissance assets and its inclusion in the broad JAM-GC. These will need further analysis and refinement by operational planners to meet the demands of an evolving and wide-ranging threat and operating environment.

Two recommendations can be drawn from this analysis. First, joint planners should include United States Army Aviation attack/reconnaissance assets in the JAM-GC. This guidance will drive the doctrinal framework that will enable the Army to create new or amend existing mission essential, collective, and individual tasks in support of the concept. In turn, this will drive the training and resourcing of combat aviation brigades (CAB) regionally aligned with the PACOM. Army Aviation lacks the institutional experience associated with maritime operations and there will be inherent doctrinal, training, and materiel friction, some of which can only be resolved through experience and repetition. The Army must resource these CABs to conduct maritime operations training and their training cycles synchronized with naval units and exercises.

Second, Army Aviation attack/reconnaissance company and troop headquarters are not manned for independent operations. They rely heavily on the battalion/squadron's primary and special staff for planning long-duration operations. Army Aviation leadership should consider staffing the company and troop headquarters to provide this lower echelon with the organic capacity to operate independent from the parent headquarters as part of a joint team across a large operational area to better achieve cross-domain synergy.

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Acronym Reference

A2/AD - anti-access/area denial
ASB - aviation support battalion
ASCM - anti-ship cruise missile
CAB - combat aviation brigade
FARP - forward arming and refueling point
GPS - Global Positioning System
G-RAMM - guided rockets, artillery, missiles, and mortars
ISR - intelligence, surveillance, & reconnaissance
JAM-GC - Joint Concept for Access and Maneuver in the Global Commons
JOAC - Joint Operational Access Concept
JSEAD - joint suppression of enemy air defenses
LACM - land attack cruise missile
LOO - lines of operation
LOI - level of interoperability
LOS - line-of-sight
MRBM/IRBM - medium and intermediate range ballistic missiles
NM - nautical miles
PACOM - Pacific Command
PRC - People's Republic of China
SAM - surface-to-air missile
SOF - Special Operations Forces
UAS - unmanned aircraft system
USMC - United States Marine Corps

What's Old ... Is New Again:

Multi-Functional Aviation Decisive Action Training Environment

By MAJ Jamie R. LaValley,
MAJ Brian Silva, and
CPT Fredrick Heitjan

An AH-64E lifts from the tactical assembly area for a night live fire iteration.

Upon redeploying from Operation Enduring Freedom in November 2014, 1-229th Attack Reconnaissance Battalion (ARB), 16th Combat Aviation Brigade (CAB) received an order to prepare to assume the I Corps Contingency Response Force (CRF) mission beginning in October 2015. The CRF mission requires the 1-229th ARB Tigersharks to operate in a decisive action (DA) fight under expeditionary conditions from land or sea. Because 16th CAB is aligned with the Pacific Command (PACOM) area of responsibility (AOR), the Brigade is focused on training to overcome the unique challenges of fighting, communicating, maintaining, and sustaining on or near water and in close proximity to a near-peer competitor.

This alignment presents an entirely different set of challenges for an aviation organization that has trained to succeed in Afghanistan and Iraq. In response to this "new" problem-set, the 1-229th ARB developed a rigorous, nine-month training plan that would ensure the unit was ready to adopt the CRF mission at the beginning of Fiscal Year 2016 while remaining nested within 7th Infantry Division's (ID) overall training strategy, referred to as the Integrated Training Strategy (ITS), and remain a global responsive unit. The 1-229th ARB plans and trains alongside each of the 7th ID's major subordinate commands utilizing an expanded crawl, walk, run methodology. By planning and executing training events corresponding with the seven gates of the ITS, 16th CAB ensures it will be mission-ready and fully-integrated with all of the 7th ID's units.

The 1-229th ARB leadership immediately identified three key tactical objectives for succeeding as the CRF in the PACOM AOR. These were: maneuver the AH-64E against sophisticated air defense (AD) threats, counter or destroy AD threats, and fight through to accomplish the mission. The unit recognized that it was not proficient at these tasks and leveraged the combined experience and knowledge of the officers, warrant officers, and non-commissioned officers to develop a training plan to educate all pilots and Soldiers to a collective base level of knowledge in the decisive action training environment.

ITS Gates 1-3: Decisive Action Training Program of Instruction

The first phase of the ITS (Gates 1-3) involved training company and staff aviators during a three-week DA program of instruction (POI) led by a cadre of trainers from the battalion and companies including the battalion master gunner and battalion aviation mission survivability officer and an instructor pilot from each company. The DA-POI consisted of one week of academics each on radar frequency threats; AH-64E aircraft survivability equipment/electronic warfare (ASE/EW) capabilities; and tactics, techniques, and procedures (TTP) to defeat a myriad of weapon systems, EW platforms, and other theater-specific threats common to the PACOM AOR.

The DA-POI instructors directed academic training towards the selection and pairing of combat crews into two-aircraft teams while maximizing the effectiveness of organic systems to defeat enemy AD assets. The Attack Weapons Team, has been the workhorse of AH-64 support of ground forces throughout the Global War on Terror. The DA-POI maintains the flexibility of a two-aircraft section in a hybrid threat/anti-access/area denial (A2/AD) environment but the training can be scaled in order to facilitate multiple sections, platoon, company or battalion-sized elements as mission requires. Ultimately, the goal is to train air mission commanders (AMC) to retain their section's freedom of maneuver and survivability in contested airspace.

The DA-POI enabled staff and company pilots to plan and execute missions against near-peer competitors. Trainers introduced company commanders and AMCs to the advanced AD and EW threats intrinsic to the CRF mission, the planning complexity of multi-section events, and the increased mission command challenge therein. Furthermore, pilots honed their individual skills to outmaneuver and defeat AD threats during simulated and live flights. Finally, to prepare for the likely scenario of a CRF company planning and executing missions independent of an aviation battalion or brigade staff, the training curriculum included lessons and exercises on company planning cell organization. At the end of the instruction, battalion instructors designed culminating training scenarios which forced air crews to synchronize attacks in task, purpose, and time in order to achieve maximum destruction

against an array of targets without the aid of a robust aviation staff.

For many pilots, these exercises were their first exposure of their careers to DA threats and company planning cells. For the more senior aviators, the DA-POI was their first departure from the counterinsurgency (COIN) method of planning and conducting operations since the beginning of Operation Iraqi Freedom and Operation Enduring Freedom. In both cases, the DA-POI prepared staff, commanders, and aviators to plan and operate in the PACOM AOR against capable, well-equipped adversaries.

ITS Gates 4-5: Operation Arrowhead Hammer II

After completing the DA-POI, the battalion reorganized as a multifunctional aviation task force and deployed to Yakima Training Center (YTC) for Operation Arrowhead Hammer II (AH2). This exercise was a 3-2nd Stryker Brigade Combat Team (SBCT) training event focused on DA operations in preparation for their upcoming National Training Center (NTC) rotation. Task Force Tigershark was headquartered by Headquarters Company/1-229th ARB with operations and logistics staff support from the 2-158th Assault Helicopter Battalion (AHB) and 46th Aviation Support Battalion. The resulting battalion training plan blended expeditionary aviation operations and mission command, air assault, air resupply, and attack reconnaissance operations into 3-2nd SBCT's overall training scheme. Task Force Tigershark was constantly manned by a rotation of 200 personnel, 62 vehicles, numerous aircraft maintenance shops, 6 UH-60M, and 5 AH-64E from every line and support company in 16th CAB.

Task Force Tigershark conducted all of its ground and air operations from a tactical assembly area (TAA) on Silica Drop Zone at YTC. Tactical Assembly Area Silica was co-located with the 296th Brigade Support Battalion in the 3-2nd SBCT Brigade Support Area (BSA). TF Tigershark's tactical planning and arrival at YTC simulated the introduction of the aviation task force into combat operations after 3-2nd SBCT had already expanded a lodgment following initial entry into theater. Task Force Tigershark and 3-2nd SBCT shared local Class I, III, V, and VII* logistics support requirements. Any additional support arrived from the notional aerial point of debarkation, Joint Base Lewis-McChord.

The 3-2nd SBCT tasked TF Tigershark with support for three lanes that included company attack (offense), company defense (defense), and air assault and high value individual targeting (security). The AH-64E companies planned and participated in the company attack and security lanes while the UH-60M companies planned and participated in the defense and security lanes. The 3-2nd SBCT and TF Tigershark maneuvered against a live, hybrid-threat opposing force (OPFOR) from the 2-2nd SBCT in each lane. The company attack and defense lanes simulated a decisive action threat, while the security lane resembled a familiar, albeit more technologically and tactically-advanced, COIN threat.

Each line company from the 1-229th ARB and the 2-158thAHB completed three iterations of their respective lanes with infantry companies from each of the 3-2nd SBCT's battalions. Each rotation lasted 10 days, with a "day zero" administrative and setup day followed by three consecutive three-day operational rotations. Company footprints included tents, generators, heaters, and other basic life support equipment that had not been used regularly in over a year.

Task Force leadership encouraged each aviation company to be fully-integrated with their infantry company's mission planning and rehearsals. In addition to conducting troop leading procedures, the partnered units used these planning days to gain a shared understanding of the capabilities and limitations of each unit's organic equipment. For example, aviators rode along in Strykers during the company attack and defense mission rehearsals while infantrymen sat in the front seats of the AH-64E and UH-60M helicopters to see the pilots' and gunners' battlefield perspectives and optics capabilities. In addition to achieving the pre-determined training objectives, the collaborative, company-level planning process enhanced the habitual relationship, camaraderie, and familiarity between the Soldiers and leaders of the 16th CAB and the 3-2nd SBCT.

AH-64Es in the forward arming and refueling point at Tactical Assembly Area Silica receive fuel from 46th Aviation Support Battalion.

Although companies from the 3-2nd SBCT conducted each lane one time, the aviation companies had three full iterations of each of their lanes as they supported each company. In order to maximize the training value of these iterations and encourage each company to employ their TTP from the DA-POI, each of the AH-64E and UH-60M missions became progressively

* Class I - rations; Class III - petroleum, oils, and lubricants; Class V - ammunition; Class VII - medical supplies.

more complex. While the actual OPFOR situation did not change for the infantry companies, TF Tigershark introduced sophisticated radar AD threats, heavily armored ground opposition, and more intricate enemy TTP on each objective. Crews integrated intelligence briefs, brigade unmanned aircraft system reconnaissance resources, and aviation mission planning system tools to generate requests for information and multiple courses of action. By the third iteration of each lane, AH-64E and UH-60M crews were flying masked routes based on threat restricted intervisibility (IV) plots, implementing joint fires platforms to suppress enemy AD threats, and ultimately outmaneuvering, engaging, or destroying their objectives prior to supporting the infantry companies as they executed their lanes.

One of the highlights of these missions was AH-64E deliberate engagement area (EA) development to defeat an overpowering armored and mechanized threat. Air crews utilized suppression of enemy air defense, tactical emplacement of direct fires, and single and two-ship maneuvers to shape a three-dimensional battlefield in its favor. Operation Arrowhead II was the first time Tigershark aviators had encountered or trained EA development in over a decade. The battalion-generated enemy threat forced even the most senior aviators to rethink how they would approach a complex, mature enemy threat. As each interation progressed, aviator and staff proficiency in the DA mission set rose to meet the new challenges. Recording and implementing the lessons learned from each mission's after action review (AAR) is critical to the brigade's success in future exercises and operations as the I Corps CRF.

A/5-20 Commander gives his commanders intent to his company and AH-64E aviators from A/1-229 ARB.

Lessons Learned - Integration with Ground Forces

Operation AH2 was the most extensive integration between conventional air and ground assets in the 16th CAB and 7th ID's histories. The close collaboration between aviation and ground planners inspired unique training opportunities for the 3-2nd SBCT, 16th CAB, and mission-enablers participating in the operation. Because neither the 3-2nd SBCT nor 16th CAB had ever participated in a similar training exercise, each iteration of the lanes generated numerous AAR comments and lessons learned. Many lessons were learned during the 30 day rotation, such as the importance of airspace deconfliction, but, the most distinct lesson each company encountered was in planning and executing mutually supportive fires and maneuver.

An AH-64E lands at an AAR site after completing a dry fire attack mission.

Even disregarding differences in unit TTP, ground and aviation maneuver leaders entered the exercise without a clear understanding of each unit's capabilities, limitations, and doctrinal role in a DA fight. Side-by-side planning ensured air and ground assets understood each others' capabilities and roles and positively altered unit TTP. For example, without aviation assets, Stryker units opposing an armored threat would approach an

IV line, dismount troops with anti-tank weaponry to scout forward, remount their Strykers and proceed to the next IV line. AH-64E crews ensured their advanced optics and weapons payload were leveraged on the attack lane to scout beyond ground force IV lines and neutralize mounted and dismounted enemy threats. Ground forces effected the battlefield by suppressing and destroying enemy AD threats during forward movement. The result was the ground force commander dismounted troops less often and neutralized his objective with greater efficiency and fewer casualties. Similarly, aviation assets had greater freedom of maneuver and aviators were able to maximize the use of their airframe. On the defense lane, UH-60M crews were able to deliver dismounted troops forward of enemy lines to exploit weaknesses beyond the forward line of troops. In turn, the ground force commanders maneuvered their forces to destroy AD threats and secured the airspace for UH-60M and AH-64E helicopters to loiter, provide resupply, or screen enemy avenues of approach. This increased shared understanding between combat arms leaders was essential to planning and executing missions to defeat a near-peer competitor.

View from a 2/3 Stryker from a 1-229th downed aviation recovery team Soldier.

ITS GATE 6: ASE Lanes & Gunnery

In October of 2015, 1-229th ARB deployed to the Idaho Army National Guard's Orchard Combat Training Center (OCTC) to conduct the unit's first ever aerial gunnery aligned with standards established in the Army Aviation Gunnery manual. This gunnery, combined with training missions against live radar emitters on an electronic warfare range at nearby Mountain Home Air Force Base, served as the battalion's culminating training event prior to deploying to the NTC in early 2016.

During this training event, air crews completed basic and advanced aerial gunnery tables ranging from individual aircraft through platoon-level missions with battalion mission command. Simultaneously, companies not executing gunnery tables planned, rehearsed, and executed attack missions against a theater ballistic missile (TBM) site protected by an integrated AD network. Crews again adopted the crawl-walk-run methodology in fighting these live systems by going through academics on radar threats and specific defeat techniques from the battalion aviation mission survivability officer and the 1-2nd SBCT Brigade Aviation Officer. Next, crews flew single- or two-ship missions to gain familiarity with in-cockpit indications and specific avoidance TTPs. Finally, upon receipt of mission orders from the battalion headquarters, the company planned, briefed, and executed platoon-level (four AH-64E) attacks not in close proximity to ground forces in order to destroy the TBMs while countering the AD threat. Each company developed different methods to counter the AD network protecting the missiles, but proficiency in company-level mission planning and execution, as well as execution of mission command at company and battalion headquarters rose visibly throughout the training exercise.

As a culmination of the battalion's training in Idaho, each company planned and executed a platoon-plus sized Gunnery Table 12 at the OCTC. This mission again required an attack not in close proximity to ground forces and stressed airborne mission

command by integrating a ZSU-23-4 live emitter adjacent to the gunnery range. Crews were forced to call for fire from air and ground systems to defeat this threat before being able to maneuver against the armor column they were sent to destroy.

ITS GATE 7: NTC 16-04 (DA)

While the 1-229th ARB was ultimately relieved of its CRF requirement, the battalion turned its focus to an upcoming DA rotation at the NTC. After completing staff-oriented training at the Leader Training Program and further training and rehearsals at home station, the battalion deployed to "Atropia" as a maneuver task force alongside elements from 3rd Cavalry Regiment (3CR). The battalion task force fought against a hybrid / neer-peer motorized infantry threat, and regularly accounted for the majority of the regiment's assessed battle damage. The task force successfully executed requirements from 3CR to provide attack, reconnaissance, security, and sustainment operations in zone while also executing out-of-sector attacks assigned by 3CR's higher headquarters, the 28th Infantry Division.

A simulated Fallen Angel (UH-1) is recovered off of the objective by a combined 2/3 Infantry and 1-229th ARB DART team.

This dual role for the task force highlighted a unique requirement emerging in Army Aviation – to be able to operate as a maneuver element for one or multiple units, while also serving higher echelons in a more traditional fire support role. As Army Aviation continues to redefine its role on today's battlefield, leaders at battalion and brigade levels must reinforce our ability to shape deep, while also providing close effects for the ground commander. By focusing on a gated training strategy which links crew qualification to company and battalion collective task proficiency, we will deliver the best possible support not only to companies and platoons in contact, but also provide necessary responsiveness at the operational level.

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Acronym Reference

3CR - 3rd Cavalry Regiment
A2/AD - anti-access/area denial
AAR - after action review
AD - air defense
AH2 - Operation Arrowhead Hammer II
AHB - assault helicopter battalion
AMC - air mission commander
AOR - area of responsibility
ARB - attack reconnaissance battalion
ASE - aircraft survivability equipment
BSA - brigade support area
CAB - combat aviation brigade
COIN - counterinsurgency
CRF - contingency response force
DA - decisive action
EA - engagement area
EW - electronic warfare
ID - infantry division
IV - intervisibility
ITS - integrated training strategy
NTC - National Training Center
OCTC - Orchard Combat Training Center
OPFOR - opposing force
PACOM - Pacific Command
POI - program of instruction
SBCT - Stryker brigade combat team
TAA - tactical assembly area
TBM - theater ballistic missile
TF - task force
TTP - tactics, techniques, and procedures
YTC - Yakima Training Center

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Warfighter 6

Major General Dave Robinson

Fighting Army Aviation At The Tactical Level

America's Army is a force projection Army with the mission to rapidly deploy decisive force anywhere in the world under any circumstance. Though smaller than the Cold War Army, the 21st century force will optimize emerging technologies to meet any adversary. Technology will dramatically increase force lethality and battlefield mobility. Battlefield command and control will greatly improve through information management derived from the power of the micro-chip. The battle calculus will become more complex as operational tempo increases.

The Army must be capable of supporting national and international interests. The post-Cold War environment demands a focus on regional conflicts, crisis response, power projection, and joint and combined operations. Operations from civil disturbances, national disasters, to lesser and major regional contingencies are certain to challenge future planners. The force must be a total force consisting of National Guard, Reserve, and Active forces trained together and capable of delivering decisive victory with minimum casualties.

Fast moving forces, instantaneous information, and unprecedented lethality will characterize the battlefield. While there are certain to be close battles, many high-technology weapons arrays will have the "effects of mass" yet may be elusive, low dwell time targets operating from ranges beyond the close fight. There may be a blurring between the tactical and operational level as commanders simultaneously focus close and deep fires against the enemy's arsenal, his intent and will. Armed reconnaissance and attack aviation commanders will need to possess a degree of mental agility to think simultaneously in tactical and operational terms.

Real-time information will be required to develop intelligence and synchronize the employment of forces and systems to destroy the enemy's warfighting capabilities. Sensors will find and accurately locate targets; lethal weapons will engage enemy forces, many beyond visual range. Land maneuver forces, operating in all dimensions of the ground regime, will overwhelm and destroy the enemy around the clock in all types of weather.

Battle tactics will be inextricably linked to our ability to project contingency forces into a battle area. Once deployed, we must be capable of protecting the force, winning the information war, con-

ducting precision strikes throughout the battlefield, and dominating the maneuver fight.

Now, you might be saying what do all these operational notions have to do with tactics? Because the intended purpose of the *U.S. Army Aviation Digest* is to provoke discussion and dialogue, I make the hypothesis that the difference between tactics and operational art in the third dimension of the ground regime (the dimension of Army Aviation operations) is a difficult distinction. In a classical sense, tactics often are described as maneuvering to gain an advantage or success. However, when force agility is increased such that maneuver can be done at speeds more than 100 knots, one might argue there is a blurring between tactical and operational maneuver. A dash across the battlefield, a quick-stop, and final positioning to attack a high-value target compress the essentials of tactics and operational maneuver into a very short period.

Attack helicopters, modern artillery, and missiles with requisite range and munitions are paramount to conduct these precision strikes. Even now we are quite advanced in achieving digital communication across the battlefield. Targeting information in bits and bytes is burst-transmitted at lightening speed to a firing system. These firing data, possibly derived from a laser spot and correlated with position location confirmed by global positioning systems, require virtually little effort from the aircrew. Certainly, such communication networks are essential to conduct synchronized, decisive operations against enemy forces throughout the battlefield.

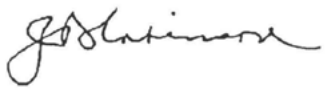
Decisive operations culminate with the destruction of the enemy's land combat capability. The Army will maintain an overmatching combined arms maneuver force. Real-time, fused intelligence must be available to the maneuver task force commanders. To win, the commander must combine direct and precision fires to achieve land force dominance and swift, decisive victories.

Army Aviation brings powerful capabilities to the combined arms team in the form of security, armed reconnaissance, attack, assault, logistics, and special electronic mission aircraft operations. The ability to place the enemy in a position of disadvantage through the flexible application of this combat power in the third dimension is the notion advanced through maneuver by air. These operations are essential in the project, protect, win the information war, conduct precision strikes throughout the battlefield, and dominate in maneuver battle notions just discussed. However, such operations are not for much duration without a "lead with logistics" commitment.

Tactics associated with screen, cover, guard, all forms of reconnaissance, and attack battledrill are necessary but not a sufficient condition to win on future battlefields. Such tactics must be given rapid expression in agile maneuvers at the operational level to challenge enemy weapons that have the effects of mass. Theater ballistic missiles are appearing in increasing numbers around the world. Such weapon systems are relatively cheap compared to large, standing forces and have considerable destructive potential.

Given our emergence into the post-Cold War environment, it seems our battledrill regimes need expansion to practice simultaneous close and deep operations. These "expanded tactics" certainly will stress the communications networks and challenge logistics support capabilities of the combined arms team. Today, aviation tactics must be practiced with the combined arms team in terms of projecting the force, protecting the force, winning the information war, conducting precision strikes throughout the battlefield, and dominating the maneuver battle.

More than ever before, we must exploit simulation and combined arms training opportunities to achieve a total force that is trained, ready, and capable of decisive victory. As commanders of all components begin to address the challenges of operational maneuver, it is Army Aviation that offers that extra dimension of capability—operational capability in the third dimension.



UNLEASH THE DRONES!

By SSG Michael Guinn

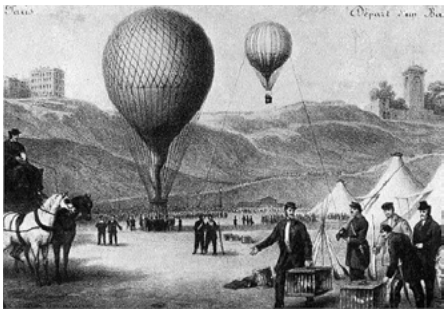
Throughout the ages, pioneers have envisioned mankind soaring through the heavens amongst creatures of flight. From the tragedy of Icarus in Greek mythology, to the modern era of drones, technological developments in aviation continue to become more sophisticated. Many would like to believe that movie concepts like "Skynet" and homicidal cyborgs were just science fiction. The truth is, these technologies may not be too far off into the future.[1] Unmanned aerial vehicles (UAV), and the complex software programs associated with them, introduce a relatively unique aerial concept into the aviation domain. Unmanned aerial vehicles as small as insects and as large as airliners are being designed for various civil and military functions. According to Merriam-Webster (2016), technology is defined as "a manner of accomplishing a task especially using technical processes, methods, or knowledge,"[2] and the aviation industry has only begun to scratch the surface with drone technology.

Much of society is skeptical towards the use of UAVs, mainly due to concerns of public safety and the violation of privacy; however, many organizations are starting to realize the potential that UAVs offer. Technological advances have paved the way for success and continue to surpass milestones in design and application. Unmanned aerial vehicles will be the future of aviation because they are more cost effective compared to traditional airframes, reduce the risk of property damage and pilot fatalities, and possess a capacity to function in challenging environments while maintaining operational effectiveness.

History of Unmanned Aerial Vehicles -

Pre-Cold War Era

Many would believe that UAVs are relatively new. On the contrary, UAVs have been around for over a hundred years. Unmanned aerial vehicles have



had a profound impact, primarily on the battlefield, early on in airpower infancy. NOVA's *Spies That Fly* presentation on the Public Broadcasting Service (PBS) noted that "years before the first manned aircraft flight on December 17, 1903, primitive UAV technology was used for combat and surveillance in at least two wars."[3] Hot-air balloons were among the first of these platforms. Being able to reach impressive altitudes for their time, balloons fitted with primitive photography equipment, provided vital information on the terrain and enemy positions and even conducted "uncoordinated" attacks through the use of timing devices attached to a hatch at the bottom of the balloon's basket. During the 1930s, huge advancements were made using radio waves. In 1939, an Englishman and "aviation enthusiast," by the name of Reginald Denny, teamed up with members from the Lockheed Company to begin developing a very efficient radio-controlled aircraft.[4] This basic UAV quickly captured the attention of the U.S. military due to its smaller design and low-cost of development. The U.S. Army realized the benefit that UAVs provided and began to evaluate their performance in different positions on the battlefield such as flying as decoy aircraft during aerial raids, conducting reconnaissance and surveillance missions, and delivering various payloads in combat with the occasional kamikaze-like attack. Aerial photography, in particular, proved very useful in the mission planning and coordination phases, enabling military commanders to make the crucial decisions needed to accomplish their objective.

Post-Cold War Era

Beginning in the mid-1960s through the 1980s, aircraft with stealth capabilities began to appear and UAVs were not excluded from this new technology. One of the first unmanned platforms to use

stealth capabilities was the American built AQM-34 Ryan Firebee. Originally designed by the United States Air Force (USAF), the Firebee proved extremely capable of carrying out the challenging missions assigned to it. NOVA's *Spies That Fly* also stated that "test flights proved that Firebee UAVs could provide covert surveillance. From October 1964 to April 1975, more than 1,000 AQM-34 Ryan Firebee UAVs flew in excess of 34,000 operational surveillance missions over Southeast Asia." Due to the demonstrated success accredited to the Firebee, other U.S. allies, such as Israel, began to acknowledge the potential for unmanned aerial operations and started to develop UAVs to satisfy their strategic and national interests. The successors to the AMQ-34 Firebee were the Israeli made Firebee 1241, the Scout, and the Pioneer. Each successive model surpassing that of its predecessor with added capabilities.[5]

Previous conflicts mainly used UAVs for surveillance or in a defensive capacity. But, the U.S. eventually determined that it was time to assess the performance of UAVs in more of an offensive role on the battlefield. This idea was brought to fruition during the beginning of the Gulf War and continues in present day Iraq and Afghanistan. The need to minimize civilian casualties and collateral damage has always been a challenge. The development of precision guided munitions (PGM) have greatly reduced inaccuracies on the battlefield and have made chemical and nuclear weaponry impractical. Unmanned aerial vehicles were increasingly utilized as the preferred delivery system for PGMs. For added measure, UAVs and their munitions were also fitted with the Joint Direct Attack Munition (JDAM) guidance kit which was primarily used at the beginning of Operation Iraqi Freedom and Operation Enduring freedom to strike opposing forces with pinpoint-surgical precision. The U.S. military has been able to engage its targets in challenging locations in ways never before possible solely due to innovations such as these. Garwin asserts that "JDAMs offer the important capability of being able to work in cloud or smoke, and they can attack dozens of individual targets in a region tens of kilometers across" and "the probable error for GPS [Global Positioning System]-guided rockets of any range is likely [only] to be in the 5-meter range."[6]

Military Applications

Unmanned aerial vehicle technology continues to grow and has made a significant impact in giving the U.S. military the operational advantage it needs to accomplish its mission. Many of the platforms that the U.S. Army employs are capable of carrying a multitude of various payloads simultaneously such as Hellfire missiles, reconnaissance and surveillance equipment, imaging and measurement equipment, and communication equipment. General Atomics, creator of the U.S. Army's Gray Eagle platform, states that "Gray Eagle has an endurance of 25 hours, speeds up to 167 KTS [knots], can operate up to 29,000 feet, and carries 1,075 lbs. [pounds] (488 kg) of internal and external payload."[7] The versatility of UAVs make them a formidable force on and off of the battlefield. In addition to being significantly cost effective, they also offer a safer alternative during hostile situations since a pilot's life is no longer placed in harm's way. With more and more features continuously being added to enhance performance, the future application of UAVs for military operations will continue to be a vital asset that compliments America's air superiority.

Civilian Applications

For decades, leaders in Washington reaped the benefits of using UAVs and it wasn't until recently that they have started to attract the attention of the civilian sector, whether it be for commercial or recreational use. Many businesses are actively looking for ways to increase work efficiency by utilizing drones to cut down on time and overall costs. The familiar online retail outlet, Amazon, is just one of many organizations that are trying to capitalize on the opportunity. By using drones for delivery, Amazon estimates that the overall delivery times for packages could be reduced significantly, shipping merchandise to consumers within minutes versus the days it currently takes. Although the size of commercial drones would limit the proportion and weight of packages delivered to a mere few pounds, this would encompass approximately three-fourths of Amazon's inventory, giving the business a significant increase in operational efficiency.[8]

Many ingenious ways of using UAVs are emerging and proving to be highly effective compared to more conventional methods. Drones tend to be very simple and require very little skill to operate in the workplace. While not limited to these applications, some foreseeable use of drones in the civilian sector are: law enforcement surveillance, weather reporting, agriculture, package and/or mail delivery, food delivery, providing aid to victims of natural disasters, herding farm animals, bridge inspections, monitoring and regulating fishing and hunting practices, mapping and other geological surveys, and search and rescue operations. Along with being used for commercial purposes, flying UAVs recreationally is quickly gaining popularity among private individuals. Although it may be fun operating a small drone, many people are unaware of the dangers associated with flying these machines. Irresponsible use of UAVs continue to be a growing nightmare for law enforcement and the Federal Aviation Administration (FAA).

Regulating the use of Drones

The societal benefit of operating UAVs

within the National Airspace System (NAS) prompted Congress to enact the FAA Modernization and Reform Act of 2012, mandating that the FAA establish regulatory guidance governing the safe and orderly operation of unmanned aircraft systems (UAS). The FAA explains in detail the rules regarding the use of UAS in the Small UAS Rule (Part 107) which took effect on August 29, 2016. Within the text of this sizable publication, the FAA meticulously outlines the parameters required to be met in order to legally and safely operate a drone within the NAS. Some of the criteria to be met include: drone operators must establish two-way communication and obtain authorization from air traffic control prior to operation unless operating within Class G* airspace, the total weight of the drone to include its payload and attachments must be under 55 pounds, drones may only operate up to 400 feet above ground level and must not exceed a ground speed of 100 mph, flying of drones is only permitted in daytime hours under visual meteorological conditions, and drones must remain within line of sight of the operator at all times.[9] Drone pilots will be required to adhere to the strict rules and regulations governing UAS operations. Those who violate any of the rules outlined within the Small UAS Rule Part 107 may have their privileges revoked and may be subjected to imprisonment and penalties imposed upon them by federal and state laws.

The Financial Benefits of Drone Use

So why exactly have UAVs been gaining popularity in the recent decades? One critical element that has swayed government officials is the economics involved with employing such systems, or in layman's terms - money. Even though they require control stations and other equipment to operate, the cost benefit of using UAVs is compellingly less expensive compared to using conventional airframes for most jobs.

Our enemies, well aware that they could never take on the United States in a conventional war, employ such tactics as "attrition" in an effort to cause economic hardship and eventually collapse to the infrastructure of the United States. Using terror tactics to place fear into the hearts and minds of its citizens is extremely effective in forcing a nation into overspending on its national security. The U.S. government decided to take a page from the history books and realized that overspending on a defense budget was one of the major factors that caused the collapse of the Soviet Union during the Cold War. To counter such tactics one viable solution was the implementation of drone warfare.

Like the invention of the tank and rifle, which eliminated the need for a large number of Soldiers to be present on the battlefield, drones are also proving to be remarkably cost effective to use in lieu of manned operations. In his article, *Drones are cheap, soldiers are not: a cost-benefit analysis of war,* Wayne McLean states that the estimated cost of a basic drone, such as the MQ-9 Reaper was significantly lower, a notable 93 percent cheaper in unit price and two-thirds cheaper to operate, than the USAF's new F-35 Joint Strike Fighter. Another important element in the money equation that people fail to acknowledge is the amount of money it takes to train, maintain, and place a Soldier into combat. McLean goes on to say that in 2012, the average cost to have a service member in Afghanistan "cost the government US $2.1 million." With the advancements made in technology and in medicine, troops injured on the battlefield are more likely to survive compared to the fatality rate in previous wars. In order to provide them with the required food and medical treatment, established facilities were needed overseas to facilitate this. There is also the large amounts of money needed to support those getting out of the military with medical disabilities in their early to late 20s and 30s. With tens of thousands of troops deployed to the austere environments of Iraq and Afghanistan, you can imagine the total amount of money that was poured into the American soldier; an estimated "US $836.1 billion" by the height of the wars.[10]

Drones not only proved to be a viable solution for the U.S. defense budget, but they also demonstrated to be beneficial towards civil businesses and the jobs they created. Chris Mailey, author of *Are UAS More Cost Effective Than Manned Flights?*, discusses how the Bureau of Land Management has collected sufficient data while performing site surveys and inspections for various construction projects over the past few years, correlating the differences in cost and efficiency between manned and unmanned aircraft - the end result was astounding. He further explains that the data collected shows that the use of drones to conduct these services was up to 98 percent cheaper to operate compared to a manned aircraft, in terms of unit cost and cost per hour of flight. When pit against each other, the UAV

* Class G airspace formally known as 'uncontroled airspace," is airspace in which flight under instrument flight rules is normally not allowed.

almost always proved superior with being the most cost effective option while maintaining operational effectiveness. After going through the process of pre-inspections and obtaining a Certificate of Authorization from the FAA to operate a UAV for non-recreational purposes, the profit gains of transitioning over to unmanned services was reason enough to make the switch.[11]

The Safer Alternative

The approaching robotic age is inevitable and the media tends to demonize drones because humans naturally fear what they do not understand. Recent public outcry has condemned the use of drones in the Middle East because of civilian casualties. The truth is that the military UAS possess a highly accurate targeting system which is just as efficient as a manned aircraft engaging a target. Regarding the subject of risk management, drones tend to compliment risk mitigation within the aviation realm. Bottom line up front, using UAVs in any facet over a manned aircraft not only alleviates the costly loss of a multimillion dollar airframe, but more importantly keeps the pilot out of harm's way. Unmanned flights may also reduce the risk of airborne incidents due to pilot fatigue. A perfect example for the necessity of drones in risk mitigation would be the need for a power company to survey a malfunctioning junction box, transformer, or damaged power cables. Instead of using a crane with a human being inside of the bucket to survey the damage. You can now totally eliminate the need for the vehicle, crane, and worker needed to get the job done and complete the work in a more expeditious manner using a drone. The weight limit on UAVs imposed by the FAA--under 55 pounds--would also lessen the potential damage done to property and persons, especially when you consider the catastrophic damage that can be done by a larger aircraft.

The Future of Unmanned Aerial Vehicles

Unmanned aerial vehicles appear to be the most logical choice for future aviators but how far will the technology go? NOVA asserts that various types of micro UAVs are being developed for the military and law enforcement for surveillance activities. To assist in daily living, they go on to explain that bird-like solar powered UAVs are being developed that can achieve sustained flight for extremely long periods of time. Their primary function will be to assist satellites with broadband communication systems and Global Positioning System (GPS) tracking as a cheaper alternative to other methods. Complex software programs are constantly being developed to improve the overall performance of these machines. Many developers may be required to also incorporate anti-collision systems, some form of radar, communication, tracking equipment, and weather detection capabilities to ensure the safe, orderly, and expeditious flow of air traffic operating within the NAS. Future UAVs may completely eliminate the liability of a pilot and the need for numerous navigational aids by completely switching over to GPS tracking. Perhaps someday in the near future we can expect thousands of these tiny machines communicating amongst each other, flying about delivering messages and information to people around the globe.[12]

Integrating the Concept of Drone Technology into Society

Much of society today is still hesitant towards relying on UAVs to carry out their tasks. This is understandable. Whether it be for deliveries or public transportation, people are reluctant to fly and go about their daily business knowing that direct human intervention is not involved with these systems. Some of the biggest issues continue to be related to public safety and privacy concerns. What is preventing someone from weaponizing their drones or attaching cameras to them to spy on you in your backyard or bedroom window? Would drone footage captured by law enforcement be inadmissible in a courtroom if the footage was taken without a warrant? How does a growing UAV presence affect the jobs of air traffic controllers, pilots, photographers, law enforcement, etc.? Some will also claim that there is the issue of limited visibility to avoid collisions due to the absence of a pilot but this is untrue. If anything, drones have proven to be more effective due to advancements in radar, GPS, and thermal imaging capabilities. Contrary to popular belief, it would be extremely difficult to attach sizable weapons to UAVs without affecting the performance of the machine. The FAA along with law enforcement are already employing their versions of unmanned aircraft for security related missions, surveillance, and even border control. The job market, particularly in aviation, will benefit from the growing utilization of UAVs immensely since there is a never ending demand for the technical skills needed to pilot the diverse array of platforms

available, and the maintainers needed to conduct the required maintenance on them. Many people are being employed to help come up with ways on how to improve and use the technology.

Conclusion

Technological advancements could eventually lead to autonomous land, sea, and air vehicles. As with all new technologies, there will always be areas that need improvement and people will find ways to misuse it to their advantage, but it is important to remember that the benefits outweigh the negatives. Drones are best suited to provide the services we need because they are economical, mitigate injury and reduce the potential for loss of life, and enable us to explore difficult locations with ease that would otherwise prove troublesome to reach. A question that has always seemed to plague the minds of man is: "How exactly can we prevent the possibility of wars in the future?" Having the advantage on the battlefield through air superiority is one option that may effectively deter our enemies from causing undue harm to the nation. Former U.S. President Ronald Reagan once said: "Freedom is never more than one generation away from extinction. We didn't pass it to our children in the bloodstream. It must be fought for, protected, and handed on for them to do the same, or one day we will spend our sunset years telling our children and our children's children what it was once like in the United States where men were free."[13] The United States of America has a moral obligation to the world and its citizens to preserve the liberty mankind is entitled to. Through a joint effort, lessons learned from history, and the ethical application of technology, destruction and terrorism may possibly become a thing of the past. Like the many innovations before it, UAVs are just another development in the never ending need for mankind to satisfy his curiosity and explore unknown horizons.

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Acronym Reference

ATS - air traffic services	**PGM** - precision guided munitions
FAA - Federal Aviation Administration	**UAS** - unmanned aircraft system
GPS - Global Positioning System	**UAV** - unmanned aerial vehicle
JDAM - Joint Direct Attack Munition	**USAF** - United States Air Force
NAS - National Airspace System	

Redundancies in the General Support Aviation Battalion's Forward Support Company

By CPT Ryan E. Dennison

Redundancies have been created in the sustainment support structure to cover worst-case scenarios. However, a leaner sustainment footprint may be worth considering.

One unit with overlapping logistics support is the general support aviation battalion (GSAB) forward support company (FSC). Because of how the GSAB is employed, the FSC is almost always co-located in an area of operations with other logistics elements. This overlap creates redundancies in field feeding, petroleum distribution, and ground maintenance. While a robust GSAB FSC can be a force multiplier when used to its fullest extent, the current operational environment and its constraints leave the FSC underutilized. Thus, the FSC could be downsized to a platoon-sized element that falls under the headquarters and headquarters company. (See figure 1.)

THE GSAB STRUCTURE

The mission of the GSAB is to provide aerial command and control support, limited air assault capability, air movement, and medevac support for the assigned area of operations. The GSAB consists of seven companies: a headquarters and headquarters company, command aviation company, heavy helicopter company, aeromedical evacuation (MEDEVAC) company, aviation maintenance company, air traffic services (ATS) company, and the FSC.

The GSAB is a versatile unit that can easily be split for decentralized operations. Each flight company, with the exception of the command aviation company, is task-organized with the ability to be split into three elements for separate operations. The mission of the command aviation company

Proposed FSC Manning Changes

	Main Location	Remote Location 1	Remote Location 2
Field Feeding	Covered by ASB or Consolidated Dining Facility	1 - E-6 92G NCOIC 1 - E-5 92G NCO 1 - E-4 92G Cook	1 - E-5 92G NCO 1 - E-4 92G Cook
Distribution	1 - E-7 92F NCOIC 1 - E-5 92F NCO 4 - E-4 92F Fuel Handlers	1 - E-6 92F NCOIC 2 - E-5 92F NCO 7 - E-4 92F Fuel Handlers	1 - E-6 92F NCOIC 2 - E-5 92F NCO 7 - E-4 92F Fuel Handlers
Maintenance	1 - 91SA Warrant 2 - E-4 92A Specialist 1 - E-7 91B NCOIC 1 - E-6 91B NCO 2 - E-4 91B Mechanic 1 - E-5 91C NCO 1 - E-4 91C Mechanic	1 - E-5 91B NCOIC 1 - E-4 91B Mechanic 1 - E-4 91D Mechanic	1 - E-5 91B NCOIC 1 - E-4 91B Mechanic 1 - E-4 91D Mechanic

Legend:

915A = Automotive Maintenance Warrant Officer
91B = Wheeled Vehicle Mechanic
91C = Utilities Equipment Repairer
91D = Power Generation Equipment Repairer
92A = Automated Logistical Specialist
92F = Petroleum Supply Specialist
92G = Culinary Specialist
ASB = Aviation Support Battalion
FSC = Forward Support Company
MOS = Military Occupational Specialty
NCO = Noncommissioned Officer
NCOIC = Noncommissioned Officer-in-Charge

Figure 1. This figure details the general support aviation battalion forward support company's structure with the author's proposed changes to reduce personnel.

necessitates that it be located with the brigade and battalion headquarters.

The air traffic services and aviation maintenance main elements are located with the headquarters but have small teams that support forward operations as the mission dictates.

The FSC is intended to be utilized at forward locations, while the aviation support battalion's (ASB) headquarters support company and distribution company provide support at the headquarters location.

Because of the financial and force multiplier value of aviation assets, the main element of the aviation brigade and GSAB are typically located at the most secure locations within the area of operations. Any elements that are pushed forward should still be located with battalion-sized combat units. A forward support MEDEVAC team could possibly be emplaced at a company-sized location.

FIELD FEEDING

The GSAB is authorized a field feeding section that consists of 11 enlisted Soldiers, a containerized kitchen, and two assault kitchens. Looking at the structure of the GSAB as a whole, this support structure makes sense; through task organization, the GSAB can operate at three separate locations, one consolidated and two remote. The containerized kitchen can support up to 800 Soldiers per meal, and the assault kitchen can support a company-sized element per meal.

Each remote location is run by two culinary specialists. The consolidated location is run by the remaining nine culinary specialists. When you look at the numbers, the manning is appropriate to sustain long-term operations.

The overlap in field feeding personnel occurs because of where the aviation assets are emplaced. The field feeding structure makes sense only if the GSAB were to deploy without external support. However, the main element of the GSAB will most likely be co-located with the brigade and, thus, the ASB. With an ASB at the location, a combat brigade and various support elements with their own field feeding sections most likely will also be present.

The field feeding structure within the theater aviation brigade contains 19 ASB Soldiers in addition to the FSC field feeding sections when the attack and assault battalions are co-located with the ASB. This simply accounts for the military personnel assigned to the aviation units.

Locations that have an aviation brigade are likely to have a consolidated dining facility augmented by local contractors, leaving aviation brigade culinary specialists to execute non-military occupational specialty (MOS) related duties for the duration of their deployment.

In many remote locations, the forward aviation element can receive food from the land-owning field feeding section or an internal assault kitchen operated by two culinary specialist Soldiers.

Considering this information, the field feeding section of the GSAB FSC can be downsized to five personnel: one staff sergeant, two sergeants, and two lower enlisted Soldiers. This structure would allow the field feeding section to support remote locations or augment the main element location if military personnel are providing sustenance.

Attack or assault battalions will also likely have assets co-located at the remote location. The two GSAB FSC culinary specialists can feed the entire remote element, freeing up the attack or assault battalion culinary specialists to augment the main location if required.

PETROLEUM DISTRIBUTION

The GSAB FSC distribution section is authorized 50 Soldiers, two advanced aviation forward area refueling systems, 22 heavy expanded-mobility tactical truck (HEMTT) fuel tankers, six trailer-mounted modular fuel systems, and five HEMTT tanker aviation refueling systems.

The Class III (petroleum, oils, and lubricants) section is split into heavy, utility, and air ambulance sections. But, in reality, petroleum supply specialists within the GSAB can fuel any aircraft at their assigned location regardless of their section. Having personnel fuel only specific aircraft would be extremely inefficient and a poor use of assets.

The ASB distribution company has a Class III section of 28 personnel whose mission is to receive, store, distribute, and issue fuel. The distribution company also has an aircraft refueling section of 11 personnel. An attack or assault battalion has a distribution section of more than 30 petroleum supply specialists.

FORWARD ARMING AND REFUELING POINT OPERATIONS

The ASB distribution company's Class III section is responsible for forward arming and refueling point (FARP) operations at the main battalion and brigade location.

This structure leaves 50 petroleum supply specialists available for the GSAB's remote locations.

Forward arming and refueling point manning is dictated by mission, enemy, terrain and weather, troops and support available, time available, and civil considerations. However, the most likely scenario can be used to determine manning while allowing for short-duration surge capabilities.

During normal operations, a two- or four-point FARP can be manned by five personnel or a total of 10 personnel for 24-hour operations. Hot FARP operations can be used exclusively, or cold fuel can be used for steady-state operations without requiring any additional personnel.

A high operating tempo would require a surge to more than five personnel working at the same time for short durations. If fast-paced operations are expected for an extended amount of time, the location should be augmented ahead of time. Augmentees can come from the ASB, assault, or attack battalion FSCs, or internally. This type of manning would be expected at locations with multiple airframes.

At locations with a forward support MEDEVAC team, five personnel can provide 24-hour, on-call coverage since the operating tempo should not be as high.

The GSAB FSC can meet most theater aviation brigade fuel-handling requirements with 26 Soldiers. This would allow for the FSC to man two remote locations for 24/7 operations and provide surge capability or coverage of a jump FARP.

Any additional manning requirements can be filled through augmentation from the ASB or the attack or assault battalion FSCs. With the addition of attack and assault battalion FSC personnel, the aviation brigade should be able to sustain at least six remote FARPs 24/7.

Again, this analysis only accounts for military personnel. In many instances, contractors are brought in to provide cold fuel at robust operating locations. When these contracts are put into place, fuel-handling personnel conduct non-MOS-related duties.

BULK FUEL DELIVERY

The ASB, the combat sustainment support battalion (CSSB), or contractors should deliver bulk fuel. All deliveries should be direct and minimize handoff, even at remote FARPs. This would allow the GSAB to reduce the number of HEMTT fuel tankers required. The CSSB could line-haul HEMTT fuel trucks to the remote locations if FSC internal personnel were not available to conduct the convoy. An alternative would be replace HEMTT fuel trucks with fuel bladders.

GROUND MAINTENANCE

The GSAB FSC maintenance section is authorized 47 personnel and a complete wheeled-vehicle repair package to include standard automotive tool sets, a forward repair system, and contact trucks. Specialty repair personnel are also available to repair small arms, night-vision devices, communications equipment, and other unit equipment. The ASB has a robust maintenance section of 83 personnel. The assault and attack battalion FSCs have maintenance sections similar to that of the GSAB FSC.

WHEELED VEHICLES

The flight companies have few wheeled vehicles. Most of the battalion's wheeled vehicles are in the FSC, the aviation maintenance company, and the headquarters element. The number of GSAB vehicles can be greatly reduced, which would allow for the maintenance section to be downsized.

The GSAB would maintain flight-line vehicles and a small element of medium tactical vehicles (MTV) and high mobility multipurpose wheeled vehicles. This reduction would allow the FSC to reduce its wheeled-vehicle capability accordingly. Fewer wheeled vehicles would also mean fewer mechanics would be needed.

The GSAB can use its heavy-lift assets to self-deploy equipment, work with the local CSSB to line-haul large amounts of equipment, or have the Air Force airlift equipment to the area of operations.

SPECIALTY REPAIR

Specialty repair personnel reside in both the GSAB and the ASB. Their skill sets are used for low-priority equipment that can be sent to the rear for repair. These GSAB personnel would only be used to their fullest extent if the battalion is deployed as a standalone element. In that case, the GSAB could rely on the local CSSB or other support elements for these repairs.

HEAVY ASSETS

The GSAB FSC maintenance capabilities should be tailored to support a main location and two remote locations. The remote locations can use an MTV and a contact truck to support forward maintenance operations. I propose that this element consist of two wheeled-vehicle mechanics and a generator mechanic.

A wrecker would not be needed because the element would not be expected to convoy. Anything outside of the element's ability to fix could be line-hauled by the local ground element back to the FSC's main maintenance location or directly to the ASB.

I also propose placing a palletized load system with a forward repair system, an MTV, and a wrecker at the main FSC maintenance location and staffing this location with a maintenance warrant

officer, two production control specialists, four wheeled-vehicle mechanics, and two generator mechanics. Any work that the section could not complete itself in a timely manner would be sent to the ASB maintenance section.

CONVOY SECURITY

Maintaining the current strength of the GSAB FSCs can be justified if the units become tactically self-sufficient. Currently, the GSAB FSC does not have the convoy protection platforms needed to successfully provide logistics convoy security. If the FSC had convoy protection platforms, then it would not have to rely on outside units for convoy security.

Convoy protection platforms would also enable the FSC to fill the GSAB's downed aircraft recovery team needs. This would allow the aviation maintenance company to focus on maintenance while the downed aircraft recovery team and its convoy security stayed within the battalion.

Doctrinally, these changes would not be difficult to implement. The hardest part would be obtaining convoy protection platforms.

Redundancy is necessary because operational environments are always changing. Today's logistics requirements may not be the same as tomorrow's requirements, so having a robust logistics structure makes sense and should be maintained. Support units must ensure they can provide the tactical support that contractors cannot to maintain relevance during times when redundancy and reliance on contractors are high.

If changes to the personnel structure of the GSAB FSC must be made, doing it in the ways described in this article would ensure the required support capabilities are maintained. In this case, tactical capability would have to be provided by outside resources and units.

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Acronym Reference

ATS - air traffic services	**GSAB** - general support aviation battalion
ASB - aviation support battalion	**HEMTT** - heavy expanded-mobility tactical truck
CSSB - combat sustainment support battalion	**MEDEVAC** - aeromedical evacuation
FARP - forward arming and refueling point	**MOS** - military occupational specialty
FSC - forward support company	**MTV** - medium tactical vehicles

Training Iraqi Flight Medics

By SGT Bradley Owens

In early March 2016, at the request of the Iraqi Army, F Company, 2-238th Task Force (TF) Heavy Cav (3rd Battalion, 6 Cavalry Regiment, 1st Armored Division Combat Aviation Brigade) began working with the Iraqi Army on developing their flight medics. The student population was relatively small given that the Iraqi Army only had one dedicated aeromedical evacuation (MEDEVAC) company.

Prior to conducting the first class, the team assigned to conduct the instruction met with the Iraqi unit commander to assess their aircraft for medical capability. During this meeting, we were able to speak with one of the potential students and ask them about their operation. They were initially apprehensive to the strangers who were suddenly interested in their job and capabilities, but they were also very proud of the duty they were performing. After polite greetings, they graciously accepted us and demonstrated their aircraft and some of their medical equipment.

Though they were purchased for light scout purposes, the Iraqis had adapted several of their EC-135 helicopters for MEDEVAC. The interiors are similar to most helicopters of the same type being used for aeromedical missions in the United States but lack most of the onboard medical components normally dedicated to that mission. The Iraqi medics adapted to that by storing aid bags on the aircraft with the equipment that they felt was needed. Since there was no onboard oxygen capability, they provided two D type oxygen cylinders stored in a hard case. The EC-135 currently does not have an external hoist installed so rescue capabilities from the aircraft are limited.

Tentative Training Plan

Despite multiple attempts by TF Heavy Cav to consult with the Iraqi medical officer responsible for the medics, he appeared to have little interest in our efforts. This initial lack of interest made it difficult to decide upon an exact curriculum. The requests from the Iraqi Army was for extremely advanced medical training and medical supplies so TF Heavy Cav decided to first provide proven combat relevant training in the form of Tactical Combat Casualty Care (TCCC). The curriculum was very similar to the U.S. Army's Combat LifeSaver Course.

Statistical data demonstrating success/failure figures pertaining to MEDEVAC missions flown in the Iraq and Afghanistan wars was omitted to avoid providing information to the wrong source. Other statistical information was limited to only what was necessary to build confidence in the materials being taught. Relevant facts included were that most casualties who die will die regardless of medical intervention and that the number one preventable death is from massive extremity hemorrhage.

There was concern that the material would be too simplistic for the students, or that it would be complicated and cumbersome. In order to provide the best possible training, we administered a short pre-test covering some tenets of TCCC and material that would be considered rudimentary by advanced emergency medical technicians. The test proved to be a wise idea as our students were able to answer each of the questions successfully. We ascertained that they had a solid basis for pre-hospital care. We elected to continue with the plan to teach TCCC, but we also needed to provide advanced follow-on training in order to improve the students' skills.

Advanced Training Plan

As a follow on for TCCC, we needed material for the pre-hospital care of severe traumatic injuries. The Iraqis were experiencing a variety of traumatic injuries ranging from simple gunshot wounds to the extremities to complex multi-system trauma requiring ventilator management. While they had received quality basic training from their experience as ground medics, they had not remained current in pre-hospital management for these types of injuries. They were putting all of their patients on long backboards regardless of injury, constantly using large volume fluid resuscitation, and operating an auto-vent with the same settings on each patient.

To facilitate these training needs, we chose to use the National Association of Emergency Medical Technician's Pre-Hospital Trauma Life Support (PHTLS) Course. Considered to be the world's premier prehospital trauma education, the course was developed in cooperation with the American College of Surgeons to promote critical thinking in addressing multi-system trauma and provide the latest evidence-based treatment practices.

The PHTLS Course was the ideal curriculum for the mission tasked to the Iraqi flight medics.

"The fate of the wounded rests in the hands of the one who applies the first dressing (Nicholas Senn, MD)."

Sgt. Bradley Owens with Company F, 2nd Battalion, 238th Aviation Regiment, TF Heavy Cav., observes an Iraqi Aviation Medic converting a tourniquet to a dressing during an advanced prehospital trauma training exercise at Camp Taji, Iraq

It was critical that the students be provided with relevant trauma training to increase survival rates. The material in PHTLS covers a wide variety of trauma mechanisms and its effects on all the systems in the body. It also provides detailed information on the medic's approach to the casualty and his injuries as well as detailed steps for mitigation. Pathophysiological and epidemiological information found within the text helped explain the answer to the question "why" for every intervention and patient condition. Coupled with TCCC, we were able to help the students understand the priority of injuries and what effects will kill the casualties after patient transfer.

Areas of special emphasis were secondary patient assessment including hypoperfusion; chest, abdominal, and pelvic injuries; central nervous system trauma; burn management; mass casualty management; interfacility transport; and a slightly more advanced airway management than what was provided during TCCC. Some areas which could not be elaborated on due to the Iraqis lacking the equipment were monitoring and managing end tidal carbon dioxide and cardiac rhythms.

Iraqi Training History

The Iraqi soldiers who comprise the whole of their army's flight medics had varying degrees of previous medical training. The students reported that in 2009 the U.S. Army offered them training in TCCC. They did not refer to it as such, but they recognized the phases of TCCC and some of the techniques. One flight medic was a registered nurse (RN) who had received his training at Baghdad University prior to the 2003 invasion. Another soldier was a licensed practicing nurse who had also received training from Baghdad University. The remaining three soldiers had received medic training from the Iraqi Army's medic training school. Each of the students had previously served as ground medics with the Army.

The Iraqis had received limited flight training for their positions. They had been trained in pertinent aeromedicine similar to that taught to U.S. Army aircrewmembers. They had also received limited familiarization with the EC-135 and UH-1 airframes to be able to operate within them. Their training did not include pertinent aviation pathophysiology which would improve their ability to recognize medical problems during transport or to titrate various medical interventions (e.g. ventilator management, tension pneumothorax, dysbarism, etc.).

Conducting Lecture

There was a significant language barrier when working with the Iraqis, and at first, there was very little rapport. On the first day of class, the Iraqi medical officer, whom we had not met previously, joined the lecture to assess the instructors and the material being taught. After initial introductions, he revealed that he had a decent capability to speak and read English most likely due to his study of medicine. The RN of the group also spoke and read English well, but there was still a significant language barrier with the rest of the students.

It was important that we not "lose" the students by speaking down to them. It was also important politically that we teach them topics considered to be important by their superiors. Having an interactive discussion over the pre-test, which could not have been given solely as a written exam because of the language barrier, the Iraqis and the American Soldiers realized that there was common medical background which lead to comradery between the two groups. In addition to the material being taught, the Iraqis were very interested in the practical experience of the instructors. Two of the instructors were practicing paramedics in the United States, and the other two were U.S. Army Healthcare Specialists with limited experience in pre-hospital care. This experience was valued among the students and provided confidence that we were providing them with quality training.

The Iraqis had limited attention for didactic lecturing not unlike most student populations. It was, therefore, important to be engaging and require participation from the students as often as possible without exhausting them physically. Practical application training proved to be extremely advantageous and was used as much as possible. The students expressed gratitude for being able to apply these skills. Occasionally, when the students claimed to be proficient at a task, both they and the instructors discovered that more practice was required. It was important to encourage them to practice even mundane tasks to ensure that they were performing them to the highest standards. The ability to

explain why a given task was rehearsed incessantly made the Iraqis feel as though their time was not being wasted.

Complex scenarios were used to test the students' absorption of material. The iterations were progressively more difficult as repetition made early concepts well known. Whenever the students began to show proficiency and anticipate the types of injuries and tasks being assessed, the scenarios were varied with different combinations of severe and minor injuries. The setting for each scenario was also varied to help reinforce the differences between point of injury care and en route care medicine.

A variety of teaching strategies were used during the entire training program. Didactic and practical training were conducted, but also used were models, pictures, videos, and pertinent references. An example of a reference would include the pain associated with descent from high altitude when attempting to explain barotitis media, and an example of a model would include using two bottles of water and drink flavoring to visually demonstrate dilutional anemia. Frequently, drawing simple diagrams while lecturing helped to engage the students as visual learners and to mitigate the monotony of lecture. At times, it was also beneficial to sit down at the same table as the students and change the social dynamic from lecturer and audience to a round table discussion. Rapport with the students helped them receive the most value from the training.

Common in emergency medical services (EMS), and most other professions, is the use of mnemonics for memorizing key bits of information. English examples include SAMPLE (**s**igns/**s**ymptoms, **a**llergies, **m**edications, **p**ast illnesses, **l**ast oral intake, and **e**vents leading up to present illness/injury), AVPU (**a**lert, **v**oice, **p**ain, **u**nresponsive) and many others. None of these mnemonics are relevant to non-English speaking students and encouraging them to learn a second language and new skills is cumbersome at best. To better facilitate learning, the instructors learned a second language while the students either learned new medical material or reinforced old ideas. New acronyms were created based on the relevant Arabic words. In English, TCCC is commonly taught as H-A-B-C (**h**emorrhage control, **a**irway, **b**reathing, **c**irculation). An Arabic version of this methodology was "dawra al damawia (blood circulation)," "majraa al tanofosias (patent airway)," tonafos (breathing)," or "DMT" in English. Once student and teacher agreed on a given phrase, it was given an easily remembered acronym; in this case "DMT." By having the students teach their language to the instructors, it indirectly reinforced the material in their minds because they became teachers themselves (See one-do one-teach one).

Unsung Hero of the Training Program

The success of the mission was largely due in part to having a proficient and adaptive interpreter. Born a native Iraqi, our interpreter was able to explain all of the cultural variances with an insider's point of view. He was as happy to teach us about Iraqi culture as he was to learn about the medicine we were teaching. He did far more than simply relay our words from one language to another. Instead, he learned the material as it was taught and then expressed it in terms that made it relevant to the students. This included using lessons he learned as a child from his parents about growing up in a desert environment. His anecdotal stories were very useful in explaining the signs and symptoms of hypoperfusion because they very often were similar to subtle signs of dehydration commonly seen in the region such as headaches, muscles aches, blurred vision, and rapid heart rates. He became so proficient in the early material that the instructors frequently observed him teach instead of conducting the lecture themselves. Hands on training and evaluation proved that the lessons were translated well.

Exchanging Cultural Knowledge

Both the Americans and the Iraqis invested time in learning each other's culture. There was one break taken daily in which both students and instructors would drink Iraqi Chai (Cardamom tea) and occasionally enjoy sweet snacks. This facilitated building rapport with the students and making them invest their time and interest in the program. A kinship and esprit de corps was established between the coalition forces, and both sides felt as if they were working with brothers in arms.

Sgt. William Dempsey, right, a medic with Company F, 2nd Battalion, 238th Aviation Regiment, TF Heavy Cav., demonstrates the placement of defibrillator pads during cardiopulmonary resuscitation training at Camp Taji, Iraq

The Iraqis greatly appreciated the willingness of the instructors to learn about their culture with open minds. They discussed social etiquette, cuisine, their families, medical practices, and education in Iraq just to name a few. This distinguished their American counterparts from some of the other coalition members because they were less willing to learn the Iraqi way of doing things. The instructors of this project learned as much Arabic as possible in order to make practical training more effective. Words such as "Neseef (Massive hemorrhage)" and "Tonafos (Breathing)" facilitated practicing TCCC concepts. It also allowed quicker understanding of the material by the students.

EMS across cultural boundaries

The medics serving in the Iraqi Army shared many similarities with EMS providers from the United States. Ultimately, they are compassionate members of their communities who wish

to ease suffering and administer to the sick. Each one of them would graciously put themselves at risk to save another life. The stories they shared were very similar to stories I have read, listened to, or even experienced myself while serving in EMS. They have responded to emergencies while off duty, faced violence from bystanders, been under appreciated by hospital staff, and have watched their patients succumb to their injuries regardless of interventions. They are passionate about their tradecraft and are dedicated to becoming better practitioners of pre-hospital medicine. It is easy to imagine their stories as taking place anywhere other than Iraq. Despite geographic and cultural differences, the Iraqi army flight medics have much in common with other EMS practitioners.

Conclusion

Training the Iraqi Army flight medics was a rewarding and enlightening experience. Using a respected standard to provide a basis for instruction was integral to the success of the program and bridging cultural divides was a vital component that helped facilitate student learning. Through teaching, it is possible to have a greater effect over an entire region. Building partnerships with others establishes mutual trust and shared interest in peaceful coexistence. Because of the realistic scenarios and reinforcement of critical skills, a greater number of lives will be saved by the hard work of these flight medics.

SGT Bradley Owens is currently assigned as a Critical Care Flight Paramedic (MOS 68WF2), C Company, 2/104th General Support Aviation Battalion. His previous assignments include Trauma Specialist, Headquarters and Headquarters Battery, 1/201st Field Artillery battalion; Evacuation Non-commissioned Officer, Headquarters and Headquarters Troop, 1/150th Armored Reconnaissance Squadron; and Flight Medic/Unit Trainer, F Company 2-238th General Support Aviation Battalion. SGT Bradley has deployed to Kuwait and Iraq in support of Operation New Dawn and Operation Spartan Shield/Operation Inherent Resolve 15-16. SGT Bradley Owens has served in the Army for eight years and is qualified in the UH-60A/L and HH-60A/L.

Acronym Reference

EMS - emergency medical services	**RN** - registered nurse
MEDEVAC - aeromedical evacuation	**TCCC** - tactical combat casualty care
PHTLS - pre-hospital trauma life support	**TF** - task force

Back to it's Roots

Army Aviation's Doctrinal and Organizational Homecoming

By MAJ John Q. Bolton

Air-ground teamwork in combat on the battlefields of [Europe] at last became a reality.

—LTC Kent Greenfield, Army Ground Forces and the Air-Battle Team

During the first decade of this century, Army Aviation transformed itself from a parochial, Army-centric force into a highly skilled joint and international partner. Attack aviation in particular migrated from a focus on independent "deep attacks" toward close integration with ground forces. The net sum of these changes would ironically return Army Aviation to doctrinal foundations developed in the 1940s and refined in Vietnam and, structurally, to organizations that resemble World War II (WW II) tactical air commands (TAC).

Entering Iraq and Afghanistan, Army Aviation doctrine barely mentioned close coordination with ground units whereas later manuals were dedicated to detailed integration and close combat. In fact, while 1997's Field Manual (FM) 1-112*, Helicopter Operations* dedicates 76 pages to operations, there is nearly no mention of how Army helicopters should conduct close integration, let alone fire near friendly positions. This focus on unitary operations is ahistorical for several reasons. First, Army forces are predominately tactical, but "deep attacks" were focused on the operational level.[1] Second, the major growth in Army Aviation—its rebirth so to speak—in Vietnam was exclusively predicated on close coordination between ground units and aviation.

The emergence of the helicopter in Vietnam challenged previous Army-Air Force agreements over who controlled military aviation. A fierce debate grew until the services compromised in 1966: "In return for the Army's fixed-wing transports, the Air Force conceded [most rotary-wing operations], including direct fire support."[2] The Army embraced the helicopter as a means to garner support rather than relying on the Air Force.

In fact, the Army had seen the proverbial light in the form of helicopters. In addition to aerial mobility (assault), supply, and reconnaissance, the helicopter gave the Army organic airborne fire support. By 1967, the first dedicated attack helicopter, the AH-1 Cobra, was operating in Vietnam, performing Army "direct aerial fire support."[3] The Army viewed "helicopter gunships merely as occupying one point in a spectrum of escalation from the infantry's personal arms to Air Force tactical aircraft."[4]

After Vietnam, the Army returned toward its focus on Eastern Europe. AirLand Battle doctrine envisioned attack helicopters interdicting Soviet formations in "deep areas" beyond the range of artillery.[5] The epitome of this focus was FM 1-112, which focused on battalion and company-level operations and engagement area development.

Attack Helicopter Operations Field Manual Comparison

	FM 1-112 (1997)	FM 3-04.126 (2007)
Regulation Name	Attack Helicopter Operations	Attack Reconnaissance Helicopter Operations
Battalion Type	Attack Helicopter Battalion	Attack Reconnaissance Battalion
Mission Priority	Attack, Recon, Security	Recon, Security, Movement to contact, Attack
Purpose	Complement other maneuver forces	Facilitate ground movement
Employment Level	Battalion	Teams, prepared to fight at company/battalion
Role	Aerial maneuver units characterized as highly mobile and lethal; capable of destroying armor, personnel, and material	Shaping Operations; maneuver units that dominate but do not occupy

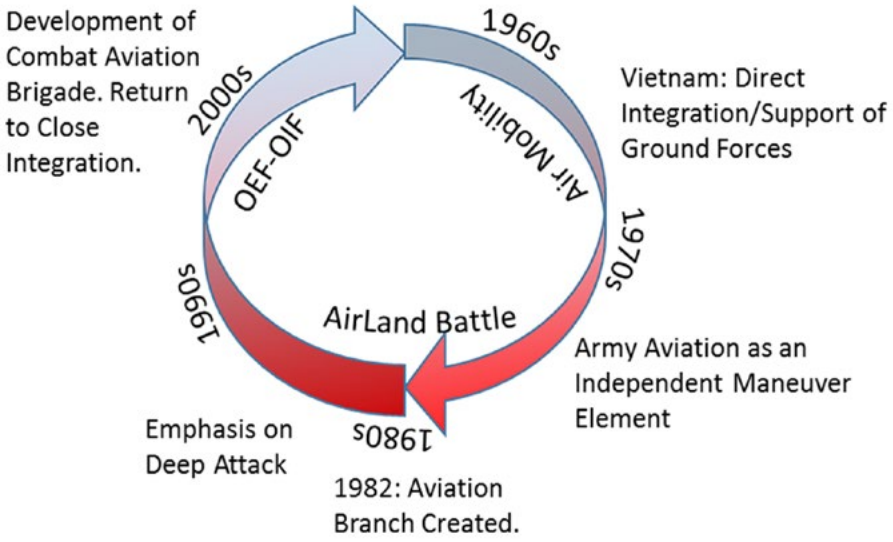
Source: Darren Buss, MAJ ,USA, "Evolution of Army Attack Aviation: A Chaotic Coupled Pendulums Analogy" (monograph, School of Advanced Military Studies, 2013).

By 2007, however, deep operations had given way to team tactics directly in support of small units. The embodiment of this change was FM 3-04.126 *Attack*

Reconnaissance Helicopter Operations. The new manual supplanted the "deep attack" paradigm with team tactics supporting urban operations, including close-combat attack.

Rather than "fly away from the Army," as the Air Corps had, by 2006 Army Aviation was firmly committed to supporting the Soldier in the ground fight.[8]

THE EVOLUTION OF ARMY AVIATION DOCTRINE



The net sum of these changes was to complete a doctrinal circle from close operations in Vietnam to a focus on independent, "deep" operations followed by a return to team tactics and integration with ground units outlined in the 2007 manual. Modern doctrine acknowledges the flexibility of aviation: "Army Aviation conducts attacks at multiple echelons. These can range from elements as small as attack or scout weapons teams using manned-unmanned teaming or a single armed unmanned aircraft system, up to the battalion or squadron level."[6] Doctrine also recognizes the inherent advantages of integrating Army Aviation into the combined arms team:

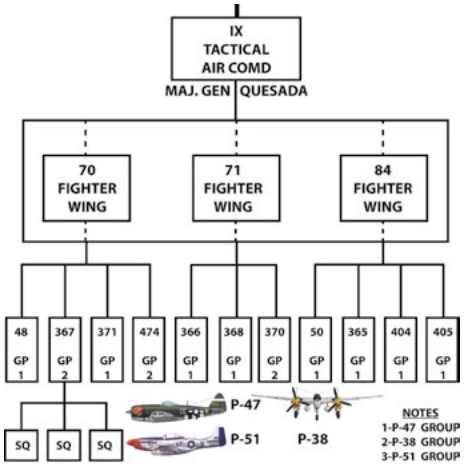
> ***"Army aviation units are organic, assigned, or attached to corps, divisions, and brigades and perform air-ground operations as part of a combined arms team. Army aviation assets, normally, receive mission-type orders and execute them as an integral unit or maneuver element. Special situations may arise where attack aviation assets are employed in smaller units."***[7]

Regardless of the size of the element however, Army Aviation remains committed to supporting the ground force.

> ***"I beg of you, to know yourself and your weapons, and to be frank among yourselves and with the rest of the Army. The Army will believe what the Air Corps says it can do, and rely on it. If its prowess is exaggerated, through whatever cause, disillusionment surely will come with war."***
>
> —LTG Lesley McNair,
> Address to Graduating Airmen, 1938

Army Aviation organization also changed, migrating from regiments controlled by Army corps designed for independent operations to the flexible combat aviation brigades (CAB), which combined each type of Army aircraft under a tactical headquarters. Though the CAB mimics the air mobility units of Vietnam, their real historical legacy is the WWII TAC.

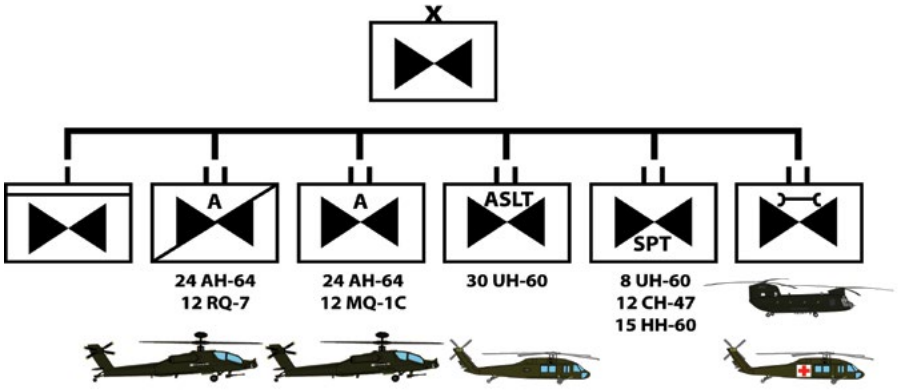
Example TAC Organizational Chart (NOV 1944)



Source: AAF. *Condensed Analysis of the Ninth Air Force in the European Theater of Operations* (1946); Author's inclusion of aircraft graphics. Note: A squadron was roughly equivalent to a modern Army Aviation company.

During the Interwar Period, nascent American and British air services fought for independence. They largely embraced the theories of Italian Giulio Douhet, who predicted that air power would *"crush the material ... resistance of the enemy."*[9] He proposed an independent air force using fleets of bombers to destroy a nation's heartland:

> ***In terms of military results, it is much more important to destroy a railroad station, a bakery, a war plant, or to machine-gun a supply column, moving trains, or any other behind-the-lines objective, than to strafe or bomb a trench. The results are immeasurably greater in breaking morale ... in spreading terror and panic...***[10]



Army Combat Aviation Brigade (2016)

Source: FM 3-04. *Army Aviation*, 2016, 2-2; Author's inclusion of aircraft graphics.

Douhet implied the necessity of centralized control to mass the effects of air power, referring to ground support as "useless, superfluous and harmful."[11] The necessity of independent air forces stressed by Douhet was a welcome relief to the Royal Air Force and Army Air Forces (AAF), who both desired service autonomy. This focus on strategic bombing—wich supported service independence—meant the AAF never developed the organizational or communication systems necessary for effective air-ground operations.[12] In fact, the AAF latched onto unproven strategic bombing theories that relied on three unproved methods: selecting the right targets; penetrating enemy air defenses; and achieving bombing precision. This framework assumed that vital targets existed; but experience over Germany would prove otherwise.

The AAF furiously pursued strategic bombing to the near-abandonment of other concerns. Even AAF commander General Henry Arnold was frustrated at the AAF's inability to support Army Ground Forces (AGF) exercises. During the 1942 corps-level maneuvers, the AAF provided less than 300 aircraft, many of which were obsolete, despite promising over 700.[13] The lack of AAF participation "served to confirm to the AGF that the AAF was committed to its own mission and priorities, irrespective of the wants and needs of the ground forces."[14] As a result, America began the European War not only inexperienced, but with serious issues in air-ground cooperation and doctrine. Many United States Army officers believed that AAF lacked the will, the ability, and the means to conduct a sustained campaign employing aircraft in close support of land units.

Following significant issues in air-ground coordination in North Africa, air and ground components were at laager heads. In July 1943, the AAF without the consent of the AGF, published FM 100-20, *Command and Employment of Air Power*. Field Manual 100-20 clearly favored strategic bombing over tactical support. On the first page, the new manual declared air power's independence in bold type:

DOCTRINE OF COMMAND AND EMPLOYMENT

1. RELATIONSHIP OF FORCES -- LAND POWER AND AIR POWER ARE CO-EQUAL AND INTERDEPENDENT FORCES; NEITHER IS AN AUXILIARY OF THE OTHER

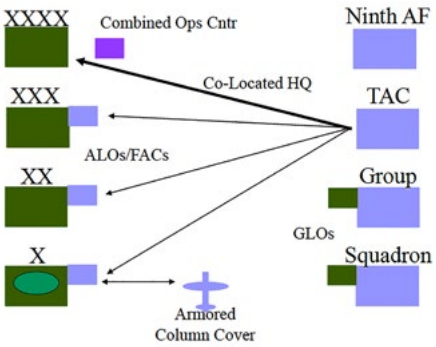
While most AGF officers recognized the need for air superiority, they were upset that FM 100-20 gave tactical air support low priority. Indeed, the new manual only mentioned liaison/ coordination between a tactical air force and theater command, whereas previous doctrine required coordination to the regimental level.[15] The AGF commander, LTG McNair, viewed FM 100-20 as a testament to the "indifference of the Air Staff to cooperation of air with ground forces."[16]

Practically however, the document's main influence was a much needed clear delineation between tactical and strategic air forces. Though AAF resources still tilted toward the bombers, in an era of almost unlimited spending and cheaper aircraft, FM 100-20 allowed freedom for tactical air leaders.

In Northern Europe, the 9th Air Force filled the tactical role. Its commander, LTG Hoyt Vandenberg, aligned a TAC with each field army. The TAC commanded one to three fighter wings consisting of seven to twelve fighter-bomber groups (100 aircraft each) and a reconnaissance group.[17] Vandenberg stressed the importance of air-ground cooperation through a formal program of exchange officers between air and ground units. In fact, Vandenberg's initial chief of staff was an infantry officer."[18] Though formally separate, Army and TAC commanders, having fought together since 1942, generally allowed battlefield realities and personal relationships to supercede doctrinal rigidities.[19]

Whereas the bombers operated with minimal coordination between ground forces, the TACs established coordination schemes recognizable to any contemporary Army aviator.

TAC Communications Schematic Fall 1944



Source: Dr. Christopher Gabel, (lecture, Army Command and General Staff College, February 2015).

The best air-ground team was 3rd Army and XIX TAC, led respectively by GEN George Patton and BG Otto Weyland. Army Air Force GEN Carl Spaatz described them as: "the greatest example of air-ground cooperation that has ever been or will ever be."[20] Though some AAF officers used FM 100-20 to demand coequal status with ground forces, Weyland viewed it as merely a starting point for developing solutions which fit the situation at hand."[21] To support Patton, "Weyland threw away the air power book, decentralizing operations, delegating command, dispersing assets as the situation dictated."[22] Field Manual 100-20 characterized tactical air power as the "most difficult to control, [the] most expensive, and, in general, [the] least effective [method]," but XIX TAC demonstrated effectiveness and a low loss rate.[23] Despite operating at low altitudes over German positions, which meant facing near-ubiquitous flak, XIX TAC loss rates were better than the bombers.[24] The lower loss rates of tactical aircraft were, in part, a result of the close cooperation enjoyed with the ground forces.

Because of the close cooperation between 3rd Army and XIX TAC, procedures for requesting and controlling air support were streamlined and integrated into operations.[25] This resulted, in part, from placing aviators as far forward as possible. Exceeding doctrine, Weyland attached a pilot to each 3rd Army battalion coordinate with four-ship fighter-bomber teams.

As 3rd Army advanced, Weyland moved his headquarters frequently. At one point in August 1944, XIX TAC had four separate

command and control elements spread across northern France, coordinating operations from 12 different airfields.[26] That month Weyland moved his headquarters seven times, displacing nearly 250 miles.[27] While adjacent headquarters created mutual understanding, 3rd Army-XIX TAC also planned jointly. Weyland attended Patton's operations meeting each morning and their staffs coordinated nightly.

The XIX TAC pilots would coordinate with 3rd Army artillery to "black out" German flak, rather than suffer through it like the heavy bombers.[28] American ground forces employed tactical air power as effectively as organic artillery; more effectively, perhaps, because the fighter-bombers could identify and destroy discreet targets, such as tanks, that artillery could only suppress.[29] A division commander remarked: "The best tank destroyer we have is a P-47."[30] Though employing aircraft against single targets violated tenets of FM 100-20, Weyland understood that time was a critical factor for Patton's columns.[31] He explained: "Well, time was of the essence. . . they were moving, so by the time they'd stop a column and deploy their artillery,. . . it might take them an hour or two. I'd have fighter-bombers out in front and we'd try to take care of anything."[32] Because of the relentless pursuit of the fighter-bombers, many Germans developed, "The German look," head turned skyward looking for the next fighter-bomber. When asked what could have "neutralized the Allied air forces," Generaloberst Heinz Guderian responded simply: "The creation of a better Luftwaffe."[33]

Patton and Weyland provide the premier example of what an effective air-ground team can accomplish through mutual understanding, close cooperation and proximity, as well as a willingness to set aside doctrine and service parochialism. Though he was not Patton's subordinate, Weyland refused to "wave an AAF flag or FM 100-20" or explicitly follow AAF doctrine.[34] Patton reciprocated his trust, even recommending that Eisenhower make Weyland a corps commander.[35] In December 1944, Weyland summarized the teamwork:

> The one I have particular in mind is the mutual respect and comradeship that has been built up between all elements of the XIX TAC and the 3rd Army. My boys like the way the 3rd Army fights. The 3rd Army goes ahead aggressively. My kids feel that this is their Army.... I think you can quote that our success is built greatly on mutual respect and comradeship between the air and ground.[36]

Comparing the doctrinal missions and organization of the TACs and CABs illustrates the similarities. Though different in scale—XIX TAC averaged over 400 aircraft and 12,000 personnel—the same principles still apply.[39]

One of the most important aspects of successful air-ground coordination is relationships between ground and air units, creating cooperation and common understanding between echelons. It is less about the "box," meaning the aircraft and its technology, than it is about the "man in the box."[40] Due to their close proximity and regular working relationship, 3rd Army corps and division headquarters laterally coordinated with XIX TAC fighter-bomber groups. Likewise, the CAB is closely aligned with a single division allowing for long-term working relationships.

This creates not only unity of command, but also common understanding, as the CAB is close - special, temporally, and doctrinally - to supported units. Since Army helicopters do not require improved sites or long runways, they can co-locate forward with ground units. Conversely, with few exceptions, the USAF has not placed aircraft forward at austere sites since Korea.

The contemporary division-CAB relationship mirrors the WW II Army-TACs Army structure, making CABs the historical

Table 1. Similarities between TACs and CABs

Organization	Tactical Air Commands	Combat Aviation Brigades
Missions	Close Air Support Interdiction Deep Interdiction Dive Bombing Counter-air Reconnaissance	Reconnaissance/Security Movement to Contact/Attack Air Assault/Air Movement Air movement Aerial Mission Command CASEVAC/Personnel Recovery MEDEVAC
Enabling Operations	Signal (Wire) Installation Air Traffic Services Leaflet dropping	Forward Arming- Refueling Downed Aircraft Recovery Air Traffic Services Unmanned Aircraft Systems
Subordinate Organizations	Fighter Groups Fighter-Bomber Groups Reconnaissance Group Night Fighter Groups	Attack-Reconnaissance Battalion(s) Assault Battalions General Support Battalion
Proximity to Ground Force	Close proximity or co-located. Moved with ground unit.	Co-located or close proximity. Can function as maneuver HQ.
Relationship to Ground Forces	Close Cooperation at the HQ level. Coordination with units.	General Support to Army Division/JTF with occasional direct support.
Higher HQ	Tactical Air Force	Division, Corps or JTF

Source: 9th Air Force Charts, Vandenberg Papers; AAF, *Condensed Analysis of the Ninth Air Force in the European Theater of Operations* (1946); FM 100-20 *Command and Employment of Air Power* (1943); FM 3-04 *Army Aviation* (2015).

CAB-TAC Similarities

The effectiveness demonstrated by Third Army and XIX TAC was the result of mutual understanding and close proximity. The CAB provides a similar level of support and integration to ground units. During operations, the close proximity of XIX TAC and 3rd Army headquarters allowed for bottom-up refinement of plans. Weyland enhanced this by devolving authority to his flight squadrons to enhance cooperation. Fighter-bomber groups developed habitual working relationships with divisions and regiments; for the first time, ground units could also reliably talk directly to aircraft overhead.[37] Moreover, Patton and Weyland encouraged lateral coordination, rather than smothering it. Furthermore, like the current modern CAB—and unlike modern U.S. Air Force (USAF) doctrine— XIX TAC and 3rd Army operations, down to the regimental level, were "planned, discussed, and arranged together. . . allowing for absolute homogeneity between air and ground."[38]

descendant of the TAC and the concept of tactical air power as a whole. Because of the organic chain of command, close proximity, and mutual understanding created by the Army's division-CAB task organization, Army aviators are able to tailor and employ air power to best suit the Army's needs.

The Past as the Future

What does Army Aviation's transformation from an independent force to one closely tied to ground forces tell us? First, close air-ground cooperation is critical to the success of the overall effort. Unitary air power has the same limitations as a tank regiment without reconnaissance or infantry. Air and ground partners enhance the other's strengths and mitigate their respective weaknesses; doctrine should reflect this. Second, cooperation creates effectiveness, meaning the structure of organization's matter. Good structures ease communication and proximity, leading to good cooperation and mutual understanding. Effective cooperation also requires leadership to instill disciplined focus on the overall mission, and discipline between partners. Modern doctrine calls this Mission Command.

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Acronym Reference

AAF - Army Air Force	**TAC** - tactical air commands
AGF - Army Ground Force	**WW II** - World War II
CAB - combat aviation brigade	**USAF** - United States Air Force
FM - field manual	

AIR CAVALRY TRANSFORMATION IN THE DOWNWIND

By CPT T. Jordan Terry

Cavalry has historically served as a flexible, multipurpose force. Capitalizing upon a significant mobility advantage over infantry, cavalry performed long-range reconnaissance and security for commanders. – FM 17-95, Cavalry Operations (1996)

In his *Kevlar Legions*, John Sloan Brown outlines the sweeping Army transformations which took place in the operational identity vacuum following the collapse of the Warsaw Pact and the USSR.[1] Through the eventual progression toward Force XXI, units of employment and the brigade combat team (BCT) saw the reshaping of many elements of the Army deemed to be relics of the Cold War operational environment. Nuclear-armed elements disappeared, air defense consolidated at the corps and theater levels, and divisional artillery and engineer units transitioned into organic, subordinate enablers within the BCTs. Perhaps, though, the most significant evolution, both practically and emotionally, involved the Army's Cavalry units.

Fiscal realities and a re-visioning of post-Cold War conflict have, with spirited internal debate, seen armored cavalry regiments acquiesce their role to battlefield surveillance brigades before assuming the equipment and structure of standard Stryker BCTs. Divisional cavalry squadrons either shed their ground forces en-route to becoming OH-58D equipped air cavalry subordinate to modular combat aviation brigades or reflagged as BCT-organic reconnaissance, surveillance, targeting and acquisition squadrons – regardless, 'Div Cav' ceased to exist.

Whether during this most recent Army transformation or during the tumult of progressing from horses to mechanized vehicles, cavalry troopers and leaders have reflected the cavalry's operational role, demonstrating mobility, flexibility, audacity, and the team-based mindset which accompanies habitual combined-arms relationships. Though more tied to the Army's present financial constraints than the post-Cold War force modernization effort, the Army Aviation Restructuring Initiative (ARI) has taken flight and is again sparking spirited conversation and major changes for the cavalry community and the Army Aviation enterprise at large. This evaluation of the air cavalry transformation at a midpoint ('in the downwind') will demonstrate that today's troopers, in spite of their understandable grief and often-vague prospects for the future, are again responding with professional flexibility and an aggressive drive to continue valuable service to the Army.

A Movement to Contact toward Utility

The announcement and initial implementation of ARI presented unique challenges to both units and individuals. Warrant officers, junior and senior, scrambled to discern their potential for future service in the aviation community: Who would get a transition? To which airframe? Would Soldiers be forced to retire or face early separation? What other opportunities existed if a transition wasn't on the table? Likewise, Kiowa Warrior maintainers and armament specialists had to grapple with the idea of re-classing, which would require the considerable challenges of re-attaining technical expertise. And commissioned officers began to forecast potential changes regarding key developmental positions, broadening opportunities, and flying in general. Air cavalry leaders faced (and still face) a significant challenge in preventing this natural anxiety from affecting ongoing training and mission accomplishment.

Yet on the heels of the initial shock, the OH-58D community began (and continues) a movement to contact of utility into the uncertain environment of ARI. Admittedly, some viewed this as 'jumping off a sinking ship.' The truth, however, is that many scouts made an aggressive, deliberate move to continue to find ways to contribute to Army Aviation. Many senior, tracked warrant officers took on the challenge of transitioning to the unmanned aircraft systems (UAS) field to cross-level their reconnaissance, security, and air-ground operations expertise with the existing UAS operator skill sets focused on collection and surveillance. Aviators, commissioned and warrant, also took the opportunity to assess and attain positions within Army Special Operations Aviation. Company-grade commissioned officers without an immediate aircraft transition focused their efforts on opportunities to command and contribute in aviation maintenance, forward support, headquarters, UAS, air traffic services, or recruiting and training companies. Kiowa Warrior non-commissioned officer maintainers, not

immediately identified for re-training, competed to serve in recruiting, drill instructor, and other important by-name-selected positions.

Some air cavalrymen, rather than condemning ARI for orphaning them from their beloved aircraft, instead turned to serve as the bedrock of two key ARI efforts. On short notice, and with little preparation, a small cadre of troopers displayed traditional cavalry flexibility in taking on Fort Rucker's transitional effort from the TH-67 and OH-58 aircraft to the LUH-72 for primary, instrument, and basic warfighter skills flight training. The cell of former Kiowa Warrior instructors rapidly qualified in the Lakota, progressed to instructor and standardization pilot status, and began to serve as the train-the-trainer foundation of the flight training aspect of ARI. Likewise, field grade officers and tracked warrant officers rapidly integrated into the effort to provide a critical core of reconnaissance experience and cavalry tradition to the Army's new heavy attack reconnaissance squadrons employing AH-64 Apaches and RQ-7 Shadows.

The air cavalry community's aggressive demonstration of institutional flexibility and mobility will take time and effort to fully synchronize with the highly-technical nature of modern aircraft, maintenance, and operational support. Nevertheless, the cavalry spirit remains and troopers moving to contribute to the Army Aviation team effort will continue to draw motivation from the question that has motivated air scouts for generations: How can I provide the ground forces with the support they require and deserve? The Kiowa Warrior community does not yet fully know what future utility and support to the ground force looks like outside an OH-58D cockpit – that uncertainty, however, only heightens troopers' drive to move forward to gain and maintain contact.

Challenges Moving Forward

The ARI has taken flight – the critical decisions have been made and major shifts in personnel and resources are underway. There are, however, several extant challenges specifically confronting the air cavalry community.

The last Kiowa squadron has not yet cased its colors. For reasons of safety, mission demands, and pride, there is no room for complacency. That the maintenance infrastructure for the OH-58D has dwindled and the training pipelines for aviators and maintainers have ceased operations calls for more deliberate management of personnel and materiel. The Aviation community must remember that for a few remaining OH-58D troopers, for a few remaining months, the fight continues on.

Second, there is an enduring demand for personnel management, specifically with commissioned officers. The warrant officers of the air cavalry community have generally enjoyed a clearly-defined, centrally-managed way ahead, including the board evaluating potential for continued service. Whether the ARI pushes an individual toward positive changes or negative, at least the Aviation Branch managers at Human Resources Command (HRC) have provided some element of predictability and expectation management. This does not ring true for the commissioned air cavalry officers. If there is a centralized plan, it has not been well-communicated. Officers are left to speculate on a varying (and seemingly inconsistent) exchange between HRC, the United States Army Aviation Center of Excellence, specific units, and individuals. Advertising that aircraft transitions will be doled out inconsistently on a case-by-case basis provides no useful reassurance to officers who have flown, fought, and led dutifully and courageously. The insufficient communication of prospects for continued service in the Aviation Branch forces capable officers to operate in professional uncertainty and doubt.

Finally, questions remain about the air cavalry community moving forward as a whole. Reflagging attack units, giving out Stetsons and spurs, and learning Fiddler's Green are only the symbolic elements of the cavalry transition. The true substance of the transition involves the cavalryman's mindset. Of critical importance is the passing-on of the service-provided attitude, the mentality which provided decades of faithful support to the ground force. Also, the aviation community must delineate roles, responsibilities, and mission expertise between Apache-equipped attack battalions and cavalry squadrons. Significant intellectual effort must be put forth to incorporate the Apache's strengths and capabilities into the combined-arms reconnaissance and security mission sets. Thus, substantial mental agility and introspection must inevitably follow the assumption of the cavalry mantle.

Conclusion

The current situation is not unlike the Kiowa Warrior itself. The professional hurdles imposed by the ARI mirror the humbling limitations present in the aged airframe – air cavalry troopers must acknowledge and creatively overcome these drawbacks. Kiowa Warrior pilots and maintainers thrived for decades by focusing on what they could do, rather than what they could not do. The air cavalry transformation will shortly turn to final. The aviation enterprise should reciprocate the air cavalry community's honorable service by providing predictable opportunities for continued service. Former OH-58D troopers should continue to find creative ways to apply their experiences and knowledge. Every effort should be made to ensure that new heavy air cavalry units are adopting the selfless mentality that earned the Kiowa Warrior the affections of the ground forces. Air cavalry operations are not limited to an airframe and will always depend on men and women possessing the audacity, flexibility, and combined-arms expertise to provide the armed reconnaissance and security the Army needs and deserves.

Scouts Out!

[1] John Sloan Brown, Kevlar Legions (Fort Leavenworth: U.S. Army Center for Military History, 2013).

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Acronym Reference

ARI - Aviation Restructuring Initiative
BCT - brigade combat team

Army Aviation Safety

By CW3 Emilio B. Natalio
and CW3 Jon N. King

Why doesn't the Army standardize Safety? Standardization means adherence to proven procedures to ensure consistency and repeatability. We use standardization in Army Aviation to preserve resources – lives and aircraft. At first glance, it seems that every aspect of Army Aviation's daily business is standardized. We adhere to many standards of flight and are governed by many regulations that ensure safety of flight. There are standard annual flight hour requirements, there are checklists that standardize the start-up and shut-down of every Army aircraft, and there are standardized steps to follow in the event of an aircraft emergency. As strange as it may seem, while standardization may have widespread application in Army Aviation as noted in the short list of previous examples, the business of Army Aviation Safety is not. Some of the issues are small and maybe insignificant, others are downright irritating as they reflect a significant and unnecessary latitude between every major aviation organization to accomplish the same task. As a safety community we need to standardize - the old adage of "in my last unit" or "but here our SOP states…" should not be an answer when we discuss safety. Safety should be standardized as any other aspect of the Army Aviation profession.

We rely heavily on locally made products made by the unit "spreadsheet guru" who understands the inner workings of macros and tables. But what happens when that one skilled individual leaves the unit? Since the procedures for creating the product were never documented, the product often becomes outdated and the cycle of re-inventing a suitable product to serve the same purpose starts over again. As a member of the Aviation Safety Officer (ASO) List Server, I have seen multiple requests for a "good" spreadsheet to track the unit's fighter management program or a universally acceptable class sign-in roster. During installation inspections we use locally produced forms to demonstrate documented training and attendance. As the records inspectors see many different versions of sign-in rosters and forms, they normally find issues with the format or the information contained on the form itself. Although many of these comments are well-intended to improve the units efficiency, each new inspection bring new inspectors with new and well-intended comments.

Fighter management tracking is an important function intended to account for the crew member's duty day. Tracking methodology varies significantly from unit to unit and appears to be in large part a function of the safety officer's knowledge of Microsoft Excel. The fighter management tracker is never set up the same. In a single example of many variations, a forward medical support team is typically assigned to a different task force when deployed with each working under a fighter management tracker different from the others. One task force might track on a non-secure internet protocol router, another on the secure internet protocol router, while others might use a local drive on the unit's Miltope computer. Some units will only track flight hours and duty hours and others will use it as a semi-annual and annual flight hour tracker. As long as the duty day and flight hours are tracked, our many varied systems seem to meet the requirements; however, standardizing how and where Army Aviation tracks fighter management would greatly reduce confusion across the force and minimize the potential loss of information.

How the records are maintained should also be standardized. Requiring Soldiers to carry a paper product that tracks all of this information from unit to unit is an option, but when a tool such as the Digital Training Management System (DTMS) is available, why risk the chance of important records being misplaced or lost while in transit from unit to unit? Why waste the trees? Standardized documentation of every Soldier's completed training could be made available to the commander and training managers. Not only could mandatory training be tracked, but an additional advantage would be the ability to identify special skills annotated in the training record that support essential additional duties within the unit. For example, a DTMS review of a new Soldier's

records show that he has completed the Occupational Safety and Health Administration approved Hazardous Communication, Hazardous Material/ Waste (HAZMAT) and Hazardous Waste Operations and Emergency Response training in an earlier assignment, allowing his skills to benefit the receiving unit.

The training record could potentially include the Army Abbreviated Ground Accident and Abbreviated Aviation Accident Reports under reference numbers available only to the command team. The rationale is that this information is key to allowing the commander to create a viable safety training plan or creating a unit accident trend analysis. Each Command Team has a "High Risk" tracker, that track Soldiers' who are "High Risk", due to a pending divorce or financial issues, why wouldn't they need to know about a previous accident that the Soldier was involved?

Another opportunity to standardize practices within Army Aviation is with aviation risk assessment analysis. Interestingly, the Army provides a standardized Ground Risk Assessment Tool to assist in the identification, assessment, and control of hazards. But we, in Army Aviation, have not managed to come to terms with this level of standardization with the risk assessment worksheet (RAW). The RAW format changes with every major unit/installation and the assessment varies from assigning numeric values to assigning colors to designating risk values. The inconsistency across Army Aviation is confusing and consistently open to

discussion as to whether a particular form completely answers the mail as a risk assessment analysis tool during major aviation unit inspections. Of all of the forms used within Army Aviation, why has this form not been standardized? Each area of responsibility has unique areas of concern that require additional risk assessment considerations but these should not necessarily change the overall format or method of completing the risk assessment worksheet. The additional considerations could simply be added to an Army standardized form as a local addendum.

Using the Ground Risk Assessment Tool as a guideline, the aviation risk assessment could become a standardized form, decreasing the chance of inaccurate or incorrect information. As an online/ electronic tool, individual aircrew information could be pulled from the Centralized Aviation Flight Records System as an accurate reflection of crew flight hours. Additionally, incorporating the fighter management/crew endurance program into the risk assessment would also create an all-inclusive form for providing a detailed overview for a mission briefer or a final mission approval authority. Eventually, other data which has direct correlation to aviation risk assessment such as illumination tables, weather brief information, and the DD 175-1 Flight Plan could be added as deemed necessary. From a different, albeit unpleasant, afterthought - in the event of an incident/accident all of this information could become a bundled data point for an investigation team.

There are many ways safety professionals can standardized the safety community. Incorporating these few changes could be the catalyst in standardizing the Army Safety Program. Creating a Soldier Safety Training Record, standardizing the fighter management tracker, and creating and standardizing an Aviation Risk Assessment form will enable the Safety Officer to do their job more efficiently in creating a "Safety Culture" in the Army.

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Acronym Reference

ASO - aviation safety officer	**HAZMAT** - hazardous material/waste
DTMS- Digital Training Management System	**RAW** - risk assessment worksheet

TURNING PAGES

~ book reviews of interest to the aviation professional

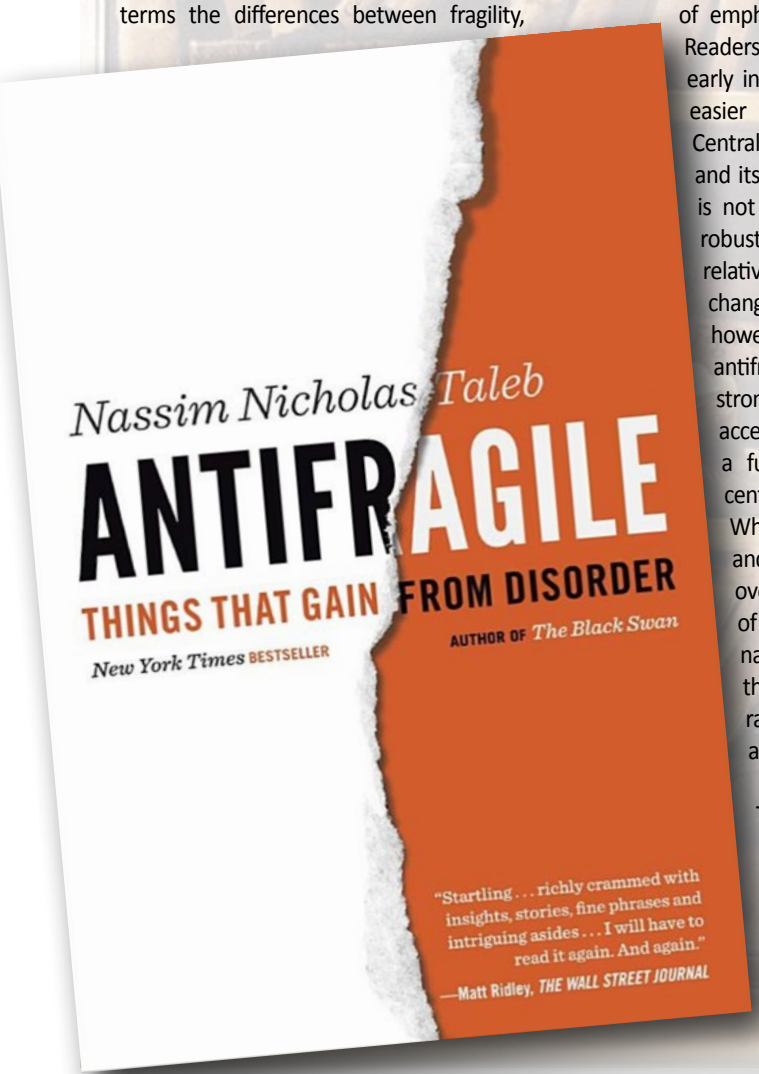
Antifragile:

Things That Gain from Disorder

By Nassim Nicholas, Published by The Random House Publishing Group, 2012, New York, 507p
Available in hardcover, paperback, and Kindle formats.

A book review by CPT Sean Clement

Antifragile: Things That Gain from Disorder is the fourth of five books written by the former Wall Street trader, scholar, and statistician Nassim Nicholas Taleb in his Incerto series. Taleb's previous works, include his prophetic book The Black Swan (2007) where he is credited with predicting the banking and economic crisis of 2008 and the Syrian civil war based on the inability of business leaders, bureaucrats, and politicians alike to understand fragility and its consequences. The central theme of Antifragile is to expound on the ideas of fragility presented in his previous works and to explain in clear terms the differences between fragility, robustness, and antifragility, how to identify fragility, and steps to reduce fragility to the point of robustness of antifragility.



While some readers will no doubt find Taleb's bombastic tone off putting his points, which are delivered in simple, easy to digest terms are hard to ignore. At some point in the book it is likely that Taleb will say something that annoys the reader, however, it should be kept in mind that his diction is derived from the passion he holds on the topic and its implications rather than an attack ad hominem. His pension for repetition is a tactic of emphasis and done deliberately. Readers who know these two facts early in the book will have a much easier time digesting its content. Central to understanding Antifragile and its concepts is that antifragility is not the same as robustness. A robust person or system will remain relatively unaffected by exposure to change, volatility, and randomness; however, according to Taleb, the antifragile person will become stronger. Once the reader can accept these concepts as distinct, a full understanding of Taleb's central point becomes possible. Which is that we, as individuals and organizations, vastly overestimate our understanding of rare events, which Taleb names black swans, and that our attempts to control randomness is mostly useless and sometimes dangerous.

To be more specific, we underestimate the frequency of rare events, underestimate the fragility of our systems to these changes, and lack the understanding to accurately predict large scale events. Some may wonder about his condemnation of prediction when he is credited with predicting both the Syrian civil war and the economic crisis. Taleb would respond to this by saying no one can predict exactly what the "black swan" event will look like but we can identify, as he did, the fragility in our systems which, given enough time, will fail. This central idea and its supporting concepts can change everything you think you know about understanding, evaluating, and managing risk in your organizations. An in depth technical understanding of statistics or mathematics is not needed to understand and appreciate Taleb's points in the book, although more technical writing and explanations are available for his examples via his website. Anyone who is, has, or will be in a leadership position within the Army should take the time to read and digest this book. Taleb artfully explains mathematical and philosophical concepts of risk management using simple heuristics, modern examples, classical literature, and autobiographical accounts. His recurring themes of skin in the game, via negative, the Lindy effect, barbell strategy, and the green lumbar fallacy highlight incorrect and often dangerous or immoral mistakes we as leaders can make in not fulling appreciating the randomness and complexity of our world.

Antifragile explains how we underestimate the occurrence of rare events (black swans) and how we can detect the vulnerability of our systems to those events before they occur. In doing so, we can learn to make our military organizations more robust and perhaps even antifragile to the randomness and volatility of modern combat. His heuristics of detection and system design are well worth the time of any Army leader looking for the next edge in organizational theory or using statistics to improve their organization.

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