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ABOUT THE COVER

The far reach of air traffic services

Editor's Note

"A thourough knowledge of your profession is the first requirement of leadership and this certainly has to be acquired."
- GEN Omar Bradley

As professionals, we are afforded the opportunity in this issue of Aviation Digest to gain a greater appreciation and understanding of how Army air traffic services (ATS) contribute to our Army's ability to operate around the world in a joint environment and here in the United States. The Soldiers assigned to ATS units conduct air traffic control, airfield management, and flight dispatch operations. They are integral to our ability to plan for and then conduct forcible and early entry contingency operations; reception, staging, onward-movement, and integration; sustained theater aviation operations; and defense support of civil authorities. Their integration is critical to mitigating many of the risks associated with aviation operations in and around tactical assembly areas, heliports, airports, training stage fields, and operational airspace. ATS Soldiers also greatly contribute to commanders' ability to visualize, describe, direct, and lead.

The articles in this issue will enhance one's ability to better understand airspace management and the capabilities and limitations inherent to ATS. Any planner and subsequent user of the airspace over an operational area must consider the presence of mortars, artillery, fixed-wing, rotary-wing, unmanned aircraft systems, and joint partners when planning operations against a determined enemy. If poorly planned and/or executed, the combined arms team may forfeit mass, concentration, or tempo due to a lack of synchronization. Air traffic services undoubtedly contribute to our ability to accomplish the seven core competencies of Army Aviation as identified in FM 3-04. Utilizing systems such as the Tactical Airspace Control System, Air Traffic Navigation Integration Control System, Tactical Terminal Control System, and the Mobile Tower System, Soldiers assigned to theater airfield operations groups, airfield operations battalions, ATS companies, and the airfield management element, spread across the active Army and National Guard impact contingency operations and training 24 hours a day, seven days a week.

As aviation leaders strive to develop the most realistic and complex training possible at the collective level, it is vital that Army air traffic services and airspace management are a part of the plan. This training will guarantee our ability to better resource and employ this capability when we no longer control all the variables. Airspace and airfield management will always be paramount to our ability to support the ground maneuver commander.

ABOVE THE BEST!

LTC Richard Coyle
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LTC Richard R. Coyle is currently assigned to the Directorate of Training and Doctrine, as the Chief of Doctrine and Tactics at the United States Army Aviation Center of Excellence. LTC Coyle has served with the 1st Cavalry Division, 2nd Armored Cavalry Regiment, at the Joint Readiness Training Center, 8th Army, the 25th Infantry Division, and the 101st Airborne Division (Air Assault). He has deployed to Bosnia and twice to Iraq. Most recently, LTC Coyle commanded the 7th Squadron, 17th Cavalry Regiment at Fort Campbell, KY. He has 20 years of service and is qualified in the OH-58 A/C and D.

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The Command Corner

This edition of Aviation Digest focuses on Army Air Traffic Services (ATS). The title alone does not do justice to the incredible mission our ATS Soldiers perform in combat and training around the world every day. A mission that enables our commanders to exercise mission command in complex environments. At any given airfield down range today, you will find our ATS Soldiers bringing order to chaos and clarity to complexity. Our controllers run the busiest airfields in the world, simultaneously controlling heavy fixed wing and fighter aircraft, rotary wing aircraft, unmanned aircraft systems (UAS), and multi-national aircraft. They do this during day, night, and instrument conditions, providing all the services a civilian air traffic control facility provides, but unlike their civilian counterparts, they also do it while deconflicting direct and indirect fires and employing force protection procedures for friendly forces and facilitating emergency medical evacuation and tactical missions. Our ATS Soldiers are an absolutely critical component for successful combat aviation operations.

During the past decade plus of deployments, Army ATS formations have undergone modernization efforts that have enhanced safety of flight, effectively managed airspace in a joint environment and conducted airfield operations in both austere and improved locations. They employed systems that enabled mission command such as the Air Traffic Navigation Integration Control System (ATNAVICS), Tactical Airspace Integration System (TAIS), Tactical Terminal Control System (TTCS), and the Mobile Tower System (MOTS) (currently in fielding) which is replacing the Tactical Control Tower System. All of this while supporting combat operations around the globe.

In addition to controlling the world's busiest airports, our ATS Soldiers also perform airfield management functions at remote airfields around the world. To date, we have performed the airfield management function out of hide. Through the Aviation Restructure Initiative, we have developed a standardized Airfield Management Element (AME) in each of our combat aviation brigade (CAB) headquarters to perform this critical mission. In the past, commanders had to dynamically task organize to man this essential element, often times having to take away personnel from other important sections. The AME is now permanently codified in the table of organization and equipment as a team in the CAB S-3 section.

Our ATS Soldiers have been on the leading edge of operating in complex environments. As we continue into the future, it is critical that home station and combat training center training continue to present our Soldiers with rigorous, complex scenarios using all of the tools the integrated training environment has to offer. Commanders need to continue to integrate ATS training into all aspects of aviation training, to include UAS operations at home station. While it is difficult to replicate the volume of traffic in a live environment for training, simulation offers the capability to present our Soldiers with complex scenarios that challenge their leadership and Soldier skills. We owe it to our Soldiers to continue to train them to operate in unknowable future environments, and develop as leaders at the same time. Tough, rigorous training is the commander's tool to develop our ATS leaders.

Above the Best!

Mike Lundy
Major General, USA Commanding

Why Army ATS?

By COL Douglas C. Van Weelden

Army Aviation forces have employed air traffic control (ATC) and air traffic services (ATS) capabilities for many years. Tactical ATC units operated and enhanced operations in Vietnam and every conflict since. As our Nation and Army address realities presented by fiscal and resource constraints, hard questions must be asked regarding the retention of certain capabilities and the risks associated with the divestiture or reduction of other capabilities. It is with this premise that I will explore the question of why the Army possesses and needs an air traffic services capability. The simple answer is that the Army does require the capability, and the answer resides in our doctrine, most specifically our mission command doctrine. The mission command principles, mission command, philosophy of command, and mission command warfighting function all highlight the need for Army ATS. In essence, Army ATS forces are a mission command enabler that provides the ground force commander a mission command overmatch.

The most current mission command doctrine, Army Doctrine Publication (ADP) 6-0, discusses the Army's approach to mission command. The approach incorporates three ideas: exercise of mission command guided by principles, mission command philosophy, and the mission command warfighting function. Within each of these three ideas are clear ties to the Army's requirement for an ATS capability.

Mission Command Principles

There are six mission command principles listed in ADP 6-0. They are: build cohesive teams through mutual trust, create shared understanding, provide a clear commander's intent, exercise disciplined initiative, use mission orders, and accept prudent risk. Air traffic service forces assist in building teams and trust, as well as creating a mutual understanding through the establishment of common procedures and controls to disparate organizations. Air traffic service Soldiers, the human element, afford the commander the ability to exercise disciplined initiative while sustaining risk at prudent levels in order to achieve the intent and end state. The ATS forces augment and enhance mission orders via the publication of airspace procedures and controls, providing sufficient guidance to minimize risk levels, and allowing sufficient flexibility to afford disciplined initiative.

Mission Command Philosophy

There are two components to the mission command philosophy - the art of command and the science of control. The art of command focuses on the commander's authority, leadership, and decision making. The science of control includes the "… systems and procedures used to improve the commander's understanding and support accomplishing missions." This science of control is dependent upon information, communication, structure, and degree of control. Air traffic service units afford the commander flexible capability in all four components of the science of control. Robust communication packages and critical information dissemination procedures are all central to the ATS function. The ATS structure, both within the combat aviation brigade and at the strategic support levels, afford tailorable forces to fit the commander's needs. Shaping procedural and positive control measures for airspace and airfields ensure the appropriate degree of control such as not to stifle disciplined initiative while managing risk at prudently acceptable levels.

Mission Command Warfighting Function

The mission command warfighting function is comprised of tasks and systems. There are commander tasks, staff tasks, and additional tasks. Within each group of tasks, ATS forces contribute to task accomplishment or execution. Commander tasks involve driving the operations process, informing and influencing, and developing teams. ATS forces and capabilities enable and enhance each of these. The staff tasks are to conduct the operations process, conduct knowledge and information management, synchronize information-related capabilities, and conduct cyber electromagnetic activities. Air traffic service forces support and enable the first three of these and I believe possess capacity for growth into cyber electromagnetic activities, specifically as an extension to the current airspace management capability. Additional tasks of the function include the conduct of military deception, civil affairs operations, network operations, information protection, and airspace control. The last task being the clearest link between ATS units and their role in the Army's mission command construct and their critical enabling function. The mission command system is comprised of personnel, networks, information systems, processes and procedures, facilities, and equipment. Air traffic service units are manned, equipped, and trained to provide necessary enabling functions and enhancement in each commodity area and afford the commander flexibility in developing the system.

All stated, ATS forces provide mission command enabling that affords commanders overmatch in this warfighting function. The ability to provide clarity to the science of control, to directly control airspace and provide airspace awareness, to reduce risk, and enhance flexibility all mean the commander is able to present the enemy with multiple dilemmas while denying the enemy that same luxury. The Army's need for the ATS capability is clear. Reality, specifically fiscal reality being what it is, then demands an examination of capacity, or how much of the capability we field. The Army and Army Aviation enterprise have to examine the intended capacity foreseen for the capability and more importantly, the acceptable risk of limitations to that capacity. Once these basic (though not simple) factors are determined, the enterprise can move forth in building and organizing the best force under DOTML-PF construct to support the Army's Operating Concept and Unified Land Operations.

COL Douglas C. Van Weelden is the Commander, United States Army Air Traffic Services Command and 164th Theater Airfield Operations Group, Fort Rucker, AL. COL Van Weelden's previous assignments include Attack Platoon Leader, Assistant S-3, Battalion S-2, and Commander, D Company, 1-14th Aviation Regiment, Fort Rucker, AL; Exchange Officer to the Republic of Singapore Air Force; Commander, Headquarters and Headquarters Company and Regimental S-1, 229th Attack Helicopter Regiment, Fort Bragg, NC; Battalion Operations and Executive Officer, and Brigade S-3, Combined Joint Task Force -180. COL Van Weelden has also served as Commander, 12th Aviation Battalion, Fort Belvoir, VA and Deputy Brigade Commander, 82nd Combat Aviation Brigade. He has two deployments to Afghanistan. COL Van Weelden has 24 years' service. He is qualified in the UH-1, AH-1, AH-64A, AS-550 Fennec, UH-60 A/L, and the UH-72.

PLANNING & EXECUTING AIRSPACE MANAGEMENT in the Brigade Combat Team

By MAJ Lee Robinson and CPT Dan Stankus

The responsibilities for a brigade combat team's (BCT) air defense airspace management/brigade aviation element (ADAM/BAE) cell may seem a bit overwhelming. The small team of aviators and air defenders are charged with managing airspace users including artillery, mortars, rotary-wing, fixed-wing, and unmanned aircraft system (UAS) assets ranging from Ravens to Gray Eagles. In a recent decisive action National Training Center rotation, this responsibility equated to tracking 44 artillery and mortar pieces, 25 UAS, 47 rotary-wing aircraft, and supporting fixed-wing assets in a 2,600 square kilometer area. This article makes three recommendations for ADAM/BAE sections to successfully manage the BCT's airspace. They include employing an effective garrison training program, managing the brigade's UAS program and creating a shared understanding of UAS employment principles across the BCT's UAS operators, and closely integrating with the BCT staff to maximize rotary - wing and UAS capabilities.

Garrison Training Program

Training airspace management in the ADAM/BAE requires an understanding among the section's members of positive and procedural control measures. The foundation for understanding airspace management can be gained through use of Army Techniques Publication 3-01.50, Field Manual (FM) 3-52, and Joint Publication 3-52. Sections should also maximize attendance at the ADAM/BAE course, attending in groups of four if possible, to practice integrating as a section during the excellent group practical exercises that are part of the course.

The ADAM/BAE section should maintain proficiency in 14 core competencies shown in Figure 1 to be successful in managing the BCT's airspace:

	Task	Task #
PLANNING	Determine integrated airspace user requirements	71-8-5702
	Develop airspace usage priorities	71-8-5700
	Coordinate air traffic services, sensor emplacement, and data links	71-8-5706
	Determine combat identification authority and procedures for airspace users	71-8-5705
	Develop rules of engagement and early warning procedures for air defense operations in the area of operations	71-8-5713
	Determine reporting requirements and monitoring methods for manual reporting	71-8-5707
	integrate airspace use within the area of operations	71-8-5704
	Develop airsapce coordinating measures to support planned operations	71-8-5703
	Develop the airspace annex	71-8-5701
EXECUTION	Process airspace orders and directives	71-8-5711
	Manage airspace control information displays	71-8-5710
	Determine track identification for airspace users	71-8-5709
	Monitor assigned airspace and airspace users within the assigned area of operations	71-8-5712
	Resolve real-time conflicts for airspace users within the area of operations	71-8-5708

Figure 1: Airspace control collective tasks[1]

Unfortunately for most ADAM/BAE sections, opportunities to practice positive and procedural airspace controls are limited due to the use of local rules and regulations that govern airspace in garrison environments. Sections must maximize opportunities such as collective training events and airspace management environment (AME) simulation software to integrate Sentinel radar coverage into positive control practices. Even if radar coverage is available, such exercises should also include procedural control measures to train the section on operations in a non-radar environment.

Combined arms training events provide the best opportunity for section training because they enable section members to practice procedural airspace control planning, current operations (CUOPS) management, and aircraft check-in procedures. In the absence of combined arms training events, a well-planned simulation will enable section members to practice these skills as well.

The section can construct a simulation using a few important elements, utilizing the 14 core competencies shown in Figure 1 as a guide to scenario development. The simulation should be based on a mock flight schedule to support multiple missions in a 24 hour timeframe and concept of operations (CONOPS) sketches that support pre-planned flights and fire missions. Activities such as UAS launches, aeromedical evacuations, no notice missions, and counter-fire missions should be scripted by the scenario designers as mission event synchronization list (MESL) events to which the operators must react. The operators receive the CONOPS during a mission brief, create digital and manual trackers, and build the unit airspace plan

(UAP) into the Tactical Airspace Integration System (TAIS) based on the CONOPS. Role players serve as battle captains, flight crews, S-2, support operations, subordinate units, and other staff entities using radios, email, and other mediums to inject MESL events, report mission statuses, and to provide other information to force the operators to react to realistic CUOPS scenarios. Training focuses on airspace deconfliction, building the UAP, monitoring current operations, aircraft check-in briefs, and general CUOPS functions. This training can be scaled from a crawl phase with minimal conflicts, missions, and injects to a run phase of a large number of conflicts, missions, and radio chatter. The more in depth the training goes, the more battle drills are stressed that can be refined within the section's standard operating procedure.

The AME hardware and software enable the same training with the added benefit of simulated track data that can be used to incorporate the BCT fires section with Advanced Field Artillery Tactical Data System (AFATADS) fire mission data to make counter fire more realistic. The AME program enables the forward area air defense system and air and missile defense workstation (AMDWS) to receive rocket, mortar, and artillery events to fully integrate the ADAM/BAE's systems into a training environment.

For either live or virtual training events, the five tools described below will enable the ADAM/BAE to successfully integrate all airspace users and maximize their effects for the BCT. Integration with the BCT staff for airspace planning is detailed near the conclusion of this article, but one critical element the ADAM/BAE must be versed in is a detailed understanding of airspace coordinating measures (ACM) among the planners of the section. Understanding the tools available to manage airspace users, detailed in FM 3-52, will enable planners to maximize the utility of airspace users in a combined arms environment.

The first tool that will help the future operations (FUOPS) and CUOPS sections of the ADAM/BAE is a detailed running estimate. The running estimate should focus on aircraft capabilities instead of statistics so the section can provide the commander and staff with recommendations on employment. The ADAM/BAE should translate combat power into an understanding of capabilities for the commander, describing lift aircraft in terms of air assault capacity, attack aircraft in terms of destructive capability on the enemy, and maintaining an understanding of crew duty cycles to posture combat power appropriately.

The second tool that will posture the ADAM/BAE for success is being well versed on digital systems. As the FUOPS section builds the UAP based upon the maneuver plan, incorporating the plan into the brigade's digital systems is vitally important to ensure shared understanding across the BCT's airspace users. Since maneuver forces likely rely on the Force XXI Battle Command Brigade and Below Joint Capabilities Release (JCR) for graphics, the BCT staff and battalion staffs on command post of the future (CPOF), and the aviation task force on the aviation mission planning system (AMPS) for graphic control measures, the ADAM/BAE must be versed in all of these systems to ensure ACMs are accurate and current across the BCT's common operating picture. While there is not a current means to transfer graphics to the JCR from the ADAM/BAE's systems, the Army Battle Command Systems enable the section to build the UAP in the TAIS and export it to the other systems described above. Section members must become well versed in transferring graphics from the TAIS to the Data Distribution System (DDS) server to enable graphics to be published on CPOF and to the AFATDs. The TAIS can also transfer graphics to the AMPS and vice versa, enabling the aviation task force to digitally receive the UAP, make bottom up refinements, and return to the ADAM/BAE for publication across the brigade's airspace users.

The third tool for a successful airspace plan is a detailed and rehearsed primary, alternate, contingency, and emergency (PACE) communications plan. Each aspect of the PACE plan should be regularly exercised by the operators on the CUOPS floor. Real world interruption to secure server stacks, line of sight communications, power generation, and failure of other systems makes rehearsing the PACE plan especially important in austere environments. The PACE plan may also be different for different units, or the type of information being relayed, e.g. graphics updates versus voice communications as detailed in Figure 2.

PACE PLAN

Graphics Updates	Information (to TOCs)	UAP / ACO
AVN Element Primary: TAIS Alternate: JCR Contingency: Email / mIRC Emergency: AFATADS E2: Courier E3: Radio Call	Primary: SVoIP Alternate: Email / mIRC Contingency: Radio Call Emergency: JCR E2: AFATADS	**AVN Element** Primary: TAIS Alternate: Courier Contingency: JCR Emergency: Email / mIRC E2: AFATADS E3: Radio Call
Maneuver BNs Primary: JCR Alternate: Email / mIRC Contingency: AFATADS Emergency: Courier E2: Radio Call	**Information (to aircraft)** Primary: FM Alternate: SATCOM Contingency: UHF/VHF Emergency: JCR	**Maneuver BNs** Primary: JCR Alternate: Email / mIRC Contingency: AFATADS Emergency: Courier E2: Radio Call

Figure 2: Example ADAM/BAE PACE Plan

The fourth tool that is invaluable for the ADAM/BAE is a detailed understanding of UAP development. The UAP is developed on a continuous basis in line with the established airspace control order/air tasking order (ACO/ATO) cycle. The UAP includes air routes, restricted operating zones, field artillery locations, friendly unit locations, aircraft bed down locations, fire support coordination measures, air defense engagement areas, boundaries, and other information pertinent to all airspace users within the BCT and those airspace users that may need to conduct operations within the BCT battle space. Inputs to the UAP generally come from operations orders; established airspace control plans; fire support operations; fire support rehearsals

combined arms rehearsals; intelligence, surveillance, and reconnaissance (ISR) planning; and other plans sessions at the BCT and battalion levels. These inputs enable staff sections and subordinate units to create air coordination measure requests (ACMR) that can be sent to the TAIS via the AMPS and AFATADS, as well as provide the information needed for TAIS operators to manually input the ACMR into the UAP tab on the TAIS. The result of the collection of all ACMRs on the TAIS is a three dimensional picture of all requests so they can be deconflicted by time, space, and priority. After deconfliction is completed, the results can be used to brief the BCT commander for approval. Once approved, the UAP is then sent to the higher echelon unit for approval and consolidation into the ACO. The higher echelon unit could be the division, joint task force headquarters, or the battlefield coordination detachment depending on location and task organization.

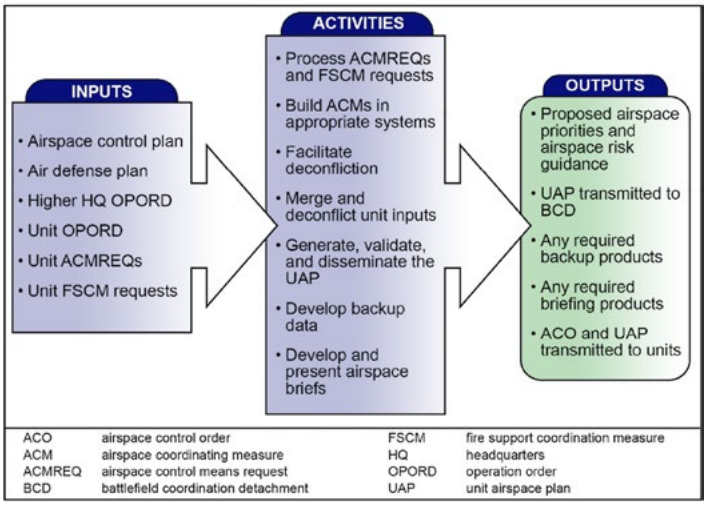


Figure 3: Unit airspace plan development[2]

Receipt of the ACO is the next step in the cycle which will be published down to the BCT in the same way the UAP was pushed up. Once the ACO is received, the ADAM/BAE is responsible for ensuring the UAP is correctly reflected in the ACO and then distributing the ACO to all BCT airspace users. This step can be accomplished in multiple ways. The TAIS can publish the ACO or UAP directly to the DDS server when properly configured to do so. This configuration can be found in the TAIS user manual and by coordinating with the BCT S-6 section for the initial position scheme. Publishing to the AFATADS and AMPS systems can prove to be major enablers when successful. Finally, operators will need to build the pertinent ACM into the JCR network. This step is accomplished by inputting each ACM into a graphic display message on the JCR. Many of the ACMs have templates in the JCR graphic display message database. Training in ACM input prior to execution will exponentially increase the speed at which this step can be accomplished. Following creation of each ACM, the graphic display message must be sent to all command posts.

The FUOPS section should also plan for transitions as the BCT transfers mission command from the tactical operations center (TOC) to the tactical command post (TAC) and vice versa. Because of the requirement to clear fires, the ADAM/BAE must tie in closely with the fires section during this process. Training on the TAIS, AMDWS, and TacView Portable Mission Display will enable section members to split these systems between two mission command nodes and maintain the capability to clear airspace from either. For instance, in a transition, the TAIS could go forward with the TAC to prepare for new operations while the TOC maintains the ability to clear airspace while the TAC is setting up with the AMDWS or TacView.

The fifth tool the ADAM/BAE should utilize is a CUOPS management product. For CUOPS management in a combined arms training event, there are four critical areas that section members must be able to track: indirect fire assets, ACMs, aviation assets, and the DA1594 Duty Officer's Log. For indirect fire assets, knowing preplanned fire missions, mortar firing points, and planned artillery areas enables the section to quickly plot indirect fire missions and clear airspace, either digitally or analog. For ACMs, section members must have an understanding of the UAP and what control measures are active at a given time and why. Lastly, the aviation asset tracker will provide the section with a running estimate of assets available over a given time period. Since all of these assets are important to the overall airspace plan, providing a means to manage this information is vitally important for the CUOPS section. An example of how to integrate this information into one document is shown in Figure 4.

Implementation of this product will only be successful if the CUOPS operators understand the UAP as it relates to the overall maneuver plan. As FUOPS transitions its plan to CUOPS, this transition should include a brief on the

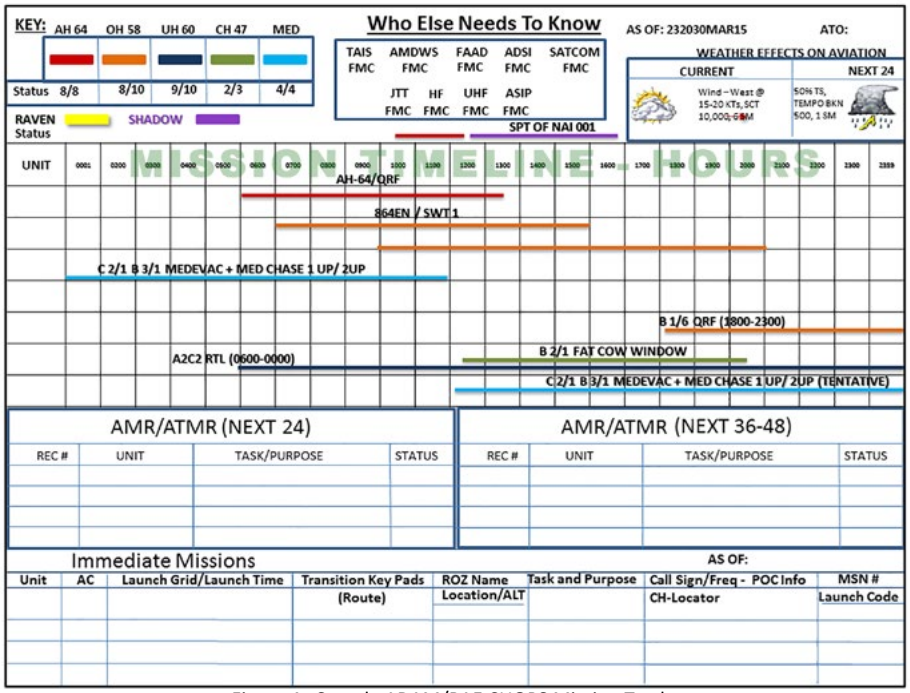


Figure 4: Sample ADAM/BAE CUOPS Mission Tracker

CONOPS as it relates to the UAP for the next phase of operations. This information can be transmitted with a briefing from FUOPS to CUOPS, attendance at the combined arms rehearsal and/or fires rehearsal by CUOPS personnel, or a back-brief from CUOPS to FUOPS after they read the operations order (OPORD) for the upcoming phase.

Unmanned Aircraft System Management

In order to be successful in implementing a UAP, the ADAM/BAE must have confidence that airspace users understand and will follow the procedures detailed in the UAP. While airspace users such as artillery and rotary-wing aviation are accustomed to airspace control measures, operators in the small UAS (SUAS) community may not be as familiar. Across maneuver battalions, experience and understanding of airspace varies widely among SUAS users, especially since there is not an additional skill identifier or military occupational specialty that ensures standardized training for SUAS users across the Army. While there are standards for SUAS operators detailed in TC 3-04.62, the minimum requirements for currency do not guarantee that SUAS operators will understand how to operate safely in a congested airspace environment. As such, the BCT UAS officer is a critical enabler to ensure standardization across the SUAS program.

The requirement for the BCT UAS officer to serve as the de-facto SUAS standardization officer is especially important since the experience and qualifications of master Raven trainers varies so widely. The recent publication of Standardization Communication (STACOM) Message 14-02 enables Raven operators to function as master trainers (MT) without the quality control that existed when Raven master trainers were required to attend the Master Raven Trainer Course at Fort Benning. The BCT UAS officer should define standards for the BCT's Raven operators to progress from mission preparation (MP) to mission qualified (MQ) to master trainer to ensure their battalion programs are operating safely and effectively. Such standards as those outlined below are easy to understand and enforceable for the BCT UAS officer.

- Mission Preparation – Solider has completed initial SUAS training, Course # 4D-F8/600-F19, has been enrolled in the Commander's Training Program as documented on a DA 7120-RM, and is designated on flight records (DA 7122-R) as MP.

- Mission Qualified – Solider has satisfactorily completed iterations of each basic, unit, and mission task (1000, 2000 and 3000 level tasks outlined in TC 3-04.62 Appendix A). Generally six to ten flight hours under supervision of a MT. Must be documented on flight records and certified by the supervising MT.

- Master Trainer (STACOM 14-02) – Graduate of the MTv2 at Fort Benning, GA, or Directorate of Evaluation and Standardization equivalency evaluation. Non-graduates may be designated as a MT by the first field grade commander provided they are a qualified operator that demonstrates maturity, good judgment, and exceptional knowledge.

The BCT UAS officer should also perform standardization functions for the battalion MTs such as records checks, oversight of annual proficiency tests, and oversight of MP courses to ensure operators can safely and effectively participate as users of the BCT's airspace.

The BCT UAS officer should perform a similar function for the Shadow platoon. In garrison training, the Shadow often operates in a designated Shadow restricted operating zone (ROZ) and is not required to navigate more complex airspace that entails specific routes and ROZs that are characteristic of a UAP in a decisive action environment. In turn, the BCT UAS officer should function as a liaison to integrate the Shadow into combined arms training so they build proficiency operating in complex airspace.

The BCT UAS officer can also serve as a link between the Shadow platoon and rotary-wing units to build training scenarios that include manned-unmanned teaming operations. Lastly, Shadow platoons are subject to Aviation Resource Management Survey inspections. The BCT UAS officer should perform courtesy inspections to prepare the Shadow platoon for these actual inspections, thereby increasing their readiness and capability to integrate into the BCT's UAP.

Integration with the BCT Staff

Because the aviators and air defenders of the ADAM/BAE are typically the only members of their branches in a BCT, it is vitally important that they bring their expertise to bear during the military decisionmaking process (MDMP). Three important working groups that the ADAM/BAE should participate in are the fires working group, ISR working group, and airspace management working group. The participants of these working groups are typically the same: the fire support officer (FSO), brigade aviation officer (BAO), air liaison officer (ALO), electronic warfare officer (EWO), S-2 to include the collection manager, and the Air Defense Artillery (ADA) officer. Since the BCT usually operates in a time constrained environment for the MDMP, these meetings can effectively be combined as outlined below to facilitate the orders process:

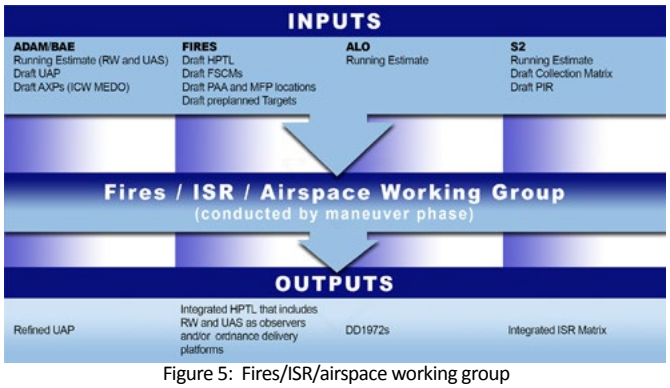
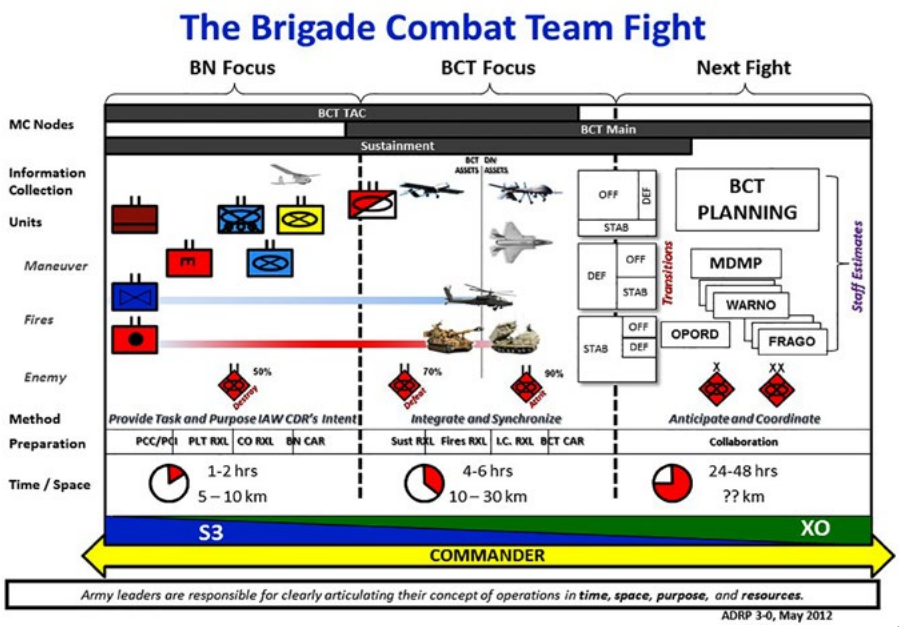


Figure 5: Fires/ISR/airspace working group

The integrated working group should be led by the BCT FSO and proceed by maneuver phase of the operation. The S-2 leads off each phase, covering enemy scheme of maneuver. An S-3 representative briefs the planned friendly scheme of maneuver. In each phase, the FSO covers the high priority target list (HPTL), describing the planned target and what assets are available to identify, decide, detect, deliver, and assess effects on the targets. The BAO, ALO, and EWO provide subject matter expertise on the integration of fixed and rotary-wing assets into the FSO's targeting plan to integrate the appropriate assets based on capability and threat considerations.

Their analysis is augmented by the TACOPS officer, S-2, and ADA officer who lend their expertise to threat considerations for fixed and rotary-wing employment. Lastly, the ISR manager refines the ISR matrix based on aircraft availability and the maneuver and indirect fire plan. At the conclusion of the working group, the BCT staff publishes the products in Figure 5 as annexes to the OPORD. Combining the fires, ISR, and airspace management working groups enables the BCT to produce timely, integrated orders so that subordinate battalions can refine the brigade's products in a deliberate fashion as articulated in Army Doctrine Reference Publication 3-0.



Producing the outputs of the fires/ISR/airspace management working group also solidifies the groundwork for successful rehearsals. The ADAM/BAE is an important participant in the combined arms rehearsal and the fires rehearsal. The UAP that emerges from the orders process should be well integrated into the fires plan, synchronized with fixed-wing assets, and should facilitate the BCT's collection efforts. Publishing the UAP after the combined working group enables it to be refined by subordinate battalions prior to executing rehearsals. In turn, the ADAM/BAE is positioned to clearly brief the UAP at both rehearsals. Points of friction such as employment of battalion mortars or SUAS can be identified and resolved at the rehearsals to solidify a well-integrated UAP. In summary, ADAM/BAE sections face a complex challenge managing the BCT's airspace. To prepare for this challenge, developing a thorough garrison training plan, providing oversight for the BCT's SUAS and tactical UAS programs, and integrating with the BCT staff will enable the ADAM/BAE to successfully integrate the myriad users of the BCT's airspace.

[1]FM 3-52: Airspace Control, Appendix E Table E-2.
[2]Ibid., Figure 3-1.

MAJ Lee Robinson is an AH-64D Aviator with over 1,600 hours of flight time, including 800 as pilot in command. His assignments include 1-6th Cavalry Regiment and 2-101st Attack Reconnaissance Battalion as a Platoon Leader, 1-227th Aviation Regiment as a Company Commander, a Political Science Instructor at West Point, Executive Officer of 1-1st Attack Reconnaissance Battalion, and Brigade Aviation Officer for the 2nd Armored Brigade Combat Team, 1st Infantry Division. He is currently the Brigade Operations Officer for the Combat Aviation Brigade, 1st Infantry Division.

CPT Dan Stankus is an Air Defense Officer currently serving as the Air Defense Coordinator for the 2nd Armored Brigade Combat Team, 1st Infantry Division. His previous assignments include 2-69th Armor Battalion (Task Force Panther) as a Platoon Leader and Executive Officer with a deployment to Contingency Operating Site Kalsu, Iraq, G-3 Air and Missile Defense, 2nd Infantry Division as the Air and Missile Defense Operations Officer at Camp Red Cloud, South Korea, and 1-43rd Air Defense Artillery Battalion (Task Force Cobra) as a Battery Commander.

Acronym Reference

ACM - airspace coordination measures
ACO - airspace control order
ADA - air defense artillery
ADAM/BAE - air defense airspace management/brigade aviation element
AFATADS - Advanced Field Artillery Tactical Data System
ALO - air liaison officer
AMDWS - air and missile defense work station
AME - airspace management environment
AMPS - Aviation Mission Planning System
ARMS - Aviation Resource Management Survey
ATO - air tasking order
BAO - brigade aviation officer
BCT - brigade combat team
CONOPS - concept of operations
CPOF - command post of the future
CUOPS - current operations
DDS - Data Distribution System
EWO - electronic warfare officer
FM - field manual
FSO - fires support officer
FUOPS - future operations
HPTL - high priority target list
ISR - intelligence, surveillance, and reconnaissance
JCR - Joint Capabilities Release
MDMP - military decisionmaking process
MESL - mission event synchronization list
MP - mission preparation
MQ - mission qualified
MT - master trainer
OPORD - operations order
PACE - primary, alternate, contingency, and emergency
STACOM - Standardization Communication
SUAS - small unmanned aircraft system
TAC - tactical command post
TAIS - Tactical Airspace Information System
TOC - tactical operations center
UAP - unit airspace plan
UAS - unmanned aircraft system

Combat Aviation Brigade Airfield Management Element PERSONNEL

By CW3 Rebecca L. Pickney

The Combat Aviation Brigade (CAB) Airfield Management Element (AME) is a new addition to the CAB proposed under the Aviation Restructure Initiative. The section consists of officers, warrant officers, and Soldiers assigned to address issues regarding airfield management that were identified during the surge of Army controlled airfields appearing in Iraq and Afghanistan. Overrunning the Air Force and Army airfield operating battalion's capability to manage the dramatic increase in operational airfields, the task of airfield management was passed to the CAB commander. This responsibility required the CAB to assign personnel, originally deployed to perform CAB or task force critical war fighting positions, to perform airfield management tasks. The issues have always existed but they lacked visibility until an accident occurred at Qayyarah Airfield West in Iraq where a MC-130H Hercules was destroyed due to landing on a runway with a 70' x 70' hole in the landing surface. The number one contributing factor to the mishap was "a lack of training on the part of the U.S. Army to effectively prepare their personnel for combat zone airfield management and operations[1]."

MC-130H Hercules crash in Qayyarah Airfield West on 29 December 2004

The proposed manning of the AME is presented in Figure 1 on the next page. While creation of this airfield management section goes a long way to fix an identified deficiency, the problem I see with the current proposal is that the military occupational specialties (MOS) are not in line with their proposed duties, the MOS skill levels aren't appropriate, and some personnel are in the wrong sections. In developing my recommendations for manning the AME, the primary concern was mission success - so my choices for personnel were not restricted to the Aviation Branch. My proposal for staffing the AME is shown in Figure 2 on the next page.

The most difficult and challenging aspect of airfield management is the construction, improvement, and maintenance of the physical airfield itself. In the airfield management headquarters section, we will then need personnel who are familiar with topographic and construction engineering operations, facility maintenance, and civil engineering which is the exact job description of a Corps of Engineer Officer. Aviation branch officers aren't trained in these areas and when put into these jobs are set up for failure because nothing in their professional education would prepare them for these duties. While it might be possible to provide an Aviation officer some training in these areas, it would be far more effective to simply utilize someone who has already mastered these skills. The time, money, and effort required to provide this training to someone who, in all likelihood, will only perform the job once in his career, would be a blatant and unnecessary expenditure of those resources.

Personnel in the Airfield Services section will be responsible for coordinating day-to-day operations on the airfield as liaisons between contractors, joint service partners, tenant units, and other Army elements handling everything from snow removal, hazardous cargo handling,

Airfield Management Element				
Airfield Management Headquarters	Provides supervision, command and control, and coordination of airfield activities.	15B00 15Q40	MAJ/04 SFC/E7	Aviation Officer/Airfield Manager Air Traffic Control Senior Sergeant
Flight Dispatch Section	Processes flight plans with appropriate agencies; transmits flight movement messages; ensures timely posting of NOTAMS; enables flight following for departing aircraft; processes flight clearances; maintains flight information on flights; monitors overdue flights; alerts crash crew and other agencies for emergencies.	15P30 15P10	SSG/E6 SPC/E4	Aviation Operations Sergeant Aviation Operations Specialist
Airfield Safety and Standardization Section	Conducts airfield safety inspections, develops local flying area procedures and airfield operations agreements.	153AB 150A0	CW4/W4 CW3/W3	Airfield Safety Officer Air Traffic and Airspace Management Technician
Airfield Services Section	Responsible for services to aircraft (POL, etc), airfield inspection, marking, lighting, facilities, and policing of the airfield.	15P20 15P10	SGT/E5 PFC/E3	Aviation Operations Sergeant Aviation Operations Specialist

Figure 1

Airfield Management Element				
Airfield Management Headquarters	Provides supervision, command and control, and coordination of airfield activities.	12A00 15Q40	MAJ/04 SFC/E7	Corps of Engineers Officer/Airfield Manager Air Traffic Control Senior Sergeant
Flight Dispatch Section	Processes flight plans with appropriate agencies; transmits flight movement messages; ensures timely posting of NOTAMS; enables flight following for departing aircraft; processes flight clearances; maintains flight information on flights; monitors overdue flights; alerts crash crew and other agencies for emergencies.	15P30 15P10	SSG/E6 SPC/E4	Aviation Operations Sergeant Aviation Operations Specialist
Airfield Safety and Standardization Section	Conducts airfield safety inspections, develops local flying area procedures and airfield operations agreements.	153AB 150A0	CW4/W4 CW3/W3	Airfield Safety Officer Air Traffic and Airspace Management Technician
Airfield Services Section	Responsible for services to aircraft (POL, etc), airfield inspection, marking, lighting, facilities, and policing of the airfield.	12T30 15P10	SGT/E5 PFC/E3	Aviation Ops SGT/ Technical Engineer NCO Aviation Operations Specialist

Figure 2

vehicle movements, refueling facilities, airfield lighting, and maintenance. In this section, therefore, we need personnel who are familiar with the layouts of an airfield, airfield inspections, markings and lighting, and general up keep of an airfield. These jobs would be better suited for a 12T (Technical Engineer Non-commissioned Officer) and a 15Q (Air Traffic Services Sergeant). A 12T30's job description, according to Department of the Army Pamphlet 611-21, Military Occupational Classification and Structure, is to supervise technical engineering activities relating to construction surveying, drafting, and testing of construction materials. The 12T30 is also responsible for compiling technical information and supervising subordinate personnel, along with performing field and laboratory testing on construction materials, construction surveys, and design drafting for military construction.

A 15Q20's job description is: a) conduct air traffic control (ATC) facility training, briefs shift personnel on runway utilization, airfield conditions and weather/ground activities. b) prepares and updates flight following maps. c) supervises a shift in a tactical or fixed tower, radar, or airspace information center. d) serves as a tactical air control team leader in a tactical terminal control system, deploys team as advance party to remote areas to secure and set up forward area refueling and rearming points, landing zones, helicopter landing zones, drop zones, and pick-up zones. e) maintains current Department of Defense and Department of Transportation/Federal Aviation Administration publications, ATC facility logs, forms, records, and situation maps. f) prepares briefs and disseminates Aviator's Procedures Guide to supported aviation units. g) assist in the preparation of terminal instrument approach procedures.

The 15P MOS isn't trained to perform these duties to the standard necessary to accomplish the mission without some knowledge degradation, once again due to no fault of their own. Therefore, a 15Q non-commissioned officer (NCO) along with a 12T NCO would be better suited in place of the two projected 15Ps.

The Aviation Restructuring Initiative will reduce our end strength of Army Aviation officers, warrant officers, and enlisted Soldiers. To every extent possible, all Aviation officer slots will want to be preserved in this proposed restructuring of the AME. It is my opinion that accomplishing the mission of airfield management with more qualified personnel should take precedence over preserving "slots."

With the number of accidents which have occurred in the last 10 years, along with the negative visibility which accompanies those incidents, shouldn't the Army develop a section manned with personnel having the right background and knowledge needed to achieve mission success? When the first brigade AME is manned and deployed, the expectations on these Soldiers will be high and the spotlight will be on them because the AME is new to the Army. The brigade AME will have a mission unique to the Soldiers serving those positions not only because the element is new, but because this is a mission that very few Army Soldiers have ever done.

References
1 Executive Summary Aircraft Accident Investigation MC-130H, s/n 85-000012, 29 December 2004 / USAF Accident Investigation Board (AIB)

CW3 Rebecca L. Pinckney is an Air Traffic and Airspace Management (ATASM) Technician with 18 years of service who is currently serving as the ATASM Course Branch Chief within the Combined Arms Division, 1-145th Aviation Regiment, 1st Aviation Brigade. Her previous assignments include numerous air traffic control facilities at the company and division level. She has two deployments to include Operation Iraqi Freedom and Operation Enduring Freedom.

Acronym Reference

AME - airfield management element
ATC - air traffic control
CAB - combat aviation brigade
TTCS - tactical terminal control system
MOS - military occupational specialty
NCO - non-commissioned officer

Maximizing ATC Controller and Maintainer Training in Garrison

By CW2 Matthew A. Dusch

Integrating tactical Army air traffic control (ATC) into garrison, division, and the combat aviation brigade's (CAB) training and mission sets is often a significant challenge for a tactical air traffic services (ATS) company. F Company, 2-4th General Support Aviation Battalion (GSAB) ("Sky Knights") at Fort Carson, Colorado, experienced these challenges first-hand as the leaders and Soldiers of this unit worked to establish the Army's newest tactical ATS company. Through setbacks and adversity, largely stemming from equipment shortages and assigned ATC personnel experience limitations, the Sky Knights developed an "outside the box" approach to effectively enhance the company's capabilities while improving training opportunities for units collocated at Fort Carson. The key to maximizing controller and maintainer progressions while enhancing their experience in a garrison environment is robust coordination and integration into both installation and division entities.

Sky Knight Controllers conducting a joint mission with US Marine Controllers and Air Force Combat Controllers at Red Devil Airstrip

An effective training strategy for a tactical ATS Company begins with strong letters of agreement (LOA) supplemented with detailed letters of procedure (LOP) in order to provide a versatile and realistic training environment. F Company, 2-4th GSAB currently has three LOAs that have been paramount to the unit's successful training and integration into the local flying area. For effective controller certification in accordance with Army Regulation (AR) 95-2, it is imperative that tactical ATS units in a garrison environment develop an LOA with their supporting U.S. Army Installation Management Command (IMCOM) ATC facility that governs control tower operator (CTO) certifications. "Army installation ATC facilities (includes Army contract facilities) will be utilized to train Army air traffic controllers assigned to tactical units. These facilities provide essential technical training for certification and proficiency. Installation air traffic density, hours of operation, and internal training requirements will be used to determine the number of military controllers that can be trained in the facility during a given period. A LOA detailing the training program between the respective unit commanders is required."[1] An additional advantage of this training is that once the initial reciprocal relationship is established, CTO ratings for F Company controllers enable Soldier support of IMCOM during times of minimal civilian manning. Two additional LOAs should be drafted to support controller training that include a LOA governing the joint use of restricted airspace within the IMCOM ATC facility's controlling area and a LOA for ground controlled approach (GCA) operations. Once these letters are in place and supplemented with LOPs depending on the mission requirements, robust and effective training can occur for tactical controllers assigned to a GSAB, even in a garrison environment.

Forging a lasting agreement with local installation facilities to enable CTO certifications should be the utmost priority for any F Company. In August of 2012, the first controllers arrived at Fort Carson as part of the 4th Infantry Division CAB build up. The majority of controllers inbound to F Company, 2-4th GSAB possessed minimal experience arriving straight from advanced individual training at Fort Rucker or from their first garrison duty assignment. The senior members of the company immediately recognized the need to develop a relationship with the installation ATC facility, Butts Tower. This relationship was initially cemented in the form of a LOA for Army ATC training in Butts Tower. Integrating arriving controllers into the CTO program at Butts Tower was a key ingredient in the Sky Knights' ultimate success in support of the CAB's mission. "Fix base training provides Soldiers with accelerated technical expertise in their career field giving them a better understanding of their assigned jobs in a shorter period of time. It makes them more technically proficient and better prepared to accomplish their tactical mission."[2] Throughout the past three years, the civilian controllers at Butts Tower trained a total of fifteen Army tactical controllers which also resulted in a multitude of parallel progressions on these specific controllers' assigned systems. It didn't stop there. Due to lack of qualified controllers at home station, as F Company

had no controllers with previous GCA or Air Traffic Navigation, Integration, and Coordination System (ATNAVICS) ratings, four controllers were sent to Troy Army Municipal Airport at Troy, AL to obtain a fixed base GCA rating. In recent months, a Borrowed Military Manpower (BMM) Directive assigned two of these CTO-rated controllers to Butts Tower for six months, highlighting again, the importance of this mutually beneficial relationship. Additionally, the civilian maintenance technician at Butts Tower trained two F Company 94D Communications and Navigations Specialists in fixed base air traffic maintenance. One of these maintainers remained at Butts Tower for twelve months to assist the installation as part of another BMM.

Detailed LOAs have been the cornerstone of the Sky Knights' training in garrison granting GSAB controllers opportunities to train and operate in the Fort Carson local flying area that would be impossible without the relationship between the company and garrison entities. In order to ensure the fixed base training for the controllers was maximized, a joint use of restricted airspace procedure for Restricted Area R2601 was drafted from the company, staffed through brigade and division, and approved by garrison. This procedure allowed F Company to activate a 5x11 nautical mile (NM) designated airspace for the southern third of the training area. Additionally, this LOP enabled F Company controllers to activate a 2NM radius restricted operating zone, surface to 2000' AGL, including the air corridor, at a packed gravel, tactical landing strip within the restricted area. This significant amount of airspace maximized controller and maintainer training for all systems. Without having designated airspace to operate in, training and certifications of controllers in a tactical environment would be nearly impossible. The designated airspace allows multiple systems to operate simultaneously in conjunction with one another such as terminal control and flight following utilizing separate facilities. Over the past twelve months, the Sky Knights successfully supported six internal exercises, five battalion level events throughout the CAB, three CAB exercises, and one division level exercise. This resulted in the safe and expeditious control of over five thousand aircraft movements in conjunction with the procedural control of Shadow unmanned aircraft systems. Most recently, this LOP proved beneficial to the installation when F Company controllers, vastly familiar with the operational airspace, conducted a joint training exercise with U.S. Marine controllers. A small detachment of F Company controllers assisted with the effective control of aircraft in a highly congested area.

F Company controllers conducting a PAR approach Butts Army Airfield

Drafting a LOA allowing GCA controllers to conduct visual flight rules (VFR) training approaches not only supports ATNAVICS-assigned controller progressions but pilot progressions for precision approach radar (PAR) instrument approaches as well. The LOA F Company put in place allowed them to conduct VFR only practice approaches stretching from Class G airspace into the Butts Army Airfield Class D airspace.* This provided a 10 to 15 NM area of airspace in which to vector aircraft for the precision radar approach. Additionally, a LOP was drafted to supplement the LOA for the Butts Army Airfield GCA letter and joint use of airspace letter for a tactical approach in R2601. If a tactical landing strip or suitable field training site is not available, creating a LOA allowing GCA practice approaches within the supporting installation's Class D airspace is a must. For a long-term flight checked approach, using the installation Class D airspace is the best course of action.

F Company Soldiers conducting training at Red Devil in R2601

The company cannot rely only on air mission requests for aircraft support. Working with other company commanders and battalion's support staff is crucial to success. Within two months of implementing the LOA with Butts Tower governing GCA approaches, six controllers in F Company were progressed to readiness level one proficiency in the ATNAVICS and conducted over three hundred approaches. This enabled invaluable training not only for the controllers but for the pilots as well in preparation for future instrument flights or when responding to inadvertent instrument meteorological conditions.

*Class G airspace is uncontrolled airspace. Class D airspace is generally airspace from the surface to 2,500 feet above the airport elevation surrounding those airports that have an operational control tower.

The relationship with the installation facility provides significant advantages to both parties in a garrison environment to ultimately enhance ATS services provided to pilots and all airspace users' combat readiness. However, to maximize controller training in garrison, tactical ATS companies must reach out beyond just installation entities and develop lasting internal relationships with division and brigade entities. F Companies should play a major role in airspace mission planning and de-confliction throughout the CAB and division. The importance of ATS integration through the battalions, brigade, and division provides realistic, robust training for all parties. The Tactical Airspace Integration System (TAIS) is a prime example of the importance of building a training relationship with the brigade air defense airspace management cell and division G-3 air. "Utilizing joint training with F company controllers by incorporating them into division level exercises, increases a shared understanding of airspace within a joint multinational endeavor."[3] In most cases, TAIS is the most underutilized asset in an F Company. Developing joint airspace training events and incorporating company TAIS operators into the training events allows the controllers at the company level to gain the full perspective of what the system can do. These initiatives establish the ability for brigade and division to operate more effectively when they are short-staffed knowing they have qualified controllers that can step in at a moment's notice.

F Company An/TSW-7A at TA51 in R2601

Internal planning and coordination with the CAB is the last critical step to secure mutually beneficial training. In order to effectively synchronize and ensure quality and realistic training events occur on a consistent basis, F Company 2-4th GSAB routinely attends sister unit mission planning meetings and battalion in-progress reviews for training exercises based on analysis of the CAB's long range training calendar. Sky Knight leadership constantly maintains contact with all of the Fort Carson aviation battalion's operations officers to ensure training opportunities for controllers are available and to offer the battalions the synergy that ATS could add to their exercises. Tactical ATS units should fight to participate in major exercises to advertise unit capabilities, to ensure safe air movements and airspace de-confliction, and to continue to forge relationships with supported entities. Similarly, F Companies should provide supported units with airspace planning services including aviation procedure guide assistance, participation in aviation procedure guide briefings, internal airspace planning, external airspace planning with installation, field heliport planning, airspace LOP, and unmanned aircraft system procedures. The end state to a professional, reciprocal relationship between tactical ATS companies and supported division entities is a company of tactically and technically proficient ATS controllers who are able to support and enhance the training and safety of sister units.

In closing, and as detailed above, through strong relationships with the IMCOM facilities, detailed LOAs and LOPs, installation coordination at all levels, and active relationships with division supported entities, F Companies in any CAB can conduct quality home station training. These relationships with both installation and division entities are the most obvious way to maximize controller training in a garrison environment. By adopting the mindset that, "Training will in most cases not find you, you need to find it." Tactical ATS leadership should aggressively pursue the relationships described above. All of these relationships and training strategies have enabled F Company 2-4 GSAB to effectively support multiple operations throughout Fort Carson and the local community. These include defense support of civil activities during flood and fire relief, garrison training events for ATC and aircrew personnel readiness level progressions, CAB National Training Center rotations, and ultimately contributing to the realistic training preparation for future deployments for all airspace users.

[1] U.S. Department of the Army, Army Regulation 95-2 Airspace, Airfields/Heliports, Flight Activities, Air Traffic Control, and Navigational Aids. (2008), 56.
[2] Taijeron, Fredrick (Butts Army Airfield Division Chief). Personal interview, May 29th, 2015.
[3] CW3 Fogarty, Shawn (4th Infantry Division G-3 Air Tactical Operations Officer). Personal interview, May 28th, 2015.

CW2 Matthew A. Dusch joined the Army in September of 1999 originally as a 13B Cannon Crew Member in the Field Artillery, stationed at Camp Hovey Korea and Fort Sill, Oklahoma. In April of 2004, he reclassified his Military Occupational Specialty to 15Q Air Traffic Control Specialist. From 2004 to 2007, he served in Wiesbaden, Germany with C Company 3-58th Aviation Regiment as the Wiesbaden Tower Training Supervisor, Tower Facility Chief, and AN/TSW-7A Air Traffic Control Central Facility Chief. From February 2007 to June 2009, he served at Fort Rucker, Alabama in A Company 1-11th Aviation Regiment as the Lowe Army Heliport Training Supervisor and Facility Chief. In June of 2009 he was reassigned to F Company 3-25th General Support Aviation Battalion (GSAB) in Hawaii. From September 2009 to July 2010 he deployed to Iraq with 3-25th GSAB and served as the Tower Facility Chief Qyyarah West (Q-West). From September 2010 to March 2012 he served as the Terminal Platoon, Platoon Sergeant. In April of 2012, he attended Warrant Officer Candidate School, Warrant Officer Basic Course, and the 150A Air Traffic Airspace Management Technician course at Fort Rucker, Alabama. From August of 2012 to Present, he has served as a Platoon Leader at F Company 2-4th GSAB at Fort Carson, Colorado.

Acronym Reference

AR - Army Regulation
ATC - air traffic control
ATS - air traffic services
ATNAVICS - Air Traffic Navigation, Integration, and Coordination System
CAB - combat aviation brigade
CTO - control tower operator
GCA - ground controlled approach
GSAB - general support aviation battalion
IMCOM - Installation Management Command
LOA - letter of agreement
LOP - letter of procedure
NM - nautical mile
VFR - visual flight rules

Ground Based Sense And Avoid

NEW EYES FOR UNMANNED AIRCRAFT

By Viva Kelley, Bob Ulrigg, Paul Wagner and Larry Herbek

Unmanned aircraft systems (UAS) have become an integral part of the U.S. military and have made significant contributions in fighting the Global War on Terror which were not possible through more conventional methods. Safe integration of an UAS into the U.S. National Airspace System (NAS) remains a significant challenge to the military. Today, the U.S. military has two primary means to fly UAS in the NAS. The first is to fly only in restricted airspace. Since the U.S. military controls this type of airspace, it assumes responsibility for the safety of any UAS flight within the restricted airspace. The second is through the Federal Aviation Administration (FAA) Certificate of Waiver or Authorization (COA) approval process. Currently, in order to compensate for limitations of the UAS associated with flying in the NAS, the COA restricts operations and requires mitigations to supplement the inability to meet specific regulations, specifically the see and avoid provisions of Title 14 Code of Federal Regulations 91.113, Right-of-Way rules: Except water operations. The Army's Project Manager (PM) for UAS, Airspace Integration Office is developing a solution as part of the Department of Defense (DOD) UAS airspace integration effort. The materiel solution, Ground Based Sense and Avoid (GBSAA), is distinctively different than the function of managing traffic or air traffic control (ATC). However, it is critical that the integration of the new system be coordinated with the ATC community to ensure that it does not introduce unnecessary workload to ATC or degrade safety of the NAS. This paper will describe the function of GBSAA and provide perspectives on UAS operations in the NAS with GBSAA from the acquisition managers and ATC personnel. Drawing the distinction between the two functions of being able to "see/sense and avoid" and controlling air traffic is necessary to understand how the two must work together to ensure safe operations in the NAS.

Unmanned Aircraft in the National Airspace System

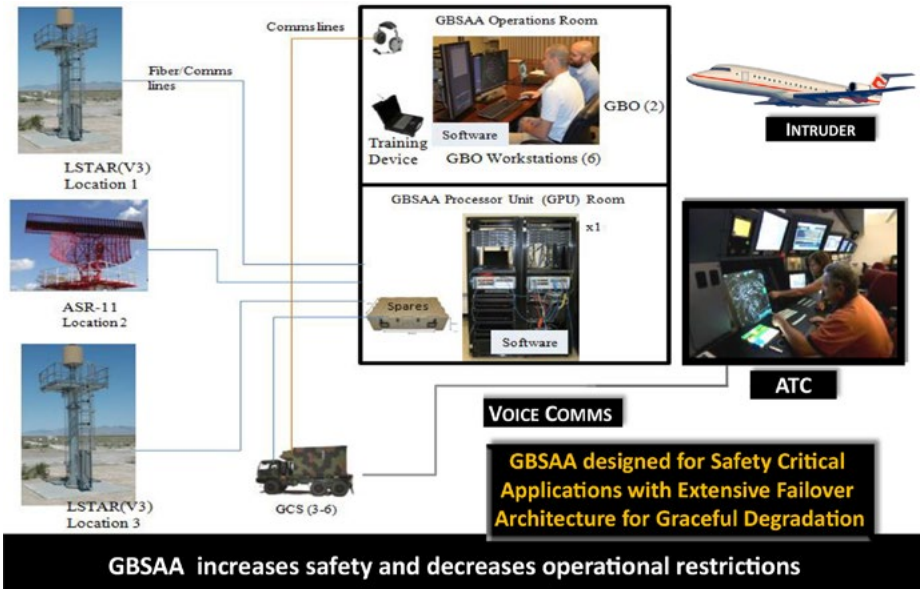
Just as a manned aircraft must be able to "see and avoid," whether under the guidance/communication with ATC or not, so must UAS be able to perform that function. In either case, it is imperative that the person responsible for the aircraft be able to safely interact with other aircraft (and vice versa). The UAS operators currently accomplish this through strict procedural restrictions and ground or chase plane visual observers. These procedures and operations are only possible through careful coordination and cooperation between the UAS operators and airspace management/ATC communities. The UAS currently fly in the NAS under the approval of the FAA, through the COA process, providing a waiver to meeting all requirements in the airspace. The COA limit UAS day or night operation to visual line of sight operations using chase planes and/or ground observers and also mandate that additional special provisions listed in the COA are followed. Employing chase planes is expensive and inefficient. Using ground observers has its own set of detractors; the most obvious being increased manning and workload requirements.

The Office of the Under Secretary of Defense for Unmanned Warfare has designated the Army as service lead for the GBSAA effort and the Air Force as lead for airborne sense and avoid. The Army is developing GBSAA incrementally to gain unfettered access for UAS operation into non-segregated areas of the NAS. The first Army GBSAA system will be employed at Fort Hood, Texas, and will provide additional safety and capability to the Gray Eagle while operating in airspace with other air traffic. The GBSAA system is designed to support flight operations in terminal areas and other airspace required for meeting Gray Eagle's needs, including restricted airspace and military operating areas.

Although the present charter for Army GBSAA is to support Gray Eagle operations, the GBSAA system is airframe and sensor non-specific. The system was designed with an open architecture framework to support expansion of capability through acceptance of different sensors, addition of new aircraft systems, and necessary upgrades to existing software and hardware. Because the GBSAA system performs a critical safety function, the software has been developed in compliance with Radio Technical Commission for Aeronautics Document-178 guidelines*, which is the primary document by which the certification authorities such as FAA and Transport Canada approve safety of software used in airborne systems.

*RTCA is a private, not-for-profit corporation utilized as a Federal advisory committee, RTCA works in response to requests from the FAA to develop comprehensive, industry-vetted and endorsed recommendations for the government on issues ranging from technical performance standards to operational concepts for air transportation.

As good stewards of the airspace, UAS operators must do everything possible to do no additional harm to the NAS than introduction of any other new manned aircraft would. Much like the introduction of jet propulsion into the aviation community, UAS have presented new and difficult challenges. And just as jets became safe, regular users of the NAS, so shall UAS. While UAS are becoming more familiar to local communities, GBSAA is still a new unfamiliar technology that presents its own challenges. The design of the Army GBSAA system has taken into account the safety critical aspects of meeting the technical and procedural challenges; however, the challenge of getting the community to embrace a new technology remains. While the concept of sense-and-avoid is simple at face value, the function of the system in parallel with the structure of the already controlled airspace is understandably not immediately obvious to the most casual observer. A significant investment of time and effort has gone into integrating both the new technology and the new way of thinking into the new GBSAA system. To fully grasp the enormity of the integration effort, one must fully understand the design and capability of the Army's GBSAA system.



GBSAA Is Designed for the Safety Critical Application of Sense and Avoid

The GBSAA enhances capability and safety of UAS operations and eliminates the need for ground observers and chase planes previously used to satisfy the visual observer requirements. The system uses ground-based sensors to gather accurate data on a 360 degree three-dimensional (3D) segment of airspace, fuses data from multiple sensors to ensure total situational awareness, classifies tracks (aircraft, ground clutter, ground traffic) to minimize unnecessary maneuvers, and uses a set of complex algorithms to evaluate and to prioritize the encounter potential of all local air traffic. This information is then displayed to the GBSAA operator (GBO) via the interface subsystem.

The GBSAA system utilizes existing airport surveillance radar and dedicated ground-based, high resolution 3D lightweight surveillance and target acquisition radar capable of range, azimuth, and altitude measurement. The sensors provide continuous surveillance of a defined volume of airspace referred to as the surveillance volume and are capable of detecting both cooperative (transponder equipped) and non-cooperative (non-transponder equipped) aircraft. The 3D radar data prevents unnecessary maneuvering around intruders of unknown altitude, which significantly increases safety since induced encounters (aircraft encountered as a result of a maneuver), are one of the primary concerns of a sense and avoid (SAA) system. This is also a major benefit from the ATC viewpoint, as they are concerned that an UAS using SAA might perform unnecessary or excessive maneuvers.

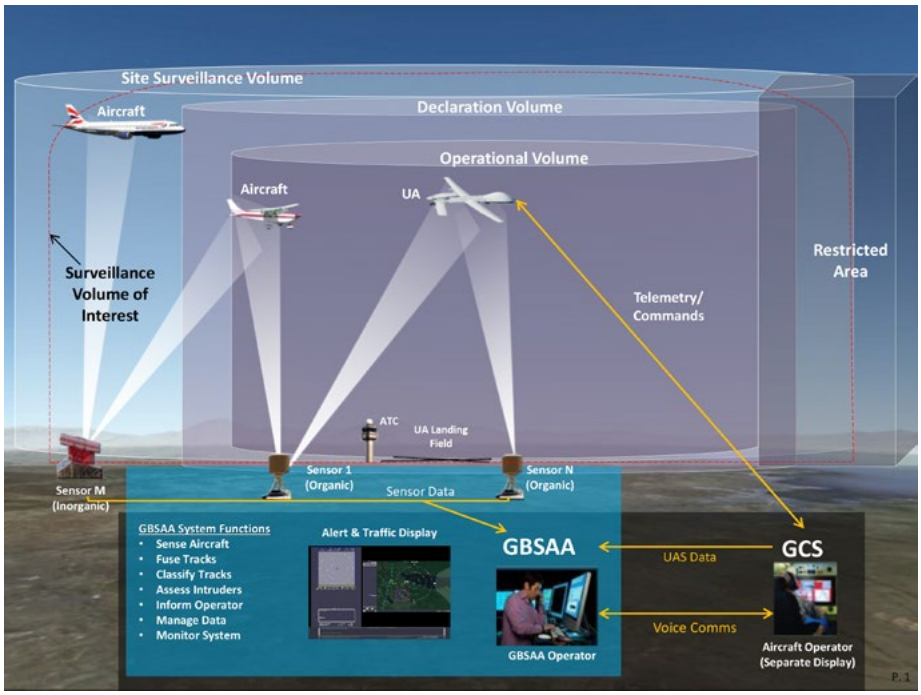
While the sensor is vital to the system's performance, it is merely one small part of a GBSAA system. Now that a surveillance volume has been established with sensors, the rest of the system must build an accurate integrated air picture, prioritize the potential conflicts, and provide necessary information to maintain safe separation. This is all accomplished while substantiating and monitoring the health and integrity of each subsystem separately and the entire system as a whole.

To meet the safety critical requirements within the surveillance volume, a declaration volume is established. Inside the declaration volume, the probability of track establishment supports the required safety levels (i.e. greater than 99.9% of the aircraft are declared to the GBO before penetrating the declaration volume). Finally, within the declaration volume is a GBSAA operational volume. This is the volume of airspace where the GBO can provide effective SAA services and will typically cover all areas where the UAS is approved to fly. The GBSAA operational volume is sized to allow for safe UAS operations, accounting for intruder aircraft speed, operator response time, sufficient time to safely maneuver the UAS, system latency, and other considerations. This essentially outlines the operational architecture of the GBSAA system.

Data from the ground sensors is fed to a Fusion Tracker, which is a GBSAA subsystem within the GBSAA Processing Unit (GPU) that is placed at the airfield hosting UAS operations. In addition to focusing on position accuracy, this fusion engine was also designed to optimize velocity and heading accuracy since velocity and heading are also critical parameters for any SAA algorithms. The product of the Fusion Tracker is a single integrated air picture. After fusing the sensor data, the refined tracks are then classified as aircraft or non-aircraft, such as ground traffic or birds, through the Classifier subsystem. Reducing the number of false alerts in the system caused by non-aircraft alerts reduces operator workload and increases safety by preventing unnecessary maneuvering and minimizing the potential for induced encounters and mission disruptions.

Tracks classified as aircraft are analyzed by two independent algorithms for potential conflicts with the UAS and displayed on the GBO's displays. The algorithms prioritize the local aircraft based upon their relative

threat to the UAS by assessing possible encounters based upon variables of each aircraft. The algorithms used for GBSAA are based on the architecture of the FAA Airborne Collision Avoidance System (ACAS) family of algorithms, a future system intended to replace the Terminal Collision Avoidance System (TCAS). However, the algorithms supporting GBSAA are much different from the ACAS algorithms as they are designed to support safe separation vs. collision avoidance, and therefore provide alert much earlier in an engagement than the ACAS algorithms do. It is worth noting that the GBSAA algorithms are inherently compatible with TCAS since TCAS maneuvers are vertical and the GBOs only make lateral maneuver recommendations.

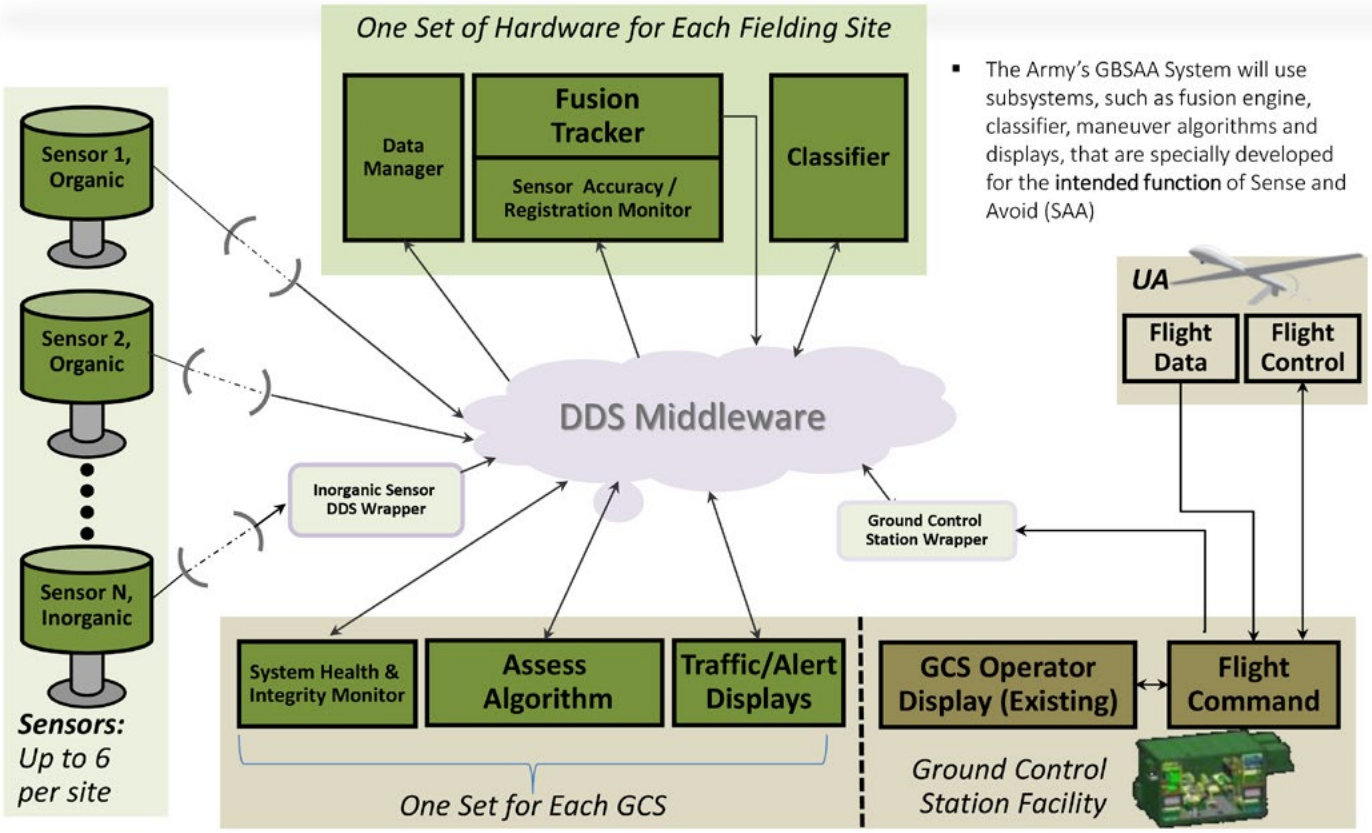


Monitoring at both the system and subsystem levels is performed for health, integrity, and accuracy. Monitoring methodologies include both start-up and continuous built-in tests. The system reports discrepancies as cautions or warnings based on the severity, system health, and integrity of the information. A key focus of the system design is the failover architecture that ensures airspace safety by mitigating risk in the unlikely event of a single failure through system functionality and operational mitigations. In simple terms, if a failure of a GBSAA subsystem occurs, the system degrades gracefully by blacklisting that part of the system and automatically adapting the data flow to provide the GBSAA operator safe, accurate information from the working parts of the system until the UAS can be returned to a safe location.

The GBSAA Operator Interface Subsystem is comprised of two displays in this first increment; an Alert Display and a Traffic Display. The Alert Display shows a simple compass rose with relative traffic icons, prioritized list of traffic alerts as determined by the algorithms in the GPU, and system health and integrity status. The Traffic Display shows the same information but has more "user friendly" applications such as a moving map background and a display of airfield boundaries and restricted areas that provide more situational awareness. Both displays show range, altitude, and velocity of relevant local air traffic with all information relative to the UAS. The relative information and prioritization is a unique aspect of GBSAA and distinguishes it from other applications like the ATC function.

As stated before, the GBSAA algorithms prioritize the aircraft tracks based upon the severity of hazard they pose by assessing possible encounters relative to the UAS position, heading, and velocity. The air traffic icons are then color coded based on the assessed threat level. The Alert and Traffic Displays are displayed on separate monitors and each are run by separate processors. Visual alerts are displayed on both the Traffic and Alert Displays, while only the Traffic Display will provide an audible alert. An intruder aircraft is identified as a 'Proximate' hazard level with a yellow visual alert when thresholds for certain combinations of an intruder's behavior are met. Examples of behavior include range between the UAS and intruder, the intruder's track or time to closest point of approach, and the intruder's altitude difference from the UAS. An intruder aircraft is identified as a 'Threat' hazard level, with a red visual alert when the algorithms probabilistically determine that risk associated with the flight path of a threat aircraft exceeds certain thresholds. A red alert indicates a potentially more urgent conflict, which requires immediate attention from the GBSAA operator. Intruder aircraft that do not present a potential hazard are referred to as nominal and display as a green icon on the Traffic Display.

The human component of the GBSAA system is the GBO. For the first increment of GBSAA fielding, the GBO is a contractor who has been trained to interact with the UAS operator. Each GBO will complete an 80 hour initial certification training program, which will include training on airspace and procedures. An interactive training device (simulator) is also part of the training and provides the trainee with the opportunity to safely guide a simulated UAS through varied traffic densities to help develop GBO skills. Initially, two GBOs are assigned to each of the fielding locations. The number of GBOs will subsequently be reevaluated based on site specific requirements and operational needs. Site specific training will be included as part of the GBO certification. The GBO is required to know local area published instrument approach/ departure procedures and visual flight rules traffic pattern procedures. The GBO must also maintain demonstrated levels of proficiency and currency requirements established collaboratively by the local unit, government flight representative, PM UAS, and the Directorate of Training and Doctrine. Based on cues from the GBSAA system, the GBO determines when to recommend maneuvers to the UAS operator in order to safely avoid intruder/conflicting aircraft. It is important to note that the GBO only provides maneuver recommendations. The UAS aircraft commander is ALWAYS



responsible for conduct of the UAS and makes the decision to accept or reject the recommended maneuver.

Crew resource management is an important part of the GBO/UAS operator interface. The GBO communicates with the UAS operator through the intercom system, and will be able to hear all incoming radio transmissions to/from ATC to augment the situational awareness provided by the Alert and Traffic Displays. Although the GBO hears all radio calls to and from the UAS crew, he only communicates with the UAS crew. The GBO does not communicate with ATC.

GBSAA Operational Capabilities

GBSAA was designed to easily support any type of airframe or concept of operations for UAS. The GBSAA is initially planned to be used for transiting the NAS from airfields to restricted airspace, with an expansion to allow operations in military operating areas in the near future. However, the functionality of the GBSAA system also allows its services to be independent of the type of airspace. The Army plans to field GBSAA at Fort Hood in 2015 and then four other Army bases over the next two years. All five planned Army sites are at Army airfields just outside of restricted airspace. Fort Hood's Robert Gray Army Airfield, is joint use and shared with commercial aircraft. Fort Hood's "ahead of the pack" spirit, in terms of UAS operations, make them the perfect location for the first Army GBSAA system. The ability of the GBSAA system to provide a safer means of operating will only enhance the already leading-edge capability of the ongoing UAS operations.

Full integration of UAS into the NAS, and subsequent full acceptance by the ATC community, will require the GBSAA system to adapt to allow for more close proximity traffic during flight operations. This is true within Class C or D airspace** and especially in terminal and aircraft movement areas where ATC employs additional procedural controls. In fact, this is an area where TCAS typically struggles and is largely ineffective. In response to this, a terminal area alert zone (TAAZ) has been established in the GBSAA software to cover those situations. The TAAZ is a site specific three dimensional volume of airspace normally approximating the Class D airspace volume. It is used primarily in accordance with an ATC tower since that airspace is heavily controlled – both procedurally and via personnel in the local tower. Aircraft tracks in the TAAZ will be displayed on the Alert Display and Traffic Display as a distinctive and unique split gray/yellow or gray/red (corresponding in severity to yellow and red alerts outside the TAAZ) colored icons for situational awareness, but will not cause an audible alert. This is intentionally done to highlight that these aircraft are expected to be under ATC control and that safe maneuvering in closer proximity is to be expected. In the event the alerting system presents a split gray/yellow or gray/red alert, the GBO, based on experience, situational awareness, and local area procedures, will evaluate the intruder information and determine if a recommended maneuver is warranted. Concerns about aircraft encountered in the TAAZ will typically be referred to the local ATC by the UAS operator for guidance. GBSAA is not an ATC system. Special guidelines exist for GBO maneuver recommendations in the TAAZ because of the additional regulations and published traffic procedures associated with a towered airport; however, while operating in terminal areas under ATC advisement, even if flight following services are being provided, all aircraft are still responsible for see-and-avoid. The goal is safety, and careful consideration is given to the nature of the airspace and level of control.

** Class C airspace is generally, that airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower, are serviced by a radar approach control, and that have a certain number of IFR operations or passenger enplanements. Class D airspace is generally, that airspace from the surface to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower.

The GBSAA Block 0 system allows the GBO to select any of the available operating UAS ground control stations (GCS) from any single GBO workstation. This "Select-a-GCS" feature can be used when a GBO work station is paired with a GCS to launch a UAS into the restricted area, and then switch to another GCS to bring another UAS back from the restricted area where it is already operating.

Summary

Although unfettered flight (file and fly, just like manned aircraft) in the NAS for UAS is still in the future, GBSAA is a major step in the right direction for achieving that goal. GBSAA is not intended to be an ATC system, but it is a method of ensuring safety of the NAS via safe self-separation for the UAS. Successful integration of UAS into the NAS first requires the airspace user community to understand and agree upon the clear distinction drawn between the functions of GBSAA and ATC. GBSAA relates directly to the UAS - it replaces the eyes and brain of a pilot in a manned aircraft, but it can control no aircraft other than providing recommendations to the UAS operator. Conversely, ATC can control, via verbal instructions, either or both aircraft. Air traffic control is not provided relative to any specific aircraft, but rather is a service provided to all traffic and works collaboratively with the see-and-avoid function.

It must be understood that instructions or advisories from ATC may occur in different degrees of controlled airspace occupied by participating(transponder equipped) and non-participating (non-transponder equipped) aircraft, but see-and-avoid must always exist, in any airspace, under all conditions, and whether coordinating with ATC or not. The GBSAA complements operations in all classes of airspace including the terminal areas of Class C and D airspace. The GBSAA ensures manned and UAS can safely fly in the same airspace structure using existing common procedures in the Code of Federal Regulations. Early collaboration between the SAA and ATC community will help greatly in ensuring successful and safe integration of UAS into the NAS.

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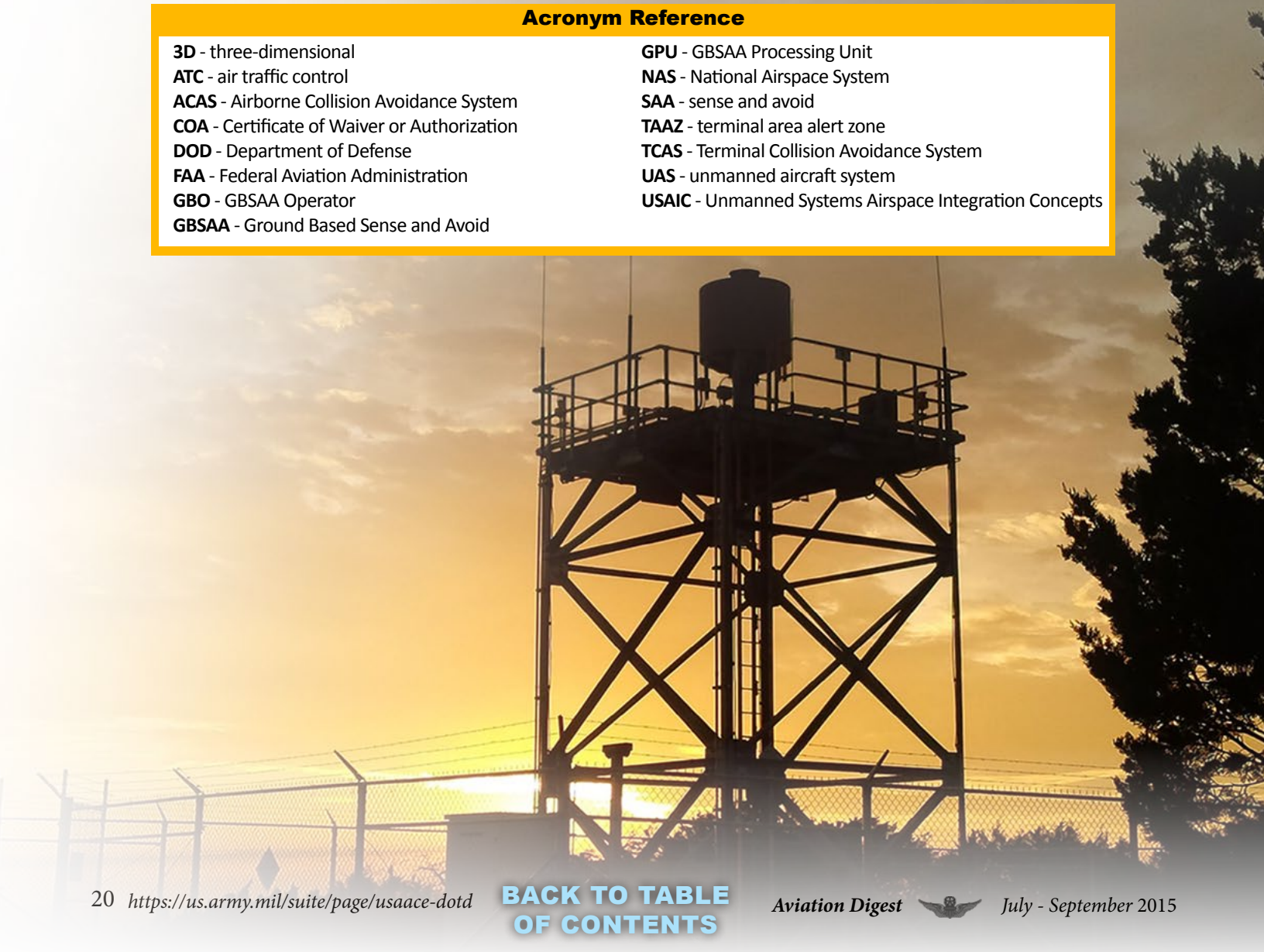
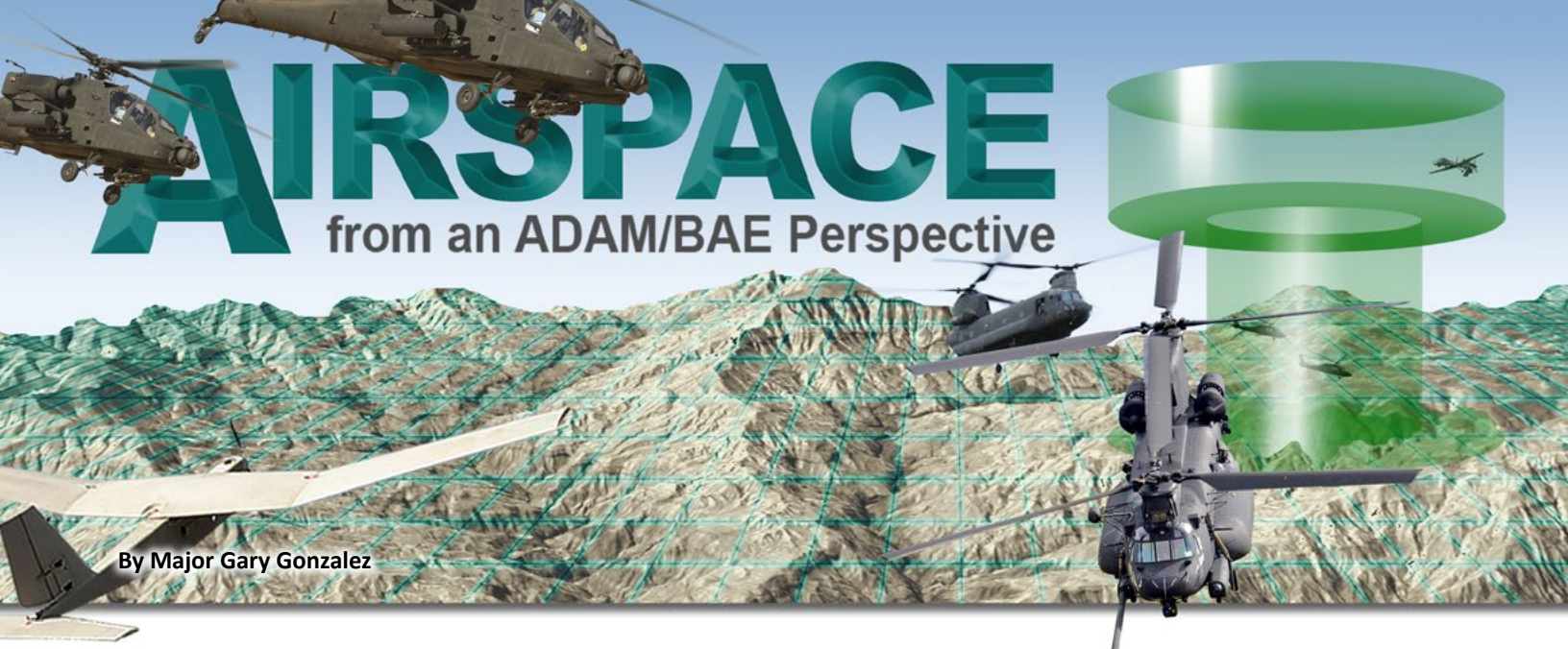
Paul Wagner is an Airspace Expert, with Air Traffic Control and Pilot experience, supporting the development and fielding of GBSAA in PM UAS.
Larry Herbek is the senior engineer and has led the technical development of GBSAA for PM UAS.

Acronym Reference

3D - three-dimensional
ATC - air traffic control
ACAS - Airborne Collision Avoidance System
COA - Certificate of Waiver or Authorization
DOD - Department of Defense
FAA - Federal Aviation Administration
GBO - GBSAA Operator
GBSAA - Ground Based Sense and Avoid
GPU - GBSAA Processing Unit
NAS - National Airspace System
SAA - sense and avoid
TAAZ - terminal area alert zone
TCAS - Terminal Collision Avoidance System
UAS - unmanned aircraft system
USAIC - Unmanned Systems Airspace Integration Concepts





AIRSPACE
from an ADAM/BAE Perspective

By Major Gary Gonzalez

Human tendency would rather avoid things that bring discomfort and concentrate on the familiar. Airspace seems to fall in the former category for maneuver planners at levels brigade and below. Even though the vertical dimension of operational areas has long been a viable consideration in planning military operations from the tactical to strategic levels, it still remains a nebulous and neglected realm to many in the Army. Some may even think that little consideration could be given to the skies above maneuver forces and there be little to no consequence. This is unfortunate. Artillery munitions, mortars, rotary-wing and fixed-wing aircraft, unmanned aircraft systems (UAS) of each service, and our allies play an active role in shaping the operations performed by the United States military. There is simply too much at stake to underestimate the activity taking place in the airspace over an operational area. A figurative hand wave in planning efforts is untenable and unprofessional.

The management and control of airspace has become more challenging with the increase in the number of competing users and assets. Definitive and precise coordination must be made with each user to ensure the most effective use of all available assets. Otherwise, deficiencies in capacity and capability materialize, resulting in ineffective support to the ground commander. There is also the prevention of fratricide and the preservation of combat power that compels planners at all levels to carefully consider the implications of airspace management and control. Just as an incorrect call-for-fire grid can end in fratricide, so too can the mismanagement of airspace. Aircraft collisions of any variety or the impact of aircraft by artillery rounds are not just potential accidents, these things have actually happened.[1]

The ability to optimize airspace to gain desired effects while protecting friendly forces represents a critical capability and marked advantage over the enemy. It aids in maintaining such notable classic Jominian* principles as mass and economy of force. It also brings to consideration the Army Doctrine Reference Publication (ADRP) 3-0 operational art elements of tempo, lines of effort, and operational reach. With these doctrinal concepts in mind, it is logical to conclude that controlled airspace is at least viable for integration into maneuver planning efforts.

At the brigade level, the air defense airspace management/brigade aviation element (ADAM/BAE) is charged with the responsibility of airspace management, and by implication, control to a certain extent. This special staff section has two primary Army doctrine publications to guide in fulfilling this responsibility: Army Techniques Publication (ATP) 3-01.50, ADAM Cell Operations and Field Manual (FM) 3-52, Airspace Control. Field Manual 3-52 largely reflects Joint Publication (JP) 3-52, Joint Airspace Control definition of airspace management as "the coordination, integration, and regulation of the use of airspace of defined dimensions." It defines airspace control as "a process used to increase operational effectiveness by promoting the safe, efficient, and flexible use of airspace." The two terms are closely related but not synonymous. Rather, management is an important part of the control process.

The head of the ADAM/BAE section is the brigade aviation officer (BAO). This officer, who may or may not have had formal airspace control and management training, is specifically directed in doctrine to develop the unit airspace plan (UAP) at the brigade level. Given the myriad of airspace users, the plan cannot be constructed in isolation or hastily. Rather, it must be developed in conjunction with higher echelon constraints while considerations for brigade artillery, mortars, rotary and fixed-wing aircraft, and UAS are also incorporated with the objective of achieving optimization in combined effects. In short, if performed appropriately, it is a rigorous iterative process led by the BAO.

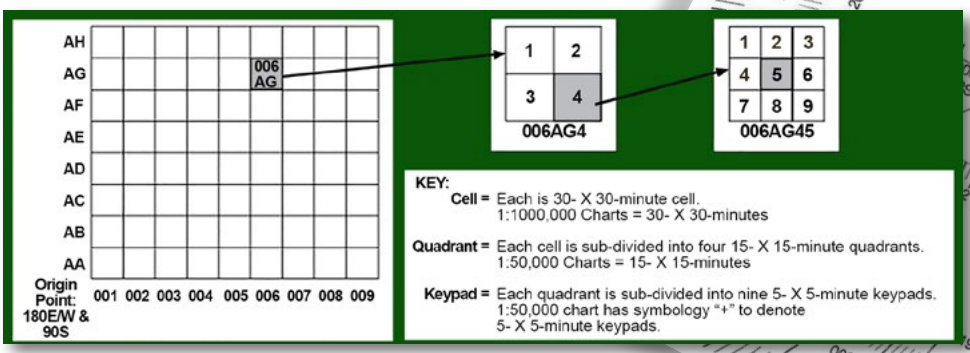
Given doctrinal parameters, how should the ADAM/BAE conduct airspace management and control to optimize all available effects in a tactical environment? The ADAM/BAE special staff section should optimize airspace management and control for effects through several means. These include, but are not limited to, leveraging the extant Department of

*Baron Antoine-Henri Jomini (1779-1869) was a Swiss officer credited with developing the fundamental principles of war that included objective, offensive, mass, economy of force, maneuver, unity of command, security, surprise, and simplicity.

Defense (DoD) Global Area Reference System (GARS), conducting daily air synchronization meetings, maintaining constant coordination with higher echelon airspace management, having the airspace management expertise resident within the section, and conducting iterative airspace assessments to determine effectiveness. Keeping this idea in mind, the purpose of this article is to offer an argument for discussion concerning how the ADAM/BAE should manage the airspace for the brigade combat team (BCT).

Leveraging the Global Area Reference System

Integrating the GARS into the BCT UAP improves airspace management and control operations in terms of efficiency and interoperability. The UAP essentially expresses how a unit will manage and control its airspace. The GARS was developed by the National Geospatial-Intelligence Agency and adopted by the DoD for military application in 2007. It was intended as a common service means to facilitate air and ground coordination. FM 3-52 provides a succinct description:

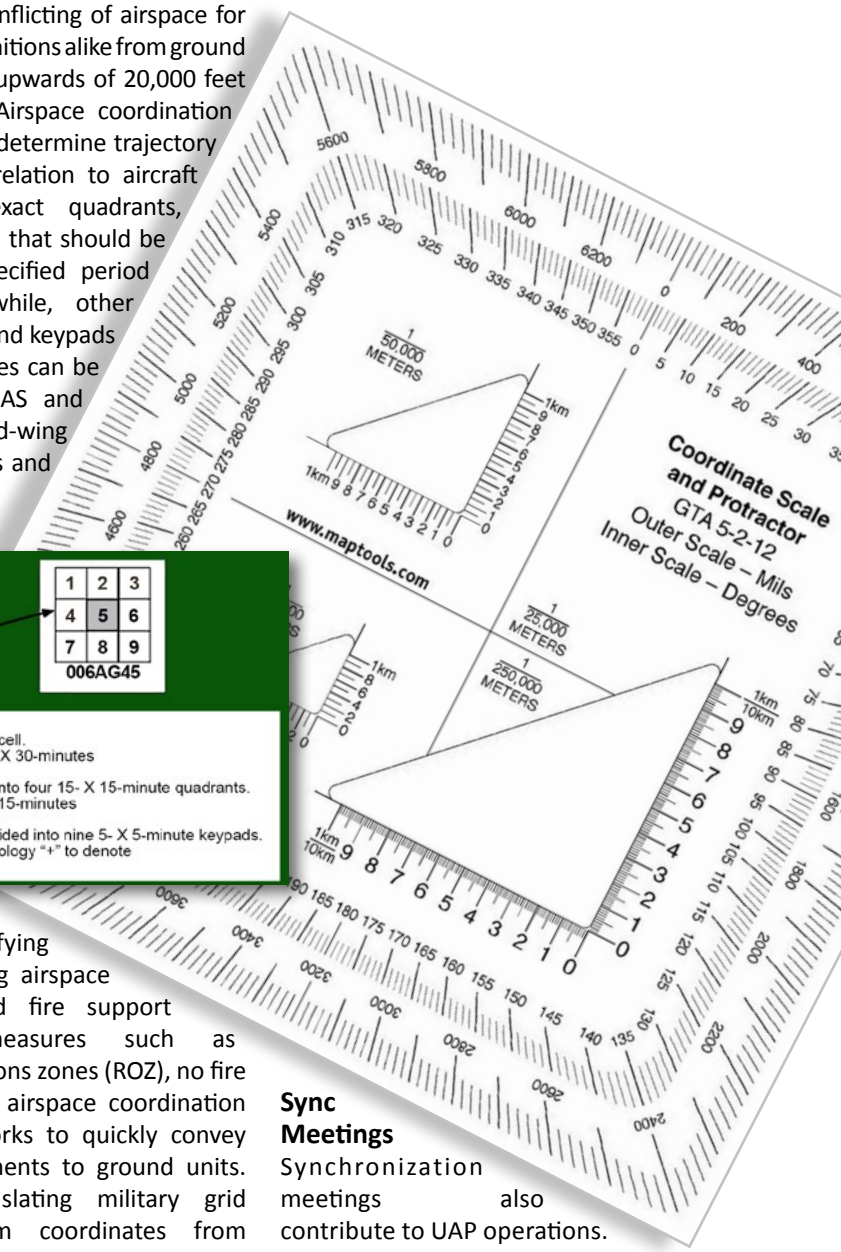


The GARS is the standardized area reference system across the DoD. It is based on lines of longitude (long) and latitude (lat) to provide an integrated common frame of reference for joint force situational awareness to facilitate air-to-ground coordination, deconfliction, integration, and synchronization. This area reference system provides a common language between the components and simplifies communications. The point of origin for GARS is 90 degrees south and 180 degrees east/west. The areas GARS describes coincide with even numbered World Geodetic System-84 degree and minute lines. GARS airspace is divided into cells, further divided into quadrants, and subdivided into keypads. [2]

As the name implies, the system applies to all the airspace of any operational environment, quickly pinpointing specific lateral areas by designating particular cells, quadrants, and keypads. Although the system typically formally applies to airspace beginning at 10,000 feet above mean sea level (MSL), in practice the system is further subdivided vertically into high and low areas (e.g. above and below the coordinating altitude). Employed appropriately, the GARS facilitates the clearing and deconflicting of airspace for all aircraft and munitions alike from ground level to altitudes upwards of 20,000 feet MSL or greater. Airspace coordination between units to determine trajectory of munitions in relation to aircraft identifies the exact quadrants, cells, and keypads that should be cleared for a specified period of time. Meanwhile, other quadrants, cells, and keypads at discrete altitudes can be designated for UAS and rotary and fixed-wing unimpeded routes and air corridors.

The GARS also facilitates identifying and disseminating airspace coordination and fire support coordination measures such as restricted operations zones (ROZ), no fire areas (NFA), and airspace coordination areas. It also works to quickly convey aviation requirements to ground units. Instead of translating military grid reference system coordinates from ground units to aviation units, the GARS provides a simple common language.

Instead of developing a separate airspace management system, integrating the GARS into a BCT UAP produces efficiencies in time while working with other Army units, other services, and partner nation militaries. Perhaps there are circumstances that may warrant developing a separate airspace management system. However, whenever possible, because of the value of time and interoperability, GARS provides leverage in airspace planning efforts aimed at supporting ground maneuver. Thus GARS integration into the UAP supports airspace control and management operations at the BCT level.



Sync Meetings

Synchronization meetings also contribute to UAP operations. But how? The battle rhythm of a BCT is typically highly detailed. Among the details are numerous briefings and meetings throughout the day involving members from the various staff sections. Whether through preparation or execution, these events can often

take more time than allotted and detract from other necessary activities. So why conduct an air synchronization meeting and add another event to the already busy battle rhythm? Is it really that important?

The information that flows through the air synchronization feeds directly into the UAP and the common operating picture (COP). This daily meeting warrants a space on the battle rhythm because of the interconnected role and dynamic character of airspace. Just as operational concepts and tactical plans change, so too does the supporting airspace plan. This meeting allows face to face communication between those requesting airspace usage or aviation support and those working to action those requests. In this forum, planning details are confirmed or altered, concerns are expressed, confusion is cleared, and shared understanding promoted. The meeting helps to ensure that the UAP is not only appropriate for the ground scheme of maneuver but that it is optimized to support it.

The air synchronization meeting is similar to other meetings, such as working groups and planning teams, in that it requires representation from across the staff sections. The difference is that only those staff sections that have interests in aviation support, airspace usage, or both should attend. This helps to decrease meeting time coordinated by the BAO, who should efficiently run the meeting so that all concerns are addressed, while taking no more than thirty minutes.

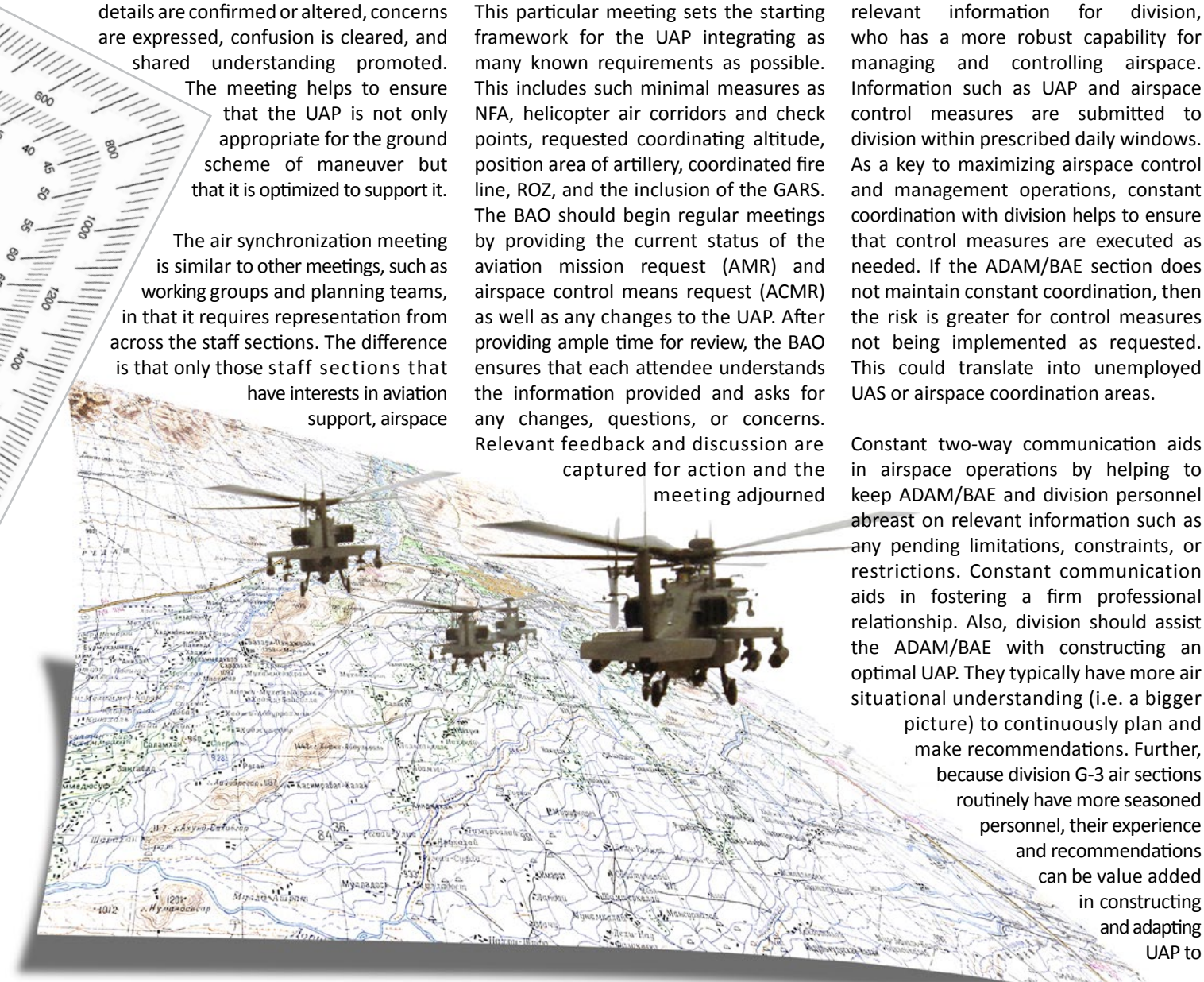
Regular attendees typically include liaison officers to the brigade, battle captain or battle noncommissioned officer, UAS and tactical operations warrant officer, airspace controller (if available), BAO, and a senior representative from the fires section. Additional personnel may include, but is not limited to, representation from the Air Force, Marines or Navy; the brigade medical planner; the brigade intelligence collection officer; and the air defense officer. The first meeting brings together regular attendees as well as representation from other services. This particular meeting sets the starting framework for the UAP integrating as many known requirements as possible. This includes such minimal measures as NFA, helicopter air corridors and check points, requested coordinating altitude, position area of artillery, coordinated fire line, ROZ, and the inclusion of the GARS. The BAO should begin regular meetings by providing the current status of the aviation mission request (AMR) and airspace control means request (ACMR) as well as any changes to the UAP. After providing ample time for review, the BAO ensures that each attendee understands the information provided and asks for any changes, questions, or concerns. Relevant feedback and discussion are captured for action and the meeting adjourned until the next day. The primary output of the meeting is a shared situation understanding of airspace picture.

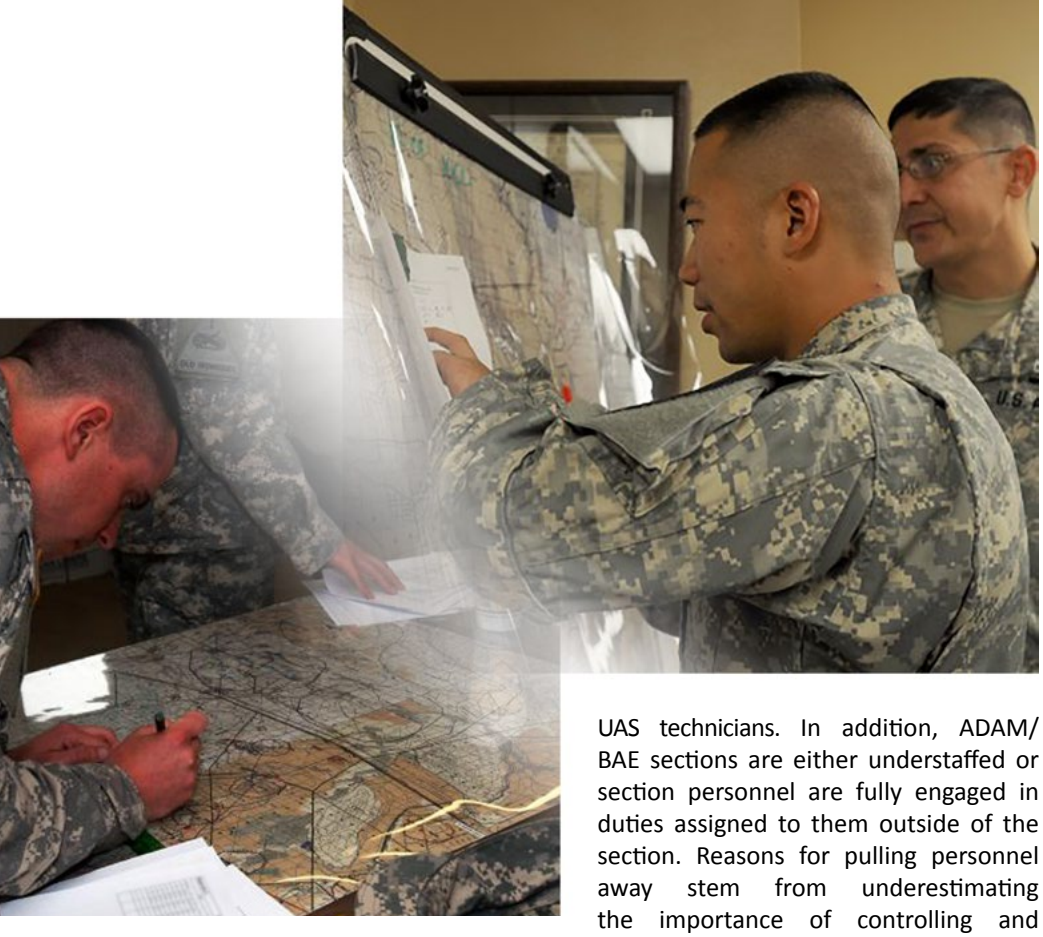
Holding the meeting in the early afternoon aids the ADAM/BAE section in submitting ACMR on time to higher, typically twenty-hours out. It also aids in providing supporting aviation units enough time to action AMRs. In addition, the early afternoon meeting time facilitates ADAM/BAE personnel updating briefing slides with the most current information.

Constant Coordination

The air synchronization meeting is a major part of maintaining constant coordination with the next higher echelon of airspace control, typically a division G-3 air. The air synchronization meeting provides relevant information for division, who has a more robust capability for managing and controlling airspace. Information such as UAP and airspace control measures are submitted to division within prescribed daily windows. As a key to maximizing airspace control and management operations, constant coordination with division helps to ensure that control measures are executed as needed. If the ADAM/BAE section does not maintain constant coordination, then the risk is greater for control measures not being implemented as requested. This could translate into unemployed UAS or airspace coordination areas.

Constant two-way communication aids in airspace operations by helping to keep ADAM/BAE and division personnel abreast on relevant information such as any pending limitations, constraints, or restrictions. Constant communication aids in fostering a firm professional relationship. Also, division should assist the ADAM/BAE with constructing an optimal UAP. They typically have more air situational understanding (i.e. a bigger picture) to continuously plan and make recommendations. Further, because division G-3 air sections routinely have more seasoned personnel, their experience and recommendations can be value added in constructing and adapting UAP to





best fit ground operations. If the ADAM/BAE section does not maintain constant communication, then these benefits cannot be realized. In fact, a lack of coordination can have disastrous effects. Examples of these consequences may include, violations of airspace stemming from ACMRs left unfulfilled, fratricide or near fratricide incidents, or a lack of critical aviation support for ground maneuver operations.

Resident Expertise

As previously alluded to, divisions typically possess more airspace management and control personnel and experience than brigades. What is actually needed at the brigade level is airspace management and control expertise in producing an optimal brigade UAP. Unfortunately such expertise is largely absent at the tactical level. Nevertheless, the BAO remains responsible for developing UAPs suitable for ground operations support. Having resident expertise in airspace management and control operations would help to ensure that the all available effects are optimized.

Tables of Organization and Equipment consistently vary with respect to ADAM/BAE assigned personnel. Some brigades may have an air traffic controller, presumably an airspace expert, while others have UAS technicians. In addition, ADAM/BAE sections are either understaffed or section personnel are fully engaged in duties assigned to them outside of the section. Reasons for pulling personnel away stem from underestimating the importance of controlling and managing airspace and being ignorant of corresponding implications. Regardless of the design of the section, it typically does not possess airspace management or control expertise. In fact, there is a steep curve to overcome in the process of learning these areas and developing a UAP at the brigade level.

If the BAO is to have the responsibility for developing a suitable UAP, then either that person needs to be a school trained airspace control and management expert or someone within the section needs to be. This expertise should include not only the airspace control and management of Army assets but of inter-service assets as well. Why - because the Army does not plan to act unilaterally. The ADAM/BAE should have an airspace control and management expert assigned to facilitate the development of an optimal UAP that is specifically tailored to enhance ground operations. This expertise would benefit not only the brigade but all organizations affected. School trained and assigned resident expertise would mitigate learning curve challenges and promote UAP optimization.

Iterative Assessments

The UAP is a living plan similar to standard operation procedures. It must adapt with the demands of the continually changing operational environment and subsequent COP. Adaptation comes from feedback that in turn comes from assessment. Even though an expert constructs a UAP on paper, the execution of it in support of ground operations will likely prove less than ideal; however, iterative expert evaluation can trend toward maximum efficiency. Discovering where efficiencies can be gained and improvements made through regular feedback evaluation is knowledge management applied to airspace planning.

The feedback is provided through the constant coordination with division and synchronization meetings mentioned previously. Feedback can also come from commanders, adjacent units, or other staff officers. Whatever its source, as long as it is feasible and logical, then feedback should be incorporated in an effort to refine the UAP. Iteration after iteration of this type of incorporated feedback will trend toward optimization.

Another Side

Some may argue against and nay say the points of this article from multiple perspectives:

1. Having another reference system unnecessarily complicates planning and coordination.
2. Another daily meeting in the battle rhythm decreases productivity.
3. Minimal coordination with higher echelon is preferable since they are unreliable.
4. The BCT should control as much airspace as possible.
5. Airspace expertise should be learned on-the-job because there is no time to make an investment in formal education.

If the Army was the only organization using the GARS, then another reference system would indeed unnecessarily complicate planning and coordination efforts. However, the reality is that the Army, in particular the ground maneuver units, may be the only ones not leveraging GARS. Ironically, those actually pointing to GARS inefficiency are an actual cause of inefficiency by not using this established system.

With regard to battle rhythms, these are pliable documents. Not all events need to occur without fail. However, because air support is of utmost importance in the conduct of most tactical ground operations, ensuring synchronization should occur without fail. Done properly and routinely, it need not take more than thirty minutes, a minimal impact overall to staff daily productivity.

Along the same lines of the no fail rationale, constant coordination with higher organizations and continuous iterative assessment ought not to be dismissed. The reliability of higher organizations such as a division can be improved in developing a relationship through constant communication. They should be leveraged as an asset. The brigade airspace management and control is too limited. Trying to control and manage as much airspace as possible is well beyond the capability and capacity of the ADAM/BAE when consideration is given to all that is required. Instead of attaining a higher level of efficiency the opposite would be realized. Moreover, unnecessary risk to friendly forces is increased.

As far as not investing in formal airspace control and management education and simply continuing with the on-the-job training method, this is self-defeating. Intentionally degrading planning capability and then expecting optimization is an untenable expectation management. Every effort should be made to set staff planners up for success. Resources need to be allocated.

Conclusion

Counter points to the narrative of this article ultimately do not pan out. Working to adapt airspace control and management in order to optimize all available effects in a tactical environment is an ADAM/BAE essential task. In order to accomplish this task, this article proposes several means: leveraging the extant DoD GARS, conducting daily air synchronization meetings, maintaining constant coordination with higher echelon airspace management, having the airspace management expertise resident within the section, and iterative airspace assessments to determine effectiveness. The importance of airspace control and management cannot be overstated. It is indelibly interconnected to the ground maneuver as the third dimension. Rather than a realm of avoidable discomfort, airspace control and management ought to become as familiar and proficient to planners as ground maneuver. Further, brigade level standard procedures need to capture exactly how to develop optimal UAP to sustain knowledge management in this arena. Lastly, brigade staff ought to be briefed by ADAM/BAE personnel about the vital importance of the UAP to help mitigate underestimation and under investment.

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[1] C-7A Caribou Association. (2014, August 31). Friendly Fire.
http://www.c-7acaribou.com/album/photos/photo02.htm

Strategy Page. Murphy's Law: The UAV Collision Myth. (2013, July 13.)
http://www.strategypage.com/htmw/htmurph/articles/20130713.aspx

[2] U.S. Department ofthe Army, Airspace Control, FM 3-52 (Washington, D.C.: Department of the Army, 2013), B-12.

Acronym Reference

ACMR - airspace control means request
ADAM/BAE - air defense airspace management/brigade aviation element
ADRP - Army doctrine reference publication
AMR - aviation mission request
ATP - Army training publication
BAO - brigade aviation officer
BCT - brigade combat team
COP - common operating picture
DoD - Department of Defense
FM - field manual
GARS - Global Area Reference System
JP - joint publication
MSL - mean sea level
NFA - no fire areas
ROZ - restricted operations zone
UAP - unit airspace plan
UAS - unmanned aircraft system

TRAINING FOR AIRFIELD MANAGEMENT SUCCESS

By Brian C. Swensen

Over the past several years, airfield management requirements in Afghanistan have exceeded the Air Force and Army airfield operations battalion's mission capabilities. As a result, the air traffic services (ATS) companies within the combat aviation brigade (CAB) have inherited the airfield management mission at numerous locations in Afghanistan. In doing so, the ATS company commander typically is appointed as airfield manager responsible for performing or overseeing all airfield management tasks. Although supported with contract airfield support personnel during the deployment, the airfield management mission was a significant challenge for a unit specifically designed to provide only air traffic services. Additionally, the airfield safety monitoring function became the task of the CAB or task force aviation safety officer.

As a result of these limitations, Army Restructure Initiative changes to Army Aviation structure will incorporate airfield management capabilities into the CAB in the form of an eight person airfield management element (AME) shown in Figure 1.

Although, ATS personnel received contingency airfield management training from a Forces Command Mobile Training Team prior to deployment, neither this training nor combat training center rotations were able to fully replicate the airfield management tasks associated with the environment encountered during the deployment. To be successful as a force, we need to look at how we are going to provide initial and continuing training to the personnel tasked with providing these capabilities.

So, thus far we have identified a mission set and assigned personnel against the mission requirements. We now have to ensure those personnel have the skills, knowledge, and abilities to carry out the duties assigned to them.

Our current training strategy relies on personnel attending the Contingency Airfield Management (CAM) Workshop provided by the Air Traffic Services Command (ATSCOM) prior to a deployment. The CAM workshop provides aviation senior leaders and select other personnel a general overview of the various tasks and requirements which together form the airfield management mission. Areas addressed during the CAM workshop include landing surface criteria, lighting and marking criteria, airfield parking requirements, airfield imaginary surfaces, airfield assessments, United States Air Force landing zone operations, and airfield airspace analysis. While the ATSCOM CAM workshop is a pre-deployment requirement, it does not help with initial and proficiency training of airfield management personnel during peacetime.

Our first challenge must be to provide courseware or training that provides more than just a general overview for personnel in the AME. Furthermore, this training must be designed to achieve some measurable level of competency in AME tasks - training for "familiarization" is a waste of Soldiers time and Army money. To further conserve time and resources, the training needs to be focused on the targeted area of AME activities which the Soldier will be working - meaning section-specific training modules for flight dispatch, safety and standardization, and airfield services. Ideally, some form of resident training would be the perfect solution, but that's just not practical, realistic, or economically feasible. Some analysis would be needed to determine the right mix and level of

Airfield Management Element				
Airfield Management Headquarters	Provides supervision, command and control, and coordination of airfield activities.	15B00 15Q40	MAJ/04 SFC/E7	Aviation Officer/Airfield Manager Air Traffic Control Senior Sergeant
Flight Dispatch Section	Processes flight plans with appropriate agencies; transmits flight movement messages; ensures timely posting of NOTAMS; enables flight following for departing aircraft; processes flight clearances; maintains flight information on flights; monitors overdue flights; alerts crash crew and other agencies for emergencies.	15P30 15P10	SSG/E6 SPC/E4	Aviation Operations Sergeant Aviation Operations Specialist
Airfield Safety and Standardization Section	Conducts airfield safety inspections, develops local flying area procedures and airfield operations agreements.	153AB 150A0	CW4/W4 CW3/W3	Airfield Safety Officer Air Traffic and Airspace Management Technician
Airfield Services Section	Responsible for services to aircraft (POL, etc), airfield inspection, marking, lighting, facilities, and policing of the airfield.	15P20 15P10	SGT/E5 PFC/E3	Aviation Operations Sergeant Aviation Operations Specialist

Figure 1. The combat aviation brigade airfield management element.

Airfield Management personnel use a hand-held penetrometer to determine weight bearing capacity during an airfield assessment at FOB Farah, Afghanistan.

training required. The Aviation Operations Specialist (15P) Soldiers in the flight dispatch section are already trained on many of their requirements. The Aviation Safety Officer (153AB) is likewise already largely trained on the tasks that they will face in the airfield safety and standardization section and the Air Traffic and Air Space Management Technician (150A) has similarly also received airfield management training in both the basic military occupational specialty (MOS) producing course and in the 150A track-specific portion of the Aviation Warrant Officer Advanced Course to prepare them for this mission. Since resident training for the remaining members of the AME isn't feasible, that means the training will have to be delivered via some form of guided or unguided distance learning. Potentially, this could be via Defense Collaboration Services (DCS) online sessions, standard computer based training/interactive multimedia instruction, or some other form of exportable training.

Once we've successfully provided that initial training, we need to create some mechanism to allow these personnel to practice and validate their skills. In a deployed environment, this is easy - they're doing the AME job every day. Back at home station this becomes a different story since our CABs don't own the installation airfield - it is normally an Installation Management Command (IMCOM) facility belonging to the installation commander. Typically, what happens at home station is that the CAB AME Soldiers are tasked as the first choice with additional non-MOS related duties assigned from higher headquarters. We need to break that cycle. The IMCOM airfields already have their own AME structure and the CAB AME needs to leverage the knowledge and experience

Airfield Management personnel document spalling on a landing surface during an airfield assessment at Al Asad Airbase, Iraq.

of the IMCOM AME personnel during home station training. We need to have CAB AME personnel working side-by-side with the IMCOM AME personnel to allow them to actually do the job they have been assigned to do. An IMCOM airfield AME element has the same job as a CAB AME element; they're just performing the tasks at their home stations and an improved airfield rather than in a deployed location. The tasks, requirements, and processes of airfield management are either identical or extremely similar. By doing this, we can train the CAB AME and allow them to practice and improve their skills on a constant basis enabling them to be ready to deploy at any time and carry out the mission set they have been assigned.

Assuming we implement a sound plan for the initial functional training, and ongoing proficiency of AME personnel, we need to have some method to safeguard the Army's investment of time and money by tracking these personnel via an additional skill identifier (ASI) or some other method. Use of an Airfield Management ASI would seem to be the obvious choice and would allow at Human Resources Command Career Management Field Managers to more effectively target assignments and reduce the costs of the unnecessary constant training of inexperienced personnel.

In a perfect world, we have provided sound initial functional training and established a plan for maintaining and improving task competency. We have also put into place a method to preserve Army resources by avoiding unnecessary retraining costs by redirecting AME trained personnel back into AME positions where feasible. Now we need to create a continuing education program to aid our AME personnel in being life-long learners. We need to work toward implementing a continuing education model through which we can introduce new doctrine; lessons learned; tactics, techniques, and procedures; or changing regulations to the AME community. This could take the form of educational material on MilSuite, an AKO Group page, periodic DCS sessions, periodic refresher courses on the Army Learning Management System, a regular column in Aviation Digest, a smartphone or Web2.0 application, or perhaps some method of electronic enabled learning yet to be developed.

Above all what we DON'T want to do is simply provide a one-time training event to "check the block" and then abandon AME personnel to learn their jobs on their own - because right now that's exactly what we are doing, and it just isn't working.

Brian C. Swensen is a retired U.S. Army Air Traffic Controller. He currently teaches and maintains the 150A Air Traffic and Airspace Management Technician course as well as the 150A track-specific portion of the Aviation Warrant Officer Advanced Course, and was selected as the United States Army Aviation Center of Excellence Civilian Academic Instructor of the Year for 2013.

Acronym Reference

ATS - air traffic services
ATSCOM - Air Traffic Services Command
AME - airfield management element
ASI - additional skill identifier
CAB - combat aviation brigade
CAM - Contingency Airfield Management
DCS - Defense Collaboration Services
IMCOM - Installation Management Command
MOS - military occupatioinal specialty

SUAS - Friend? ... or Foe in the Airspace?

The Danger They Pose isn't Remote.

By CW2 Eric Roberts

The flight is going well, your briefs were executed smoothly and you've been making great time with all of the mission objectives. As you are patting yourself on the back and easing into that comfy seat, a giant bird goes zipping past your cockpit narrowly avoiding the rotor system. After making aggressive control inputs to quickly distance your aircraft from the hazard, you realize it's actually a small remotely piloted aircraft that the ground unit neglected to mention they were flying. Prompting the ground commander for an explanation leads to a disingenuous apology and you chide them internally in the cockpit before moving on with your day.

As a collective field, Army Aviation is remarkably safety minded. Our profession quite frankly, is an unforgiving one. We are continually trying to identify the next potential risk or incident causal factor and judiciously implement mitigating controls. The concept of aviation safety has justly been established as an officer track due to the importance it plays in a career branch comparatively more dangerous than other branches in the Army. Still, one area has slipped through the cracks and has not seen the same emphasis. That sector is the function of small unmanned aircraft systems commonly referred to as SUAS.

These stories are disturbingly common and one of these times the aircrew isn't going to be so lucky. The proliferation of UAS and SUAS platforms are exploding with every technological advance. Unfortunately, in an attempt to rapidly employ the systems during exercises and combat operations, due diligence hasn't been taken in correctly managing the training and standards of the personnel involved with them. This is unsurprising considering SUAS doesn't fall under Army Aviation branch like it inherently should due to their increasing flight capabilities and battle-space presence. Likewise, SUAS operator is merely an additional duty and not a military occupational specialty as it should be designated.

The SUAS isn't an intrinsically unsafe activity and the benefits of their use on the battlefield are indisputably invaluable. However, their current modality of training and employment should raise some important questions. Contrary to SUAS, larger UAS platforms such as the RQ-7B Shadow and MQ-1C Gray Eagle fall under the umbrella of the aviation community, yet their smaller more portable counterparts still remain in the hands of the Infantry brigades distributed down to the company level. New systems such as the RQ-11B Raven have been packing on size and weight as they are outfitted with cutting edge gimbals and infrared sensors. The current version of the Raven has a 4.5 foot wingspan and weighs in at 4.2 pounds flying weight.

While the Raven is designed to be flown at altitudes of 100-500 feet above ground level (AGL) with an operator ceiling of 1000 feet AGL they are widely known to be flown much higher at times. In addition to their altitude performance capabilities, they boast a 10 kilometer radio reception range giving them a twenty kilometer diameter area to work within. These specifications provide an enormous service envelope in comparison to the relatively modest average restricted operations zone (ROZ) of surface to 1000 feet AGL and 1 kilometer diameter.

In a recent accident investigation, a Raven flight was recorded to have reached an altitude above 8,000 feet AGL before the operator completely lost control resulting in the crash and total loss of the Raven. The established ROZ had a ceiling of 1200 feet AGL and luckily no other aircraft were operating in the vicinity when the SUAS violated airspace. In this instance the operator tried to fly in weather conditions beyond his skill level, but there have been numerous cases where the operator deliberately flew outside of the ROZ limits to gain additional battlefield visibility. Whether the infraction in airspace management is intentional or not, they have the potential to be the cause of the next catastrophic accident in Army aviation regardless of the military branch in which they reside. When you consider the RQ-20 Puma All Environment System, the performance capabilities and potential hazard only increase with the size and weight of its 9.2 foot wingspan and 13.5 pound flying weight.

The majority of SUAS operators receive an unsettlingly minimal amount of training in airspace and lack the fundamental understanding of the potential conflicts and perils the systems could create. Seeing the destruction that a moderate sized bird strike can cause, these SUAS platforms are of more than adequate proportion to cause significant damage to an airframe or even result in deaths. Used inappropriately, an SUAS poses far more threat to adjacent manned aircraft than the gain of their use could ever make defensible.

The training program for SUAS operators is probably more anemic than most aviation leaders would imagine. The student operators attend a two week course where they spend half the time in a classroom and half the time out at the range. Upon

graduation the average student leaves with between two to four hours of actual flight time on the system. The program of instruction requires that all students receive a minimum of four flight hours; however, the high demand for available class slots frequently forces unit master trainers to push operators out the door with half that time on the controls.

Furthermore, the quality assurance and control of student progress is rather subjective in nature where the unit master trainer must make a judgment call over whether a student graduates the course or not based on how well they performed during their abbreviated flight training periods. With the stress put on increasing the number of available operators, it isn't surprising that the attrition rate hovers around one percent or less. Most operators, upon completing the training, will not touch nor even see the SUAS system again for the following six to twelve months. At that time, they will be looked upon by their command group as the subject matter expert, proficient enough to safely and effectively employ the system in training or combat, regardless of true efficacy.

The training curriculum for master trainers is more rigorous, yet frequently diluted still. An operator who wishes to attend the SUAS Master Trainer Certification School at Fort Benning must be a non-commissioned officer, have a minimum of 20 hours operating the system, and have a minimum GT score of 100. However the 20 hours of flight time can be and often is waived as a requirement despite it being of elevated importance to the understanding of the SUAS and how to properly and safely utilize it. In addition, the GT scores are habitually not verified by their unit when scheduling course dates, thus negating all requisite qualifications.

While there is an established aircrew training program for SUAS operators, it is usually neglected or even avoided entirely. Since these operators have a primary military occupational specialty (MOS) to tend to and SUAS training occurs alarmingly infrequently, it isn't uncommon for a freshly minted Soldier to walk away with his certificate and then never see a SUAS system again for up to a year or longer. Within the Aviation Branch, these practices would solicit concern at the very least. Similarly, the master trainers must tend to their own actual MOS, so maintaining proficiency in flying or training other operators takes a trivial role behind their "real" job.

No institution is at fault here; every link of the chain is simply trying to meet the ever-growing needs of the war-fighting units. The obvious solution is that SUAS training needs to be an Aviation branch responsibility where the operator would receive the proper emphasis on airspace and safety and receive the necessary hands-on training during qualification and meet follow-on currency requirements. Additionally, the SUAS operator must be designated as an MOS. Some may argue that doing so would pull the capability from the hands of the company commander as it was intended. That simply isn't true as larger scale UAS systems such as RQ-7B Shadow fall under Infantry command and control yet reside in Aviation Branch where they belong. The SUAS would simply be an extension of that structure at the company level. The hierarchy would mirror the Shadow platoons in the Infantry brigades.

While there will inevitably be hurdles and conflicts associated with pulling SUAS into the Aviation Branch, the benefits would be ubiquitous. The personnel requirements could significantly reduce as the operator population loss rate would greatly decrease and the master trainer personnel needs would also plummet with it. The current SUAS systems have enough similarities that one UAS MOS could effectually manage all platforms. However, the redirected primary focus would allow operators and standardization trainers to maintain skilled professionals who understand how to best employ the systems and integrate with other aviation assets in the area. We don't have junior infantrymen preparing meals for their unit as a side job, why have them endangering the lives of our service members aloft and jeopardizing mission objectives? The current operators may follow the "big sky, little bullet" adage, but the legitimacy has risen beyond questionable in congested battlefield airspace.

In the current training model, many operators get certified and never fly again prior to transferring units or changing station. By the time they arrive at their next unit, they must attend refresher training to reach a temporary degree of proficiency and then the cycle starts over. Likewise, when junior operators pin additional rank, they are viewed as too important to be wasting time on SUAS and other operators must be trained to fill their vacancies. Creating an MOS could resolve all of this and allow those other branches to focus on their primary tasks.

We have an opportunity to set a new standard for the Army. If we get ahead of the issue, we can prevent future incidents and show the other branches how SUAS should be properly managed. The utility of the SUAS is only going to continue to grow as multi-rotor models are proving their value as future recon assets. It's hard to say what the ratio of SUAS to manned systems will be in the future, but the numbers are only going to increase. It's time to deviate from the Army status quo and be proactive so the next SUAS policy change doesn't have to be written in blood.

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Acronym Reference

AGL - above ground level
MOS - military occupational specialty
ROZ - restricted operations zone
SUAS - small unmanned aircraft systems
UAS - unmanned aircraft systems

DYNAMIC AIRSPACE MANAGEMENT

IN SUPPORT OF COMBINED ARMS MANEUVERS

By MAJ R. Smith Griggs

At all echelons, airspace users collect information; deliver direct and indirect fires; and conduct air operations, sustainment, and air and missile defense. Forecasting and integrating airspace user requirements challenges Army airspace planners. Over the past 12 years, the static posture of our forces within the operational environments in Operations Iraqi Freedom and Enduring Freedom (OIF/OEF) led to a tendency to deconflict airspace users in ways that prohibited concurrent, synergistic effects. Unfortunately, the airspace-related competencies that existed before OIF/OEF have atrophied through lack of repetition. This decline in airspace management proficiency is exacerbated by similar neglect with regard to reconciling the air control order's hour cycle with the continuously evolving requirements of decisive action within unified land operations (ULO). Despite a lack of training emphasis within units while the Army focused on counterinsurgency operations, the Army stands better postured to integrate airspace users into decisive action operations than ever before. Advances in the Army Battle Command Systems (ABCS) architecture and training opportunities provided by the Fires Center of Excellence's Air Defense Airspace Management/ Brigade Aviation Element (ADAM/BAE) Course have set the conditions to improve the ground commander's approach to airspace management.

Two steps are necessary to reconcile the joint community's time-based airspace management process with the dynamic, event-driven nature of ground plans and operations. The first is returning to our doctrinal approach of airspace planning while managing large blocks of airspace at the brigade combat team and division levels. The second is utilizing unit-level airspace control orders (ACO) to increase the responsiveness of airspace management in support of highly dynamic environments. The first step is a technique to use existing doctrine. The second is a new idea to leverage the improved capabilities of our matured ABCS. Both of these techniques are complimentary and build upon the developing proficiencies found in the joint community.

Army tactical planners may develop unit airspace plans (UAP) to facilitate unrestricted fires while simultaneously permitting the execution of missions by other airspace users. The included methodology attempts to optimize UAP for their application to combined arms maneuver-focused operations. This is accomplished by enabling planners to rapidly update procedural control measures to changing tactical situations within a theater's ACO and air tasking order cycle. Collectively, the ideas put forward are an untested hypothesis, but are grounded in experiences gained as a member of an ADAM/BAE cell. Recognizing that the personal experience of one individual is insufficient to fully develop this idea, this article is submitted as an invitation to current and aspiring subject matter experts to provide their constructive insights and assist in developing and shaping our unit airspace planning and execution practices.

Commanders shape their airspace usage priorities in response to their operational environment. During the past 12 years, the predominant, aircraft-permissive prioritization relegated indirect fires to use on an "if no one else is in the airspace" basis. As a result, when fires are employed, it is not uncommon to observe all air-based enablers being pushed from the area for deconfliction. This effectively disables the sensor to shooter linkage and prevents synergistic effects. As the Army transitions from conflicts dominated by counterinsurgency (COIN) and rebalances to properly emphasize combined arms maneuver, our airspace usage priorities and the resulting approach toward airspace management must shift to facilitate the immediate massing of fires at the expense of aviation's unrestricted freedom of maneuver.

The joint community brings exceptional capabilities to bear through air-based platforms. Though their effectiveness is proven, the limited platform availability and their limited payload and station times prevent them from delivering the sustained fires required to defeat a peer or near-peer adversary. The Army's Artillery branch is best postured to provide the sustained, massed effects that combined arms maneuver requires. Similar to how fires deferred to all other airspace users during the execution of COIN, stability, and support operations, units must learn to plan the utilization of airborne enablers around the flight trajectory of fires munitions and then

restrict their operations to designated airspace to maintain a flexible fires plan during decisive actions. The continuous integration of airborne enablers while employing responsive artillery requires a dynamic, fires-centric approach to unit airspace planning.

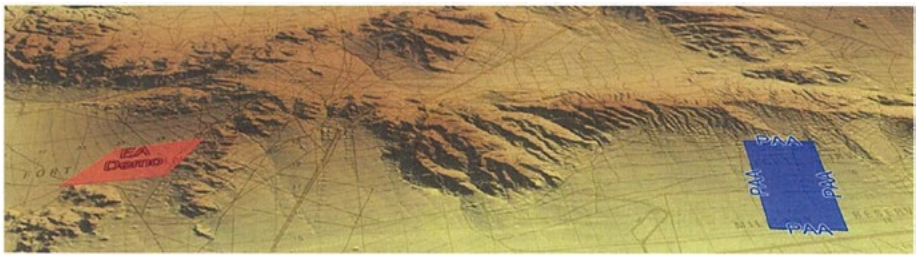
The coordinating altitude (CA) is the theater-specified altitude that delineates a change in the coordination authority, normally corresponding with the coordination level in which ownership of airspace transfers from the ground forces to the joint force air component commander. Functionally, this separates fixed- and rotary-wing aircraft. Though the CA is not restrictive, an expectation has developed while the Army focused on stability operations that anything, to include artillery munitions, rising above the CA is coordinated with the appropriate controlling authorities adding latency to the fires process. In theaters predominantly characterized by high-intensity conflict, the theater coordination altitude should be set at a level to not interfere with brigade-level fires. Doctrinally, in this environment, air power is concentrated on the interdiction of forces beyond the fire support coordination line. In hybrid environments, joint assets are applied more readily throughout the deep, close, and security areas. As a result, the CA is frequently lowered to grant increased freedom of maneuver to joint, airborne assets. In complex environments where the combined arms maneuver and wide-area security competencies are executed simultaneously, it is improbable that the theater CA meets the needs of all units conducting operations. When ground commanders fail to state their intention to manage the airspace relevant to their operations, there are two critical, negative effects - increased latency during fires due to coordination expectations and an inability to adapt the UAP to events occurring within the airspace control order's 24-hour cycle. As improved systems expand the range over which the Army is capable of exercising mission command, the time has come to apply this to the third dimension as well. The first step is breaking the COIN airspace paradigm by shifting the perception of common airspace usage prioritization that has become internalized over the past 12 years. A means to identify and assume management of the volume of airspace pertinent to the brigade's area of operations is also necessary to prevent delays for clearance of fires and increase the responsiveness of unit airspace plans. The proposed methodology meets these needs while continuing to mitigate the risk of fratricide to airborne enablers. Publishing specific control measures informs airspace users that the ground commander is assuming airspace management responsibilities and must be coordinated with prior to entry into the unit's area of operations. At least two tools exist to help commanders gain control of their vertical area of operations. The first of these tools is the high- density airspace control zone (HIDACZ). Army doctrine suggests that corps and divisional - level headquarters possess the staff necessary to control a HIDACZ. Doctrine continues to state that with air traffic control (ATC) augmentation, brigade combat teams with an ADAM/BAE can control a HIDACZ for a limited time. The other tool is simply a restricted operations area (ROA) with specified intent appropriately included while requesting its establishment. Regardless of which airspace control measure is submitted, the instructions included must clearly state that the requesting unit is planning high volumes of indirect fires in conjunction with the employment of rotary-wing, unmanned, and fixed-wing assets.

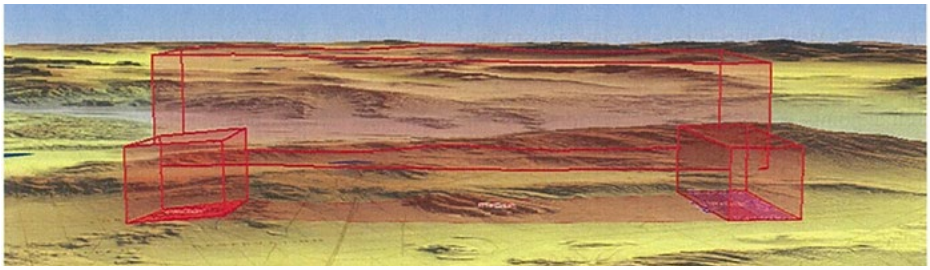
The final component of this methodology consists of adapting the unit UAP to a rapidly evolving battlefield. Without a new approach, this is nearly impossible due to the Joint Air Component's planning of the theater airspace control order on a 72-hour cycle and its publishing on a 24-hour cycle. To work within these planning constraints, the brigade develops its own internal airspace control order nested with that of higher. During planning, the ADAM/BAE, tactical air control party, and brigade fire support cell work together, in a similar capacity that a division's joint air-ground integration center (JAGIC) would, to identify and plan airspace requirements based on the ground scheme of maneuver and fires plans. These planners must forecast the requirements as necessary to meet airspace control means request submission timelines. This results in the aforementioned HIDACZs or ROAs that transfer control of large volumes of airspace above the brigade's maneuver area to the brigade. Through this and the airspace control measure's included instructions, entities external to the brigade understand the requirement to coordinate prior to entering the unit's airspace. During this coordination, key information for situational awareness and directives, as necessary, are provided to the inbound airborne enabler to synchronize its maneuver and effects with other airspace users in the brigade's area of operations.

With mechanisms in place to coordinate with non-organic enablers, the unit may develop additional airspace control measures (ACM) within the HIDACZ or ROA. These sub-ACMs represent the requirements of airspace users' flight paths and areas of operation. They are deconflicted and then pushed to the unit's organic fire batteries and airspace users for execution. Digitally, they are published by the Tactical Airspace Integration System (TAIS) to the Data Dissemination Services (DDS), as a component of a unit-specific ACO. Once published to the DDS, the unit's ACO becomes accessible to the ABCS of all echelons subscribing to the unit's publications in the same manner that the theater ACO is published. The only difference is that the brigade may enhance the utility of the original theater ACO by adding to or removing previously added control measures at any time

interval they choose. By pushing an update and receiving acknowledgement of implementation, the safety functions inherent in ABCS - specifically the Advanced Field Artillery Tactical Data System (AFATDS) - are leveraged to reduce the risk of fratricide by using airspace control measures as fire control measures in the third dimension. Unit airspace plan development occurs as a component of course of action development.

It differs from the development of other control measures only with respect to the expertise necessary to visualize and communicate how the airspace plan supports the ground scheme of maneuver. During course of action development, fires planners determine the position areas for artillery (PAA), planned targets, target areas of interest, target reference points, and other control measures as necessary. These, along with the maneuver graphics, provide an initial framework for fires-permissive unit airspace planning to begin. Analysis of projectile flight trajectory between these locations, with respect to both low- and high-trajectory flight paths for anticipated munitions under forecasted meteorological conditions, allows the rapid planning of bands of restricted airspace allocated for fires. The max trajectory altitude, plus a safety margin, becomes the ceiling for the brigade's HIDACZ or ROA. A lower altitude may be chosen, with the understanding that employing higher-trajectory fires than initially planned requires additional coordination. Within the requested HIDACZ or ROA, airspace is further blocked off for the continuous execution of fires missions from PAAs. Around the airspace blocked off for artillery, tentative flight paths and restricted operations areas are planned to procedurally control the movement of enablers (rotary-wing, fixed-wing, unmanned aircraft systems [UAS], etc.) to operating areas that facilitate the employment of their effects. Depending on the asset and situation, the planners may grant the airspace user freedom to maneuver within non-restricted airspace or confine them to operational areas. Regardless of the approach, the inclusion of the supporting units who provide these enablers while determining flight routes and operational areas is paramount.





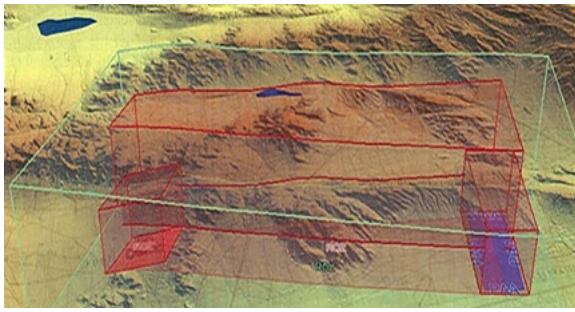
A Step-by-Step Guide to Using this Planning Methodology

1. Airspace and fires planners assist in the development of the ground scheme of maneuver to ensure an understanding of the lateral boundaries and rates of movement. This understanding shapes the two-dimensional parameters of airspace requirements.

2. Unit airspace planning during combined arms maneuver begins with fires planning. Position areas for artillery for major fires systems, target groups, target reference points, and other areas where anticipated fires are planned and templated.

3. Artillery trajectory charts are used to determine the max altitude of planned fires using high and low trajectories and are calculated for various munitions under forecasted meteorological conditions - framing the airspace requirements.

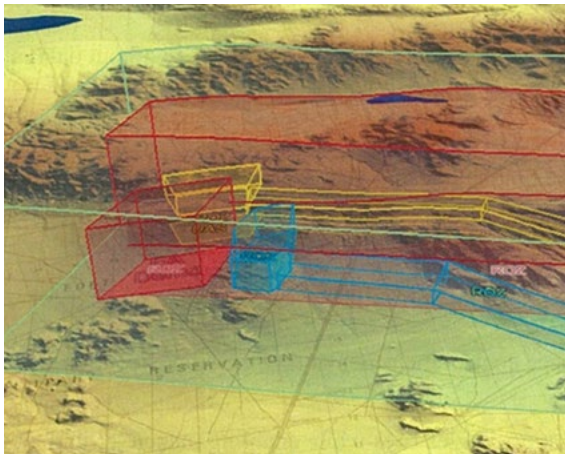
4. Airspace control measure requests (ACMR) are submitted for a HIDACZ or ROA to block off and gain control of the airspace necessary to facilitate fires without delaying for clearance outside of the organization.



5. Develop and publish restricted airspace based on the fires trajectories to include appropriate horizontal and vertical safety buffers. Publish these to the theater ACO in addition to previous ACMR from Step 4.

6. Assess the airspace requirements of other airspace users: Rotary-wing attack/recon, electronic warfare platforms, fixed-wing platforms, and UAS. Develop airspace around fires ROA at an altitude and span sufficient to facilitate their maneuver and the delivery of their intended effects.

7. Develop air corridors as necessary to facilitate transitions to and from areas where airspace users will operate. Designate airspace operational areas as required. This includes initial points, release points, air corridors for rotary-wing aircraft and UAS, and operating zones from which collection takes place or effects are applied.



8. The operation of small unmanned aircraft systems (SUAS) is prohibited within the areas designated for use by other airborne enablers. Clearance to

operate SUAS is delegated to the lowest level that maintains visibility of the UAP. When launched, airspace requirements are communicated upward, restricted operating zones are established, and notification is pushed to other airborne assets in the vicinity.

9. Keep higher informed of the status of the UAP by making the unit-specific ACO available on the DDS with every revision and providing notification of major changes.

10. Publish updated, brigade-internal ACO as required to manage the airspace controlled by the brigade. Ensure publication on the DDS reflects updates to the ACO and is accessible to higher and lower echelons.

11. Confirm receipt and implementation by units which must execute operations off of the updated ACO.

12. Utilize radar systems and data links to track airspace user compliance with procedural controls.

The completed UAP should section off all airspace included in the unit's area of operations up to the max trajectory of its fires platforms. An encompassing airspace control means request must be submitted in time for publication in the ACO. This single act enables the unit to employ and adjust planned fires without delaying for coordinating through the air component command or other external agencies. It allows the ground unit to assume control over the unit's airspace. Essential to this approach is the brigade's airspace managers utilizing all means to maintain an accurate understanding of the air picture and communicating relevant situational information and appropriate directions to enablers who are unable to receive updates to ACM during mission execution.

Utilizing airspace planning that prioritizes fires while enabling maneuver in the third dimension may require a battle drill transition from clearance of fires procedures to procedures which grant approval to airspace users prior to their launch or entry into the airspace controlled by the brigade. For instance, after the UAP has been published to the ACO, the unit will activate and deactivate air corridors and operating zones as necessary to facilitate movement on the battlefield. Prior to an air asset being granted permission to launch, the unit activates the relevant ACM and receives confirmation from subordinate units that the ACMs are active in their ABCS. When activated, the ACM will alert units engaged in fires missions if they might potentially fire through an active ACM. The crew is prompted to adjust their firing solution or pass the mission to another battery to prevent incident. With disciplined aircrews confining themselves to airspace designated for their operations, this greatly reduces the chance of mid-air collision or fratricide. The appropriate ACM size for proper deconfliction and facilitating appropriate freedom of maneuver will vary with the mission, situation, and environmental conditions.

Training for decisive action against a hybrid thread within dynamic operational environments requires us to assess the practices we have relied upon for the past 12 years and determine how these practices may evolve. This methodology is an attempt to codify how airspace users may leverage our existing doctrine and ABCS architecture to better meet the needs of ground commanders. Expanding the ground commander's area of operations further into the third dimension and utilizing dynamic, unit-level ACO is essential to obtaining the flexibility and responsiveness necessary to succeed during decisive action on the modern battlefield. Currently, these ideas require validation. You are invited to assist in testing these and any other theories to discover the Army's next best practices.

Doctrinal References

- FM 3-52: Airspace Control
- JP 3-52: Joint Airspace Control
- FT 105-BC-PROV and FT 155-AM-3 (used for artillery trajectory planning)
- TC 1-400: Brigade Aviation Element Handbook
- FM 3-04.155: Army Unmanned Aircraft System Operations
- FM 3-09: Field Artillery Operations and Fire Support
- MCTP FY14 Trends in a Decisive Action Warfighter Exercise

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Acronym Reference

ABCS - Army Battle Command System	**HIDACZ** - high- density airspace control zone
ACM - airspace control measures	**JAGIC** - joint air-ground integration center
ACMR - airspace control measure requests	**OIF** - Operation Iraqi Freedom
ACO - airspace control orders	**OEF** - Operation Enduring Freedom
ADAM - Air Defense Airspace Management	**PAA** - position areas for artillery
BEA - Brigade Aviation Element	**ROA** - restricted operations area
AFATDS - Advanced Field Artillery Tactical Data System	**SUAS** - small unmanned aircraft systems
ATC - air traffic control	**TAIS** - Tactical Airspace Integration System
CA - coordinating altitude	**UAP** - unit airspace plans
COIN - counterinsurgency	**UAS** - unmanned aircraft system
DDS - Data Dissemination Services	**ULO** - unified land operations

ATSSE

Air Traffic Services Standardization Element
Support to Theater Operations

By MAJ Mike Shannon
and CW2 Robert Hatfield

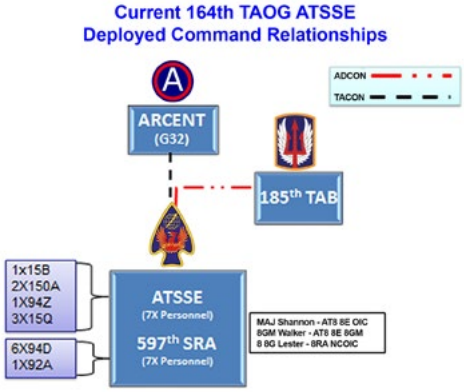
Recent conflicts have demonstrated a need, at the theater level, for Army subject matter expertise and standardization of air traffic services (ATS) and airfield management skills. Combatant command (COCOM) headquarters and G-3 air sections are being reduced in size and have a shortage of these skills resident in their force structure. Much like weather operations, air traffic control (ATC) and particularly airfield management skill sets have normally been resident with Air Force organizations at Air Force Central Command and requested by the Army as needed. Over the past nine years as requirements exceeded Air Force capabilities, the need for this expertise at the Army level drove the development and later the deployment of the theater airfield operations group (TAOG) organization.

There are two TAOG organizations. One is the 204th TAOG from the Louisiana Army National Guard and the other is an Active component unit, the 164th TAOG, located at Fort Rucker, Alabama. Each of these organizations has a table of organization and equipment (TOE) of about 83 Soldiers with the standard command and staff/support sections common with any brigade equivalent organization. Each TAOG, however, has a section called the air traffic services standardization element (ATSSE) which is a capability unique to the TAOG. The 164th and 204th TAOG's ATSSEs have been rotating deployments to the Central Command (CENTCOM) area of operations working for U.S. Army Central Command (USARCENT) intermittently since about 2006 either as part of the standard TAOG organization or independently (standalone element under tactical control to USARCENT) from the organization and TAOG command team.

By TOE*, an ATSSE is composed of one CW3 150A (Air Traffic and Airspace Management Technician [ATASM]), one MSG 15Z** (Aircraft Maintenance Senior Sergeant), two SFC 15Qs (Air Traffic Control Operator), two SSG 15Qs and one PFC 15Q. A CW5 150A ATASM and either the MAJ 15B (Airspace Management Officer) or the TAOG S-2/S-3 LTC 15B usually deploy as part of the ATSSE to form two deployable teams.

Field Manual (FM) 3-04.120 describes the ATSSE as:

> *The air traffic services standardization element (ATSSE) is a unique organizational design of the TAOG. This section provides oversight, technical expertise, standardization to Army airfields at theater level and quality assurance for training and certification of controllers and ATS maintenance personnel. It develops special use airspace for restricted areas, transition areas and control zones. The ATSSE serves as the primary staff coordinator for ATS matters within the theater area. The element is capable of splitting into two teams, with the warrant officer and NCOIC serving respectively as supervisors of one team each. Two teams are included for modularity and support of five AOBs employed across a wide geographical area throughout the theater.*



The key competencies of the ATTSE derive from its ability, as stated above, to provide technical expertise and standardization at Army airfields at the theater level. Over the past eight years, ATSSEs have performed four main functions for USARCENT and can provide similar capabilities to any COCOM or theater level organization.

1. ATS and airfield management subject matter experts (SME).
There are numerous occasions requiring assistance from the ATSSE with respect to a multitude of airspace, ATS, and airfield management issues. Key to being involved in USARCENT operations is the ability to be

* FY16 TOE dated 26 FEB 2015
** 15Q50 will revert to 15Z50 on the FY16 TOE

linked in with ARCENT plans and operations to provide feedback and assistance to the ARCENT and the combat aviation brigade staff with respect to any missions or issues requiring ATS and airfield management standardization or oversight.

With force manning levels being a major limiting factor in Soldiers supporting operations in Iraq and Afghanistan, many ATS and airfield management functions are currently performed by contractors. This requires ATS and airfield management contract oversight and involvement not only to assist COCOM contracting offices with draft initial contracts but also to ensure proper standards and measures of performance are included.

2. Networking.

One of the ATSSE team's attributes is its ability to network with the U.S. Air Force, the U.S. Army Aeronautical Services Detachment – Europe (USAASD-E), the Air Traffic Services Command (ATSCOM), USARCENT, the U.S. Air Force's Rapid Engineers Deployable Heavy Operational Repair Squadron Engineer, senior airfield authorities (SAA), airfield managers, and numerous other players. We utilize these relationships to share information and mutually support each other's operations and missions. The ATSSE stays in contact with all of the Army SAA in theater to ensure task force commanders and SAA are receiving any assistance or help that they may need concerning host nation airfields and operations. We also coordinate with the respective airfield managers, ATC facilities, (both military and contracted) and safety/ standardization offices.

3. Airfield assessments.

Without ATSSE involvement in airfield assessments at the COCOM level, airfield assessments with respect to ATS and airfield management are often conducted in a vacuum. Numerous agencies perform limited or specialized airfield assessments such as the Air Force Central Command (AFCENT) A-3. Since the ATSSE consists of teams of experienced aviators, air traffic controllers, and ATASM technicians, we have the capability to perform airfield assessments at Army airfields of interest in accordance with *ATP 3-17.2, Multiservice Tactics, Techniques, and Procedures for Airfield Opening* and *FM 3-04.300, Airfield Flight Operations and Procedures*.

The ATSSE team also uses its networking skills to collect and consolidate assessments completed by other agencies or U.S. military branches and shares their findings with those organizations. They also try to maintain some aspect of knowledge management between all interested parties and share as much information as necessary. The goal is to have a source of documents from all elements that is involved in the assessment realm.

4. Theater control tower operator (CTO) examiner duties.

With the approval of USAASD-E, ATSSE can provide CTO examiners within the theater of operations in which they work. The ATSSE senior air traffic controllers also perform this function for all the contracted and military Army airfields of interest throughout the CENTCOM area of responsibility. The mission of the CTO examiner is to certify an air traffic controller on their ability to perform duties within their respected tower and airspace. The certification process can be easy or very difficult based on the complexity of the tower and its operations. The examiner reviews records, logs, publications, maps, etc. and will also verify if they are within standards. The examiner will eventually sign onto each of the operating positions behind the air traffic controller to be certified and observe their ability to apply proper ATC standards, phraseology, and methods.

The 597th Maintenance Detachment at Fort Rucker, Alabama is a subordinate detachment to the 164th TAOG. This unit is the only ATS maintenance detachment with military occupational specialty 94D, Air Traffic Control Equipment Specialist, assigned in the U.S. Army and has had teams continuously deployed to CENTCOM and European Command since 2001. These deployed teams are called special repair activities (SRA) and are an indispensable part of the ATSSE mission. The SRA provides the theater with sustainment and depot level maintenance on not only tactical ATS systems such as the Tactical Terminal Control System, Air Traffic Navigation, Integration, and Coordination System, Tactical Airspace Integration System and 7A ATC tower, but they also perform maintenance, installation, and repair of numerous commercial off the shelf systems such as the URC-200 Line of Sight Transceiver, CM 200 Mobile Two-Way Radio, and the Zetron Radio Consoles. When the ATSSE is deployed,

a 94D with equipment certifications on all tactical systems is necessary to be on the team. The ATSSE currently has a 94Z60, Senior Electronic Maintenance Chief and a seven Soldier SRA as part of the deployed ATSSE. The SRA has the capability to deploy separately or as part of the ATSSE team.

Once Soldiers arrive at the TAOG and before deploying as part of the ATSSE, training for the team includes the contingency airfield management workshop taught by ATSCOM as well as classes and briefings on topics such as theodolite training, deployed airfield inspections and assessment overview, ATS and airfield management letters of agreement and memorandum of understanding overview, terminal instrument procedures, and flight check schedules and procedures, as well as appropriate ATS maintenance and equipment training. ATSSE members can also conduct ATS Aviation Resource Management Survey inspections and assistance visits with the ATSCOM Quality Assurance Inspection Team and often assist with ATS issues to support the Fort Rucker training area and with the airfield operations battalion missions and standardization.

Current conflicts show that the complexity of airspace, ATS, and airfield management operations will continue to increase at both the tactical and theater level. With the Army's increasing integration with host nation operations, the increasing numbers and types of unmanned aircraft systems/operations at military and host nation airfields, and increasing involvement of the Army in joint and coalition operations, the need for the ATSSE to ensure networking and airfield assessments are conducted to improve airfield safety and standardization areas will only increase. The ATSSE is a vital part of supporting these activities and continues to be a combat multiplier to theater operations.

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CW2 Robert Hatfield is currently the ATSSE ATASM technician at Camp Buehring, Kuwait. His previous assignments include ATSSE ATASM, 164th TAOG at Fort Rucker, AL; G-3 Air Airspace Command and Control Officer-in-Charge, I Corps at Joint Base Lewis McCord, WA; and ATASM Non-Commissioned Officer, F CO, 159th Combat Aviation Brigade at Fort Campbell, KY.

Acronym Reference

TOE - table of organization and equipment
USAASD-E - US Army Aeronautical Services Detachment - Europe
ATSCOM - Air Traffic Services Command
SAA - senior airfield authority
TAOG - Theater Airfield Operations Group
ATSSE - Air Traffic Services Standardization Element
COCOM - combatant command
ATS - air traffic services
ATC - air traffic control
ATASM - air traffic and airspace management
CTO - control tower operator
CENTCOM - Central Command

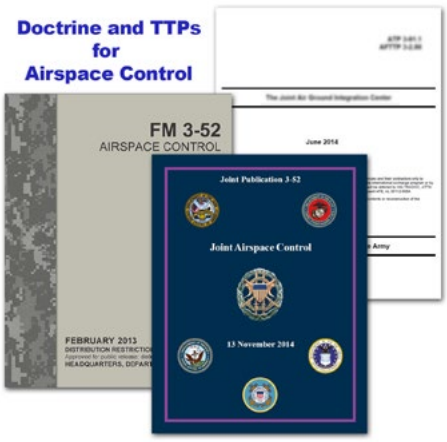
Staying Ahead of the Wave
Airspace Control

By Bernd Ingram and Marius Dockery

Whether you are a surfer, have watched live surfing at water's edge or from the comfort of a sofa in front of the television, you know that the only thing harder than making the perfect ride, is catching the perfect wave in the first place. Surfers will float out from shore, reading the waves and water underneath them, and when instinct and experience tell them it's time, lay on their board and stroke to jump into the wave as it catches and begins to pass them. Today, airspace control (AC) personnel are doing the same thing, figuratively, as a new wave of doctrine; tactics, techniques and procedures (TTP); organizational changes; and software and system capabilities is rolling through.

In February 2013, the long awaited revision of Army Field Manual (FM) 3-52 was released. Though now two years old, the undercurrent of new ideas contained in the manual is still having an effect on units in the field and leaders being trained. Army airspace command and control is now simply called AC. More telling than a simple name change is the shift toward a process designed to maximize operational effectiveness and enable more flexible and dynamic use of airspace. Prompted by the proliferation of unmanned aircraft systems (UAS) and ever higher altitude and longer range fires, airspace has become increasingly complex and begs for a simple, yet positively controlled methodology for executing the myriad of missions while accommodating the varied users. Now, as the FM states, "Airspace planning focuses on setting conditions for near-real-time airspace control during mission execution, thereby providing commanders flexibility while reducing risk."[1] And personnel should not miss that while the Army's AC methodology still emphasizes largely procedural control, it includes the flexibility to utilize positive control or a combination of the two throughout a commander's area of operations.[2] No, FM 3-52 does not de-emphasize planning; it simply adds capabilities and doctrine that enable immediate actions to support operational requirements.

Determining how to support the commander's plan and support the airspace needs of all the users, remains within the execution of the military decision making process, under the mission command warfighting function (MC WFF). Airspace control is an additional task of the MC WFF and a continuing activity in the operations process.[3] Echelon airspace control personnel provide planning and execution support under the purview of the S-3/G-3 battle captains and chiefs of operations.



It is the task of AC personnel to minimize conflicts and maximize effective and efficient use of the airspace. The WFF staff conflicts that remain unresolved go to the S-3/G-3s, or as needed, to the commander for resolution.

Ultimately, commanders integrate airspace users throughout their areas of operations while conducting operations.[4] To support a commander, airspace elements continually monitor and assess operations and current and future airspace use as part of a running estimate. Using near real-time procedural control, AC personnel can direct Army airspace users to shift airspace use to a different route, altitude, or volume of airspace, as necessary to achieve the mission.[5] This core of the new FM is critical for all airspace element personnel to understand and communicate to their leadership.

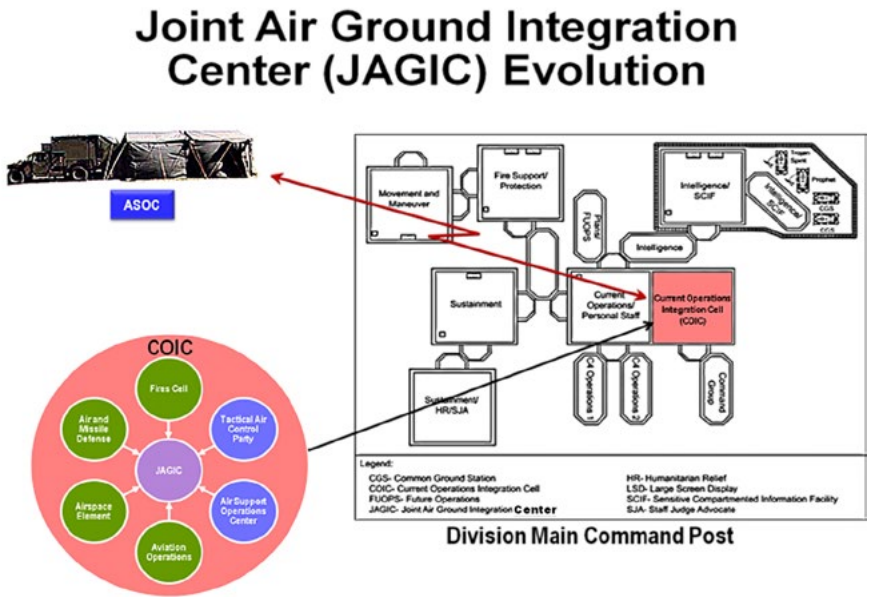
Field Manual 3-52 also revises and provides detailed discussions of airspace responsibilities and roles in Chapter 2. The information covers echelons from brigade to corps, and provides knowledge key to executing AC tasks. The discussion of air traffic services (ATS) in chapter two outlines the ATS role in establishing and operating Army airfields; a role critical to facilitating the control of local airspace and vital to supporting the area of operations AC task. Especially enlightening is the discussion of individual and shared functions between the air defense airspace management (ADAM) and brigade aviation element (BAE). In Appendix B, readers will find revised types of airspace coordinating

measures with usage tables and detailed explanations of the more commonly used measures. So the sum of new and updated information in the Army's foundational airspace document is quite worth the read and a small "wave" of its own.

The TTP manuals are also being updated and supporting new trends in AC. The Air Land Sea Application Center is currently revising a final coordination draft of the multi-service tactics, techniques, and procedures (MTTP) manual as a companion manual to FM 3-52 to bridge Army doctrine and TTP to the joint world, with additional detail and information. Additionally, an Army techniques publication addresses the long negotiated and experimented with, but recently documented, TTP for the joint air ground integration center (JAGIC).

support of division operations. They can deconflict and integrate airspace users to respond to support troops-in-contact, enable fires against enemy formations and assets, and assure the safety of division assets against unmanned aircraft swarms. The JAGIC can also make the entry/transit/exit of close air support (CAS) a seamless and responsive combat multiplier or support the intelligence collection process and targeting by providing airspace for the division UAS and recon teams, among other airspace events. So, many of these situations are what one might find in a division battle drill book involving the deconfliction, integration, and control of the division's airspace.

So what's the big deal about having a JAGIC in the CP, with USAF Airmen talking a language you don't understand? Well, the



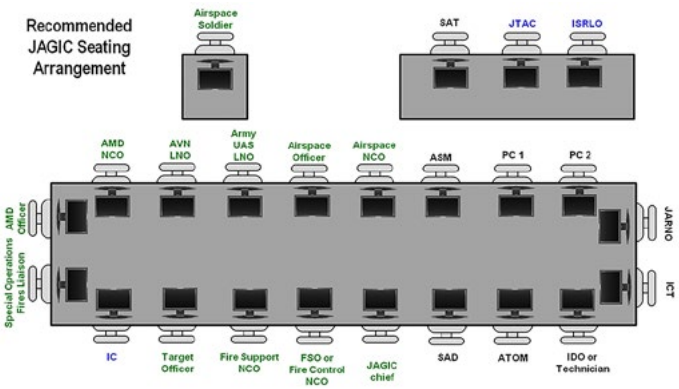
Evolution of the JAGIC is a big deal, it's like catching a wave on a new board made with the latest state of the art technology. To clear up a couple of things, you won't find JAGIC on a table of organization and equipment, and it doesn't exist unless an Army division deploys and collocates with a United States Air Force (USAF) air support operations center (ASOC). A JAGIC is a TTP, not an entity. This thing called JAGIC is a matrixed team, created when the ASOC is located in a division command post (CP), typically on the current operations integrating cell floor. The division fires, air and missile defense, AC, ASOC, and tactical air control party personnel, at minimum, team up to facilitate use of the airspace in

big deal is they speak the same language as the theater airspace control authority's (ACA) air and space operations center (AOC) that really has control authority of all the airspace over a division area of operations. Contrary to popular belief and according to doctrine, the division commander does NOT own the airspace over his area of operations. Typically, the ACA will delegate control of some portion of the airspace to the division. What the commander does own

is the Army users operating in the airspace and the requirement to integrate these users for the success of his operation. Under the idea of division assigned airspace,[6] the division commander then can control everything within his boundaries and up to the coordinating altitude. Combining these Army and air component decision-makers provides a new capability to work issues faster and resolve competing requirements more effectively.

Throughout the Army, divisions are taking on this new JAGIC challenge. From Army National Guard divisions rotating through the Mission Command Training Program Warfighter Exercises at Fort Leavenworth, to Active Component division warfighter exercises, and in experiments and joint ventures like Bold Quest and Unified Challenge, JAGICs are being formed. Service members and leaders are learning and adapting to the new capabilities. Here are a few short thoughts on things we've learned so far:

- We still have to put a full measure into planning – detailed, by phase and sub phase, synchronized to the maneuver plan, and validated through the synch drill, with all airspace users integrated and deconflicted in advance. We can, with good planning, facilitate all users, and minimize conflicts, delays, and disruptions.
- We can do immediate, or near-real-time, control when events dictate it. We have the technology, the interoperability, the connectivity and communications, and the capable personnel to make it happen.
- We have to understand what Army limitations for AC are and balance response time against unnecessary risk to airspace users.
- Machines and systems see, but don't



understand, don't anticipate, and don't care. We must keep a human in the loop, and then make that waypoint as seamless and effortless, and as assured, as possible.

- We have not been challenged in recent combat experience with an air threat, counter-fires, high-density air space use, small threat UAS, or even complex multiple combinations of joint and multinational air operations. As units are exposed to these challenges in exercises and training, JAGIC is providing a capability to better integrate Army and Joint airspace users.

As units collect lessons learned, specifically with regard to JAGIC, they should provide them to the Army's Airspace Proponent at Fort Leavenworth's Combined Arms Center (CAC) Capabilities Development Integration Center (CDID) for inclusion on the Airspace Control MilBook site (https://www.milsuite.mil/book/search.jspa?q=airspace+control).

Joint Publication (JP) 3-52, Joint Airspace Control was recently released. This publication catches the joint world up, to some extent, in the foundational doctrine already negotiated, implemented, and reflected in FM 3-52, the JAGIC manual, and the MTTP previously discussed. There remains some distinction in this manual between AC and airspace management. The USAF's position on real-time action, positive control, and fires integration is vital. Here are some highlights:

- It is clear that the Army and USAF share the idea that airspace control increases operational effectiveness by promoting the safe, efficient, and flexible use of airspace while minimizing restraints on airspace users. Airspace control includes coordinating, integrating, and regulating airspace to increase operational effectiveness.[7]
- There remains an emphasis on decentralized execution that allows subordinate commanders to take the initiative and increase AC effectiveness through real-time airspace integration during execution.
- The USAF position on positive control requires two primary conditions: the means to locate and identify airspace users and the ability to maintain continuous communications with them for required control instructions.[8] (This may have some implications on the current language and usage of near real time procedural control, and other control definitions in the next revision of FM 3-52.)
- Current AC TTP and fire support coordination measures (FSCM) do not lend themselves to seamless integration. Airspace coordinating measures (ACM) do not normally restrict other fires in the airspace; only FSCMs serve to restrict fires. To effectively integrate indirect fires with aircraft, AC elements should determine which ACM must also be protected by additional measures, such as an airspace coordination area or air corridor, and coordinate accordingly.[9]

We should also be familiar with airspace control information available in *Allied Joint Publication 3-3.5*, Allied Joint Doctrine for Airspace Control, May 2013, which outlines airspace control operations among North Atlantic Treaty Organization (NATO) allies. This publication outlines that *"the objective of ASC [airspace control] is to standardize command and control (C2) of the air to maximize the effectiveness of military operations by promoting the ability of air, land, maritime, and Special Operations Forces to operate in an efficient, integrated, and flexible manner with minimum mutual interference and without undue restraint and risk to friendly forces and civilian users."*[10] One of the airspace control system fundamentals discussed is that of "Reliable and Interoperable C2 Systems."[11] Events like Bold Quest exercises, led by the Joint Staff J-6, are making significant inroads on assessing joint interoperability, and developing TTP that maximize interoperability in AC, fires, and other areas. As those who have served in the overseas theaters with NATO force deployments report, airspace interoperability among national systems and procedures (and accounting for civilian traffic) requires much additional work before we achieve things like a seamless integrated air common operating picture, and assurance that airspace users are free from unnecessary risks. Allied Joint Publication 3-3.5 reinforces the combination of procedural and positive controls; the role of the ACA; establishment of the joint airspace control center; use of the theater airspace control plan, air tasking order and airspace control order; and consultation with host nation to integrate operations and ATS. There is a new emphasis on commander risk definition that defines acceptable procedures and controls, and minimal restrictions on operations. Differences in NATO language include the use of the term airspace control means vice the U.S. airspace coordinating measure, with ACM discussed in Appendix A. The NATO also emphasizes synchronized planning and integrated execution, and also spends some time discussing AC in Non-Article 5 Crisis Response Operations.

Let's review organizations and equipment and system trends that you'll need to think about.

The JAGIC is the biggest organization "change" that will enable the Army moving to more near-real time procedural control. The JAGIC is not a change to Army tables of organization and equipment, but a "how do we integrate and operate with JAGIC personnel when they show up" challenge. Integration of JAGIC personnel will be especially challenging for the network administrators and providers. The USAF has taken on the additional requirements for staffing, equipping, and training ten ASOCs at division instead of just the few that supported Army corps under the previous model. While Army commanders will benefit greatly from the JAGIC capability, they will need to work to integrate the JAGIC personnel, equipment, network, communications, and other support requirements and develop the TTP and processes for operations when ASOCs train with and deploy with division CP.

On the equipment side, the Army's AC system of record, the Tactical Airspace Integration System (TAIS), continues to lead the pack in anticipating future system capabilities. Version 11.1.0 software is currently in the field, adding new features and capabilities. The TAIS has fully developed the Air Operations (AO) Community of Interest (COI) interfaces. (The AO COI supports the Department of Defense (DoD) Net Centric Data Strategy to ensure AO data is shared for net centricity among DoD, combatant commands, joint, coalition, and allied partners. The COI focuses on exposing accurate, relevant, timely, complete, and secure AO mission data and improving the global operational

processes supporting the AOC and Theater Air Control System/Theater Air Ground System and other C2 communities.[12]) This allows us to interface with not only the USAF's current airspace system, but also those under development. The concept is that the USAF will enable us to have more direct access to the Theater Battle Management Core System Air Operations Database, to give us greater visibility into the planned airspace utilization, as well as enable more direct input to execute immediate ACM requests. Under development, the USAF is scheduled to field its airspace management application in the 1st Quarter of Fiscal Year 2016. The airspace management application, in the ASOC at Divisions across the Army, fully enables the ideas of real time execution, and brings the objectives of JAGIC home.

Software version 12 of the TAIS will bring the software into the virtual machine (VM) realm. This means that the software can then be hosted on any server stack supporting the brigade and higher headquarters and is less tied to specific equipment that has to be periodically updated and upgraded. Over the last few years, TAIS has moved to a Windows based operating system away from UNIX and has received upgraded TAIS systems processors and memory. There appears an opportunity to move away from hardwired and transit case systems in the future, as VM applications become the norm across the Army.

The TAIS software also features the dynamic airspace collaboration tool (DACT) that enables non-TAIS airspace users, whose client system is on the same tactical network with a TAIS, to request/submit ACM requests. Typically the DACT can be used as a web service based application simply by logging in to a TAIS, via a provided internet protocol address. Once the link with a "parent" TAIS is established, the non-TAIS user is able to begin both coordination and collaboration via the DACT. This tool can be used by maneuver battalion or task force operations staffs to see the airspace above their areas of operations, submit airspace requests, and enable support of their operations by the ADAM/BAE cell. Staff elements at brigade, division, and corps, who need visibility of airspace operations and need to coordinate or submit ACMRs, could also use DACT, as could joint or coalition/multinational units with non-interoperable equipment or those with only analog airspace control capabilities.

In the next two years ADAM/BAE cell will undergo changes as the counter rocket, artillery, and mortar based systems and shelters transition to the new Integrated Air and Missile Defense Battle Command System. General Dynamics markets IBCS by advertising that "The Integrated Air and Missile Defense Battle Command System (IBCS) is a revolutionary C2 system developed to deliver a single, unambiguous view of the battlespace. This significantly enhanced aircraft and missile tracking improves the ability of combatant commanders and air defenders to make critical decisions within seconds."[13] The IBCS is forecast to better network sensors and battlefield information, and enable fires. Assistant Product Manager (APM) TAIS is already coordinating with Product Manager IBCS to understand how TAIS will integrate with this system.

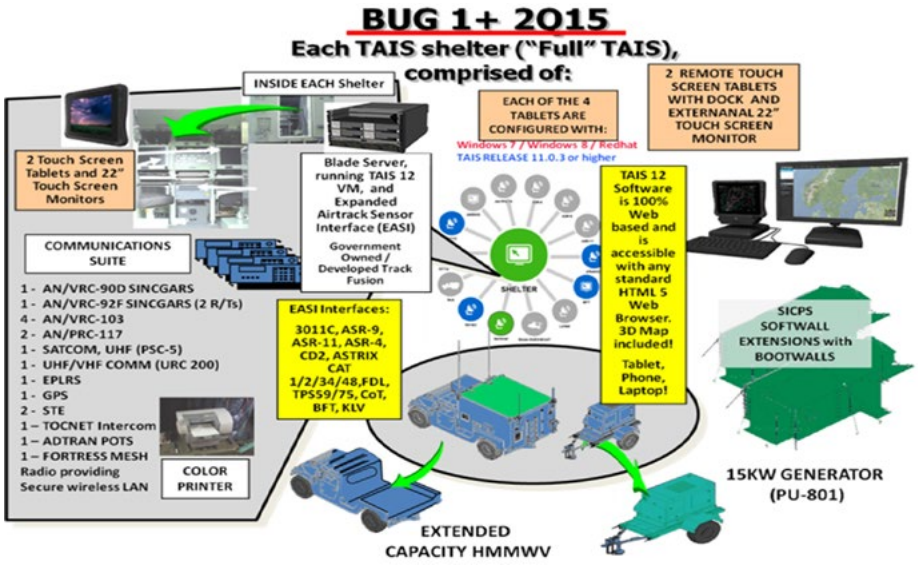
TAIS 3D View of Unit Airspace

The APM TAIS has also worked to block upgrade both the ATC and AC shelters and equipment. Block upgrade 1+ will update equipment by moving away from some of the transit case equipment to its own server and TAIS 12 VM software, among other improvements. Also, included in this upgrade is replacement of the air defense systems integrator (ADSI) equipment that provided air tracks in the ATC role for airspace controllers. The ADSI was proprietary software and equipment which required significant government expense to upgrade and maintain. Under a non-proprietary development, these shelters will now field an expanded air track sensor interface (EASI) which enables the controllers to receive, deconflict, fuse, and integrate any air track feed, system self-reporting feeds, and joint links. In addition, shelter versions over time will add blade servers and thin client tablets; new radios, phones and other communications gear; Mode 5 Level 2 receivers, Blue Force Tracker – 2, and automatic dependent surveillance – broadcast capability; and more. The TAIS 12 software to be fielded in early Fiscal Year 16 will feature a completely re-factored user interface where any device with hyper-

TAIS Shelter AN/TSQ-221

text markup language 5 web browser can access TAIS 12 services. It will also feature re-factored intuitive task workflows and will be able to simultaneously support 25 full TAIS operator capability instances and 75 DACT-like client connections! And somewhere along the way TAIS will add an embedded training capability for ATC Soldiers and AC personnel.

By now you should feel like that pro surfer, who has waited patiently for the last half hour, knowing the big one was coming, and feeling the wave underneath you. Time to go, catch the wave, and make that hot ride. The Army needs its



experienced Soldiers and leaders to use this new doctrine, TTP, equipment, and software to bring a new capability into CP from the brigade combat team to the AOC. You've never had better tools providing the capability to see three, and even four, dimensional battlefield airspace to support the commander's plans. Commanders will have a more accurate air picture and have more confidence in their ability to maximize combat power at critical points and times, reduce the risk of fratricide, and provide fires, attack, or air movements when needed.

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Marius Dockery, MSG-USA, Ret., is a support contractor employed by Iron Mountain Solutions to support the Assistant Product Manager - Tactical Airspace Integration System (TAIS), serving at Redstone Arsenal, Product Manager - Air Traffic Control, Program Executive Office – Aviation. While on active duty he served in various air traffic control and airspace control Soldier, non-commissioned officer (NCO), and staff positions, as a tactical and fixed based air traffic controller; as the 4th Infantry Division G-3 Airspace Control Non-Commissioned Officer In-Charge during Operation Iraqi Freedom, and as the Product Manager – Air Traffic Control Force Modernization NCO. Since retiring, he has served as an engineer/analyst for TAIS supporting software development and requirements verification; airspace control doctrine, tactics, techniques, and procedures (TTP) development and experimentation; and tactical air traffic control systems development. He holds a Bachelor of Science in Professional Aeronautics from Embry Riddle Aeronautical University.

[1] Headquarters, Department of the Army, Field Manual 3-52, Airspace Control, Feb 2013, p iv,.
[2] FM 3-52, p 1-4, section 1-22.
[3] FM3-52, p 1-5, section 1-28.
[4] FM 3-52, p 1-4, section 1-26.
[5] FM 3-52, p 1-5, section 1-32.
[6] Headquarters, Department of the Army Army Techniques Publication 3-91.1, The Joint Air Ground Integration Center, June 2014, p1-1, sections 1-1 and 1-2.
[7] United States Air Force, Joint Publication 3-52, Joint Airspace Control, p vii.
[8] JP 3-52, p I-6, section I.3.e.(2).
[9] JP 3-52, p IV-8, section 5.c. and d.
[10] Allied Joint Publication 3.3.5, Edition B, version 1, Allied Joint Doctrine for Airspace Control, May 2013, p 1-2, Section 102.
[11] AJP-3.3.5, p 1-3, section 0105.e.
[12] Air Operations Community of Interest Charter, v1.3, 17 Aug 2012, section 1.
[13] http://www.northropgrumman.com/Capabilities/IBCS/Pages/default.aspx

Acronym Reference

AC - airspace control
ACA - airspace control authority
ACM - airspace coordination measures
ADAM/BAE - air defense airspace management/brigade aviation element
ADSI - air defense systems integrator
AO - air operations
AOC - air and space operations center
APM - Assistant Product Manager
ASOC - air support operations center
ATS - air traffic services
ATC - air traffic control
C2 - command and control
CAC - Combined Arms Center
CAS - close air support
CDID - Capabilities Development Integration Center
COI - community of interest
CP - Command Post
DACT - dynamic airspace collaboration tool
DoD - Department of Defense
EASI - expanded air track sensor interface
FM - field manual
FSCM - fire support coordination measures
IBCS - Integrated Air and Missile Defense Battle Command System
JAGIC - joint air-ground integration center
JP - Joint Publication
MC WFF - mission command warfighting function
MTTP - multi-service tactics, techniques, and procedures
NATO - North Atlantic Treaty Organization
TAIS - Tactical Airspace Integration System
TTP - tactics, techniques and procedures
UAS - unmanned aircraft system
USAF - United States Air Force
VM - virtual machine

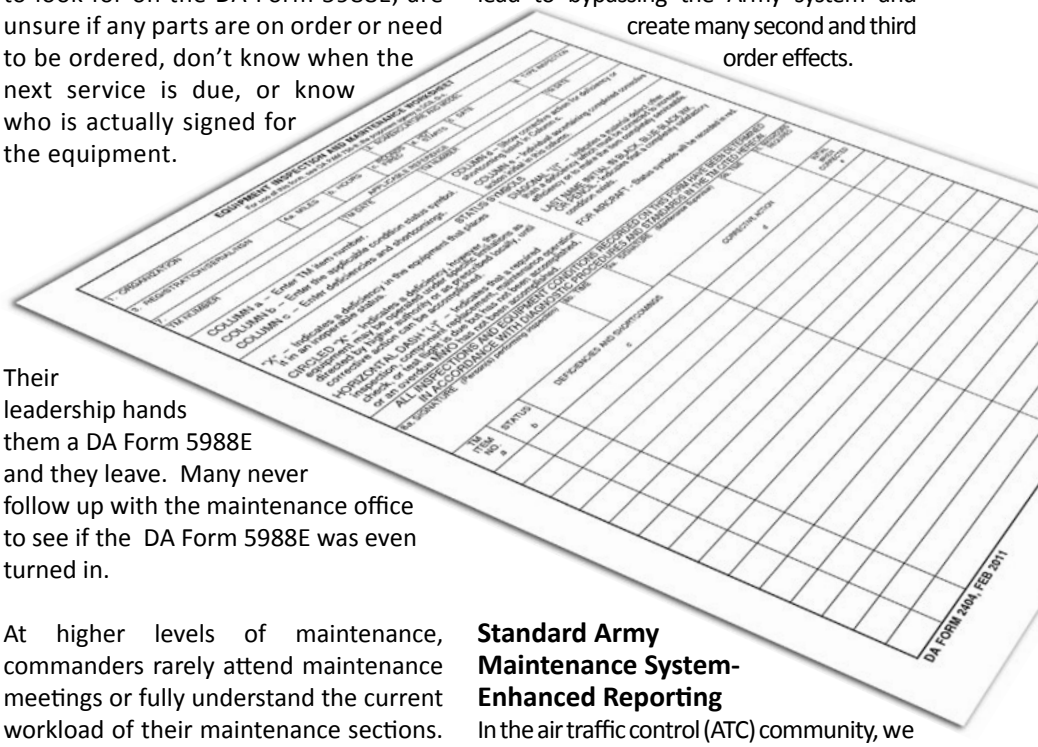
THE LOST DISCIPLINE OF Maintenance Management

By CW4 Timothy Tripp

When I entered the Army in 1993, the days were long, the budgets were tight, and Soldiers were held accountable for their assigned equipment. The first 10 years of my service involved unit scrutiny in ordering supplies, a disciplined approach to operator maintenance procedures, and a strong presence of non-commissioned officers (NCO) and other unit leaders during motor stables. Since the wars in Iraq and Afghanistan, the onus on conducting proper preventative maintenance checks and services (PMCS) has severely diminished. Commanders and senior NCO leaders are often tied up in their office with email or away at meetings. No longer are the days when the battalion commander and command sergeant major stand at the gate of the motor pool, questioning any Soldier who dare attempt to exit the motor pool on a PMCS day. Also gone are the days of company commanders, first sergeants, senior NCOs and platoon leaders taking ownership in their equipment and ensuring their Soldiers are following the proper procedures in the equipment operator's manual.

Observations of Maintenance Today

Most motor stables days start with a Monday morning formation. Senior leadership will only be present if the battalion commander makes an appearance. Shortly after formation, anyone in the rank of staff sergeant and above quickly exits the motor pool for their office. This leaves only the junior Soldiers who have been brought up in an Army that has lost the art of the maintenance program. Many Soldiers I question do not have a license on the equipment, have no clue how to check the fluids, are unfamiliar with the basic functions, do not know how to fill out a Department of the Army (DA) Form 5988-E, Equipment Inspection/Maintenance Worksheet (electronic version of the DA Form 2404), have no idea what to look for on the DA Form 5988E, are unsure if any parts are on order or need to be ordered, don't know when the next service is due, or know who is actually signed for the equipment.



Their leadership hands them a DA Form 5988E and they leave. Many never follow up with the maintenance office to see if the DA Form 5988E was even turned in.

At higher levels of maintenance, commanders rarely attend maintenance meetings or fully understand the current workload of their maintenance sections. Often, maintenance readiness becomes the responsibility of the executive officer and maintenance management does not get the command visibility necessary to be effectively implemented. Additionally, the stigmatism of reporting "deadlined" equipment has created an environment of non-reporting in order to avoid the perception of failure from command channels. Our modern equipment and two-tiered maintenance management system allows leaders to directly contact field service representatives or open tickets with contractor help desks which detracts from timely reporting of deadlined equipment in the Army reporting system. These procedures lead to bypassing the Army system and create many second and third order effects.

Standard Army Maintenance System-Enhanced Reporting

In the air traffic control (ATC) community, we are currently facing a major problem with proper equipment reporting through the use of Standard Army Maintenance System-Enhanced (SAMS-E). The SAMS-E is the only system authorized to track maintenance and Class IX repair parts

through the Army inventory. We are finding that many of the five major pacing items in all ATC units are not loaded correctly in SAMS-E. This can be solved by commanders and leaders conducting a SAMS-E to Property Book Unit Supply Enhanced reconciliation or audit. An automated tool is available in the Logistics Support Activity (LOGSA) Logistics Information Warehouse to make this process easier. Another trend we encounter in ATC units is the utilization of the Project Manager (PM)-ATC help desk to report their pacing items not mission capable (NMC) without parallel documentation in SAMS-E. The PM-ATC help desk is not an official reporting tool and should only be used to supplement reports in SAMS-E. Commanders who fail to report their items NMC in SAMS-E and ultimately in the unit status report (USR) are misrepresenting their unit's readiness status to their next higher commander. Army Regulations (AR) 220-1 and AR 700-138 require commanders to report the status of their systems accurately through their chain of command to LOGSA.

The failure to report accurately in SAMS-E goes beyond the misrepresentation of equipment availability. Parts not ordered through the system will not generate a demand history. Without the demand history, the supporting supply support activity will not have parts readily available to return the system to a fully mission capable status. The result will be longer lead times on needed parts. Item managers at the national level also require a demand history to justify the parts they store or to justify contracts needed to stock more parts. Failure to report accurately also affects the Training and Resourcing Model (TRM) dollars received to support pacing items. Major commands can adjust the TRM dollars based on trend analysis pulled from software logistics applications to generate accurate forecasts for TRM funds. Lack of reporting may cost your ATC unit operating funds.

Lastly, lack of reporting does not produce needed data for evaluation of high failure rate systems that are not meeting the requirements written when the system was acquired. Without proper trend analysis, it is difficult to make a case that a new materiel solution is needed when the Army sees high operational readiness rates from the LOGSA reports.

Changing Course-Bringing Maintenance Back in Focus

As of the date of this article the ATC community is reporting 45 systems NMC through the PM-ATC help desk. Out of the 45 systems reported NMC, only 12 are reported NMC in SAMS-E. That is a 26% reporting rate for the ATC community. However, this problem can be solved. The first step is awareness of the issue and a refocus by the ATC unit commanders. Commanders must get involved in their maintenance programs and ensure leaders at all levels are present and held accountable for properly conducting PMCS. Commanders, executive officers, and senior NCOs must ensure their systems are being reported properly in SAMS-E and USR. The help desk at PM-ATC can still be utilized, but only after proper reporting is accomplished. Senior commanders should also encourage junior commanders to properly report equipment status without fear of retribution. At the lower levels of your formation, assign operators to the equipment. Ensure they are properly trained and licensed on the equipment assigned and take ownership for its proper operation. Last, senior NCOs much teach their subordinates how to properly conduct PMCS and hold them to the standard.

CW4 Timothy Tripp is the Maintenance Management Officer assigned to the Air Traffic Services Command. He has been employed in various aviation organizations throughout the Army for more than 22 years and continues to influence positive change in Aviation's Maintenance Management Programs and Policies.

Acronym Reference

AR - Army Regulation
ATC - air traffic control
DA - Department of the Army
LOGSA - Logistics Support Activity
NCO - non-commissioned officer
NMC - not mission capable
PM - project manager
PMCS - preventive maintenance checks and services
SAMS-E - Standard Army Maintenance Systems - Enhanced
TRM - Training and Resourcing Model
USR - unit status report

Breaking Down Changes to Air Traffic Services Readiness Reporting

By Mr. Mark J. Hampton

The Air Traffic Services Command, Forces Command (FORSCOM), and the U.S. Army Aviation Center of Excellence have collaborated to improve the effectiveness and accuracy of air traffic services (ATS) readiness reporting in the unit status report (USR). With the publication of Training Circular 3-04.81, Air Traffic Control Facility Operations, Training, Maintenance, and Standardization, in 2010, came the first deliberate action to report soldier skill progression by assigning readiness levels for air traffic controllers and maintenance personnel. Beginning this year, FORSCOM implemented additional procedures to reflect crew level proficiency and more accurately reflect ATS readiness reporting. These procedures, now in use, are part of a preemptive strategy to forthcoming changes to Army Regulation AR 220-1, Army Unit Status Reporting and Force Registration-Consolidated Policies, and Department of the Army Pamphlet (DA PAM) 220-1, Defense readiness Reporting System-Army Procedures.

Air Traffic Services Crew-Level Reporting

The unit level of training (T-level) proficiency is the fourth of the four measured areas that are the factors in determining a unit's overall category level*. The Net-Centric Unit Status Report (NetUSR) software application calculates a unit's T-level directly from the commander's assessment of unit proficiency in mission essential tasks as trained (T), needs practice (P), or untrained (U). While this calculation associates a T-level assignment to the unit's overall task proficiency, it does not always accurately reflect crew level proficiency on key ATS systems. To more clearly show unit readiness status, ATS systems are now reportable to reflect crew manning levels and crew proficiency status. The entries shown in Figure 1 will be added to Table 8-3 in the next revision of DA Pam 220-1; however, the information is required to be reported in NetUSR now.

Note 44. Air Traffic Controllers must possess MOS 15Q, must pass a yearly Class IV Flight Duty Medical Examination, must be certified, maintain RL1 proficiency, and complete refresher training in accordance with AR 95-2.

Net-Centric Unit Status Reporting Application

The NetUSR application provides a crew-level assessment for all ATS reporting units. The table inputs are pre-loaded and now require an entry for each crew of the reportable ATS system. Unit representatives completing this crew table need to be familiar with the terms identifying the manning levels associated with table 8-3 such as Fully Manned/Qualified (FMQ), Fully Manned/Combat Capable (FMCC), Fully Manned/Unqualified (FMU), Minimally Manned/Combat Capable (MMCC), Minimally Manned/Unqualified (MMU), and Minimally Manned/Combat Ineffective. An example of the ATS portion of Table 8-3 is shown in Figure 2. The values represented reflect the

Additions to Table 8-3 DA PAM 220-1
Squad/crew/team/system manning and qualification criteria

Type	Key individuals	Fully manned/minimally manned leves	Notes
AN/MSQ-135 MOTS	Facility Chief / Shift Leader / Air Traffic Controller	9/5	Number 44
AN/TPN-31 ATNAVICS	Facility Chief / Shift Leader / Air Traffic Controller	7/5	Number 44
AN/TSQ-221 TAIS	Facility Chief / Shift Leader / Air Traffic Controller	8/5	Number 44
AN/TSQ-198 TTCS	Facility Chief / Shift Leader / Air Traffic Controller	4/4	Number 44

Figure 1

*The unit category level (C-level) is the degree to which the unit has achieved prescribed levels of fill for personnel and equipment, the training status of those personnel, and the maintenance status of the unit's equipment.

threshold for reporting in that category not numbers of crews. In order to be identified as "Qualified" or "Combat Capable," personnel must meet ATC qualification, proficiency, and flight medical standards. The unit representative can only enter one crew for the Mobile Tower System (MOTS), Air Traffic Navigation and Integration System (ATNAVICS), and Tactical Airspace Integration System (TAIS). The general support aviation battalion F Company will report a total of two crews for the Tactical Terminal Control System (TTCS).

NetUSR Input Example ATC Company

			Fully Manned			Minimally Manned			
Description	Req.	Authorized Reportable	Qualified	Combat Capable	Unqualified	Combat Capable	Unqualified	Combat Ineffective	Unmanned
AN/MSQ-135 MOTS	1	1				1			
AN/TPN-31 ATNAVICS	1	1		1					
AN/TSQ-221 TAIS	1	1					1		
AN/TSQ-198 TTCS	2	2	1				1		

Figure 2

How it All Fits Together

The relationship of crew reporting in NetUSR, the commander's mission essential task list (METL) assessments, unit T-level, and the assignment of individual readiness levels all relate to the unit's ability to perform air traffic control services in a deployed environment. Commanders should use each of these metrics in determining their final T, P, or U METL task assessments. Having minimally manned crews without qualified and proficient air traffic controllers should not support overall "T" ratings for METL tasks. Even fully manned units without successive training events under live traffic situations should not lend to "T" ratings for METL tasks. Readiness reporting is an official Army business intelligence tool that provides visibility of readiness status and force registration data. The readiness report is not a performance report card and should not be used as a tool to evaluate or compare the accomplishments of organizations or those of their commanders. Commanders are expected to submit timely, accurate, and complete reports that neither exaggerate nor mask their units' readiness deficiencies. No commander is expected to report readiness levels that are inconsistent with resources made available to the unit.

Mr. Mark Hampton is a Department of the Army Civilian assigned to the Air Traffic Services Command. He completed a 20 years of Army service in various air traffic control units across the Army in 2005 and continues to serve the Department of the Army and the Aviation Community today.

Acronym Reference

ATNAVICS - Air Traffic Navigation and Integration System
ATS - air traffic services
DA PAM - Department of the Army Pamphlet
FMCC - Fully Manned Combat Capable
FMQ - Fully Manned/Qualified
FMU - Fully Manned/Unqualified
FORSCOM - Forces Command
METL - mission essential task list
MMCC - Minimally Manned/Combat Capable
MMU - Minimally Manned/Unqualified
MOTS - Mobile Tower System
MOS - military occupational specialty
NetUSR - Net-Centric Unit Status Report
P - needs practice
T - trained
TAIS - Tactical Airspace Integration System
TTCS - Tactical Terminal Control System
T-level - level of training
U - untrained
USR - unit status report

AIR TRAFFIC NAVIGATION, INTEGRATION, AND COORDINATION SYSTEM

By Mr. Steven M. Haag

The Army recognized through lessons learned from recent combat operations that integrating ground controlled approach (GCA) capabilities into Army Aviation provides flexibility to commanders when developing contingency plans for inadvertent instrument meteorological conditions (IIMC).

One of the primary tools used to mitigate risk during adverse weather conditions is the Air Traffic, Navigation, Integration, and Coordination System (ATNAVICS). The mobile system is embedded in air traffic service (ATS) units and provides terminal surveillance in a 25 nautical mile area through the use of primary and secondary radars. The system's airport surveillance radar (ASR) includes advanced digital mapping displays for air traffic controllers to provide aircraft separation and vectoring to a combined precision approach radar (PAR) for instrument recovery down to two hundred feet above the landing area.

The framework for providing this expeditious precision capability exists in joint ATS doctrine. Field Manual 3-52.3 provides guidance to the joint forces commander and joint force air component commander that if the military situation dictates and a service allows the use of an installed navigational aid or approach without a flight inspection, this authorization is restricted to those aircraft under the individual service authority's operational control.

The United States Army Air Traffic Services Command introduced policy changes based on this doctrine for use of ATNAVICS during combat/contingency operations until the Department of Defense approved terminal instrument procedures are developed and flight checked by certified Federal Aviation Administration (FAA) aircrews. Mission risk approval by the first Colonel/O–6 in the chain of command has been proposed for publication in Army Regulation 95-2.

Initiatives are being sought to improve the Combined Arms Training Strategy for ATS to update individual and collective training tasks. Changes to Training Circular 3-04.81 and aircrew training manuals will be required to establish comprehensive procedures for the execution of ATNAVICS flyability checks by aviation units.

The proposals include use of automated software in the Aviation Mission Planning System to prepare the ASR minimum vectoring altitude chart and PAR instrument approach segments. Unit flyability checks will incorporate procedural and plan view documentation in order for instrument examiners to conduct an airborne evaluation of the GCA facility. Additional control measures will consist of determining the accuracy of the PAR glide path and approach course with the ATS unit's organic theodolite survey equipment. This will ensure the system meets flight inspection tolerances contained in Technical Manual 95-225 (FAA Order 8200.1D). These culminating actions are paramount to safe GCA operations and will be used to support the commander's mission risk approval.

It is vital for commanders to have diverse ATS capabilities at their disposal for IIMC recovery in a dynamic airspace environment. Implementing effective procedural controls and developing highly trained teams are core elements to the success of Army Aviation on the battlefield.

Mr. Steven M. Haag is a Department of Army Civilian and currently serves an Aviation Safety Inspector in the Quality Assurance Division at the United States Army Air Traffic Services Command. He is a retired Army first Sergeant who served as a non-rated crewmember standardization instructor, senior flight inspection technician, air traffic control (ATC) maintenance evaluator, ATC maintenance staff non-commissioned officer and ATC maintenance supervisor. He has Federal Aviation Administration credentials to act in the capacity of an airspace system mission specialist. His overseas assignments include Germany and Korea, and he performed flight inspection missions in Bosnia, Kosovo, Afghanistan and Iraq. Mr. Haag has 30 years of combined military and civilian service.

JOINT COMBAT AIRSPACE COMMAND AND CONTROL COURSE

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Aviation Digest - Archived Article May, 1988

DURING THE ALLIED invasion of Sicily (July and August 1943), Army Major General George S. Patton Jr. ordered the beachhead at Gela, Sicily, reinforced by paratroopers. On 11 July 1943, 2,000 Army airborne troops were flown to the dropsite in 144 C-47 aircraft. Good weather and advanced notification to Allied naval and ground forces promised a relatively easy mission. Disaster struck, however, when a single machinegunner started firing at the C-47s in the second flight over the beach. Within minutes every Allied antiaircraft gun on shore and water was firing at the slow, vulnerable troop carriers. Gunners on the destroyer U.S.S. *Beatty* fired at one C-47 even after it had been ditched in the bay. Total losses included 81 dead, 132 wounded and 12 missing paratroopers; and 7 dead, 30 wounded and 52 missing airlifters.*

This historical example is but one of many that highlights the importance of our requirement to command and control (C^2) airspace users essential in successful joint operations. As the numbers of airspace users increase and their capabilities become more significant, the problem of adequately commanding, controlling and integrating the airspace users proportionately increases. Training is part of the solution to this formidable problem, if we are to avoid a recurrence of disasters like the tragedy that occurred in Sicily.

The U.S. Air Force (USAF) Air Ground Operations School is developing a new course of instruction—Joint Combat Airspace Command and Control (J-CACC). This course will train selected officers and noncommissioned officers to plan, coordinate, control and integrate airspace control procedures and techniques during joint combat operations.

J-CACC is coming, and it is certainly needed. Although deconflicting joint airspace seems simple enough to keep aircraft and projectiles out of the same airspace at the same time, the actual practice of deconflicting joint airspace use while enhancing combat operations is extremely difficult. The decisions made to control airspace users, the amount of risk to accept, and the dissemination and implementation of decisions concerning airspace use are recognized as enormous tasks for our leaders. Tasks that must be accomplished for successful joint operations. In joint warfighting, the joint force commander will appoint an airspace control authority (ACA). The ACA will plan and coordinate airspace control matters and operation of the airspace control system.

We must clearly understand the relationship and responsibilities of the Army's airspace users to the ACA. J-CACC will help us with this most important undertaking.

The J-CACC course will focus on combat airspace C^2 doctrine, techniques and procedures necessary to integrate effectively airspace users into joint combat operations. It will provide essential personnel with an understanding of fundamental airspace planning, coordination and execution performed at U.S. ground force echelons of division and above. It also will provide U.S. Air Force C^2 elements associated with the Tactical Air Control System and the Combat Information System Group. Emphasis will be placed on the planning and day-to-day, minute-to-minute adjustments needed to execute airspace plans to meet dynamic real-time mission requirements. This will include the information required to support decisionmaking, information assessment and dissemination, as well as systems and procedures used to implement airspace control orders that will be published by the ACA.

The course normally will be taught in 1 calendar week and is scheduled to follow the Battle Staff Course (BSC), which is a prerequisite to attendance. If you have attended BSC within the last 2 years, you may attend the J-CACC course with some refresher training provided 1 duty day before the start day of the J-CACC course.

Instruction consists of lectures, planning exercises, guided discussions and an execution exercise. Instruction encompasses all course objectives, and the preparation for, and participation in the exercise requires the application of information and knowledge to coordinate and deconflict airspace used in

*Shrader, Charles R. *Amicide: The Problem of Friendly Fire in Modern War*. Ft. Leavenworth, KS: U.S. Army Combat Studies Institute, 1982.

a joint theater of operation.

Attendees should be assigned to positions that are directly involved in the planning and execution of joint airspace use. Members of the airspace management element at the tactical air control center, airspace management liaison section at the battlefield coordination element and the control and reporting center, Army airspace C^2 elements of corps and division and liaison personnel to tactical air force elements are the target population of attendees.

Quotas for Army students are controlled by Headquarters, U.S. Army Training and Doctrine Command, ATTN: ATTG-MPS, AUTOVON 680-3001, and Air Force students by Headquarters, U.S. Air Force Military Personnel Center, ATTN: DPMROP. The first class was scheduled for 16 May 1988 and another class is scheduled for 29 August 1988. In FY1989 and subsequent years, five classes are scheduled after the completion of a BSC.

J-CACC is coming and is needed. We must ensure the right people attend; increased combat effectiveness will result.

feedback FORUM

Your Articles and Feedback Compel Thoughts and Actions

Aviation Digest's Feedback Forum details the Army Aviation Enterprise's response to articles contributed to the Aviation Digest and represents a part of the professional discussion expected within a professional bulletin. It is an essential part of our commitment to the continuous advancement of the Aviation Branch.

Aviation Digest - A Transition in Training Philosophy

Volume 3/ Issue 1 *Aviation Digest* (Jan-Mar 2015)

Aviation Branch Response:

The Aviation Defrag Condition:

The Defrag Initiative has jump-started the evolution of Army Aviation with irreversible momentum. There's a new Initial Entry Rotary Wing Common Core (IERW CC) Course in town and she's sporting a dual engine, digital cockpit airframe (the UH-72A Lakota), with a beefed-up building block training strategy, night vision goggles, built in adaptability, and a modernized instructor pilot (IP) behind the controls. She speaks the Warfighter language and is designed to produce a "Modernized Aviator". The first modernized aviators will arrive at their field units starting in November 2016.

Under the guidance of the United States Army Aviation Center of Excellence (USAACE) Command Group, the Directorate of Training and Doctrine (DOTD), the Directorate of Evaluation and Standardization (DES), and the 110th Aviation Brigade are defragging Aviation training to produce a modernized aviator who is tech-savvy and warfighter ready. This aviator is designed to be a better combined arms warfighter, tactically and technically prepared, and highly adaptable to the modernized operational environment. Doctrine, training materials, and training methods are currently being reviewed and revised throughout aviation flight training. In the doctrine lane, the aircrew training manual (ATM) takes priority and DES continues to work on getting the message to the field. The initial "seed courses" have already been developed; the UH-72A Aviator Qualification/IP Transition Course (AQ-IPT) and the UH-72A IERW CC. The UH-72A AQ-IPT is specifically designed to be in line with the Defrag Initiative and will be used to modernize the entire USAACE IP workforce that instructs and evaluates the new UH-72A IERW CC. The AQ-IPT is currently in validation and has already produced over 80 modernized IPs. The remaining courses will be prioritized with a simultaneous effort being made to defrag the IP courses and IERW track courses for the Army's warfighting airframes. This is a culture change and will be an ongoing effort that will evolve and stabilize into the objective state over time.

Marking With Chalk is Alright … … If You Are Cutting with an Axe

By CW5 James R. Massey
Volume 3/ Issue 1 *Aviation Digest* (Jan-Mar 2015, p.36)

Maximizing human potential through training depends on understanding the role of training in the enterprise, determining what is important, and determining to what level of detail we should train. Not everything in our profession is of equal importance and relative importance is usually a matter of opinion. A brief consideration of our training tasks is a quick way of examining what is important

Aviation Branch Response:

The USAACE DOTD is continuing to develop a new Training and Doctrine Command approved task format that will assist in maximizing training while simplifying the learning process. Over the years our ATMs have become inundated with a lot of additional material. As an example, the AH-1 task "VMC Approach" in 1984 was comprised of two small pages and six standards. The 2013 AH-64D version of "VMC Approach" is equivalent to 12 small pages and includes 7 specific standards, 19 common standards, and 12 "will" or "must" imperatives in the description. That is a lot of additional information to remember and it is only one task we are talking about.

Not all of these changes are bad however, many improvements have been made based on lessons learned like aircrew coordination. The DOTDs goal is to simplify aircrew tasks without losing any of the significant lessons learned. The DOTD is currently finalizing several of these "new" tasks and are currently collecting input from multiple units and other aviation entities. During this process we are constantly integrating current doctrine and "defragging the hard drive" as it applies to the task development process. With the publishing of these "new" tasks in the near future it is our hope that focusing on what is important we can determine the right level of precision needed to safely train and accomplish tasks.

TURNING PAGES

~ book reviews of interest to the aviation professional

Shot Down:

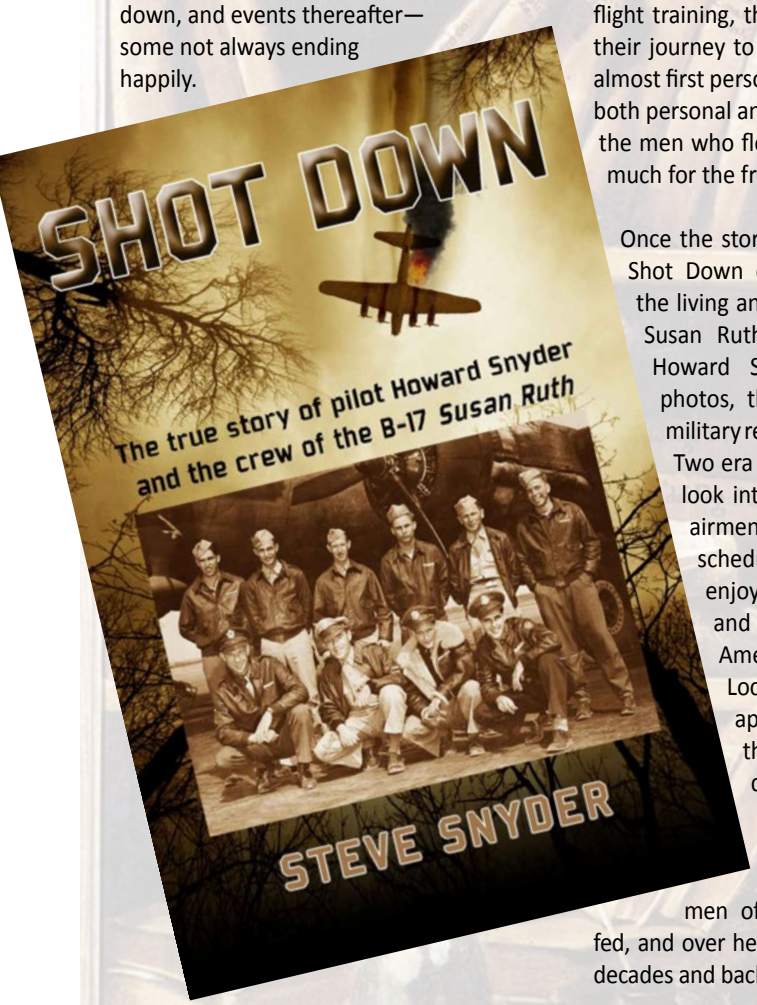
The true story of pilot Howard Snyder and the crew of the B-17 Susan Ruth

By Steve Snyder. Sea Breeze Publishing, LLC, Seal Beach, CA, 2015. Hardcover, and Kindle formats available.

A book review by MAJ Eric S. Comette

"It's Our Duty To Remember — Never Forget."

A true privilege to read, Shot Down, by Steve Snyder shares the author's father's World War Two B-17 Flying Fortress experience, sacrifice, and ultimate victory in the war-torn skies over Europe. Mr. Snyder's research, including his parents' war correspondence, yields a book chronicling Howard Snyder's and his B-17 crew's prewar life, enlistment, training, fighting, shoot down, and events thereafter—some not always ending happily.



It brings the war and the lives it touched and altered to the eyes, minds, and hearts of those who remember as well as to those who need to be reminded that, "It's Our Duty To Remember—Never Forget."

Shot Down begins with a peek at Howard Snyder's shoot down in February 1944 in the flame filled B-17 named after his daughter Susan Ruth. The reader cannot help but wonder how anyone made it out of the aircraft alive. Thence, it is arranged chronologically beginning with the early life of Howard Snyder, the Susan Ruth's pilot. As it progresses through chapters describing flight training, the B-17 itself, her crew and their journey to England, one is granted an almost first person view of the times, trials—both personal and professional—and lives of the men who flew, fought and sacrificed so much for the free world during the war.

Once the story is established in England, Shot Down covers in interesting detail the living and training conditions of the Susan Ruth's Crew. Illustrated with Howard Snyder's actual war time photos, this part of the book gives military readers of the post-World War Two era an intimate and contrasting look into the everyday lives of the airmen living around the combat schedule. Additionally, readers enjoy descriptions of the country and community with which the American airmen interacted. Local opinions ranging from appreciative townspeople and the young English women's delight to having so many "Yanks" to dance with, to the local young English men's adage about the American men of, "They're over paid, over fed, and over here" are brought through the decades and back to life for the reader.

As the book progresses and combat missions mount, the reader is witness to Howard Snyder's family and crew coping with changing technology, increasing mission tempo, combat losses and is also given a brief glimpse of the German pilot that would ultimately shoot down the Susan Ruth sending her crew to prisoner of war camps, on months of successful evasion of capture, and even death at the hands of the enemy. Having been shot down, the story continues underscoring the importance of this book with Steve Snyder telling of the people that helped his father, and many other downed airmen, avoid capture by the Germans and local collaborators. It is also a wonderful look into the lives of the civilians without which some of our heroes would have never made it back home to us.

As the book nears its end, the Allies close in on the Third Reich, sweeping through Europe and destroying the German war machine. In what is almost unbelievable by today's standards, Howard Snyder, not contented continuing to evade capture, actually continues fighting the Nazis! While the war in Europe ends, Steve Snyder also gives the reader, through letters back home, a feel for life on the home front. A far reach from today's communication speed, the agonizing pace of letters and telegrams from the war, whittled away at the hearts of those left back home. The author shows how the family members of the Susan Ruth's crew stick together as they learn the fates of their husbands and sons.

Shot Down is a rewarding and enlightening look into the air war and the lives of the Americans and Europeans that not only endured, but overcame it. Taking the reader almost firsthand through the lives and struggles of the crew and family of a B-17 name for an American daughter of the war, Shot Down is the important story of American strength, ability and tenacity in war as exemplified by her patriots both in the war and back home told by a proud son. It is a story worth reading and remembering.

58TH AIR TRAFFIC CONTROL BATTALION

The 58th Aviation Battalion was activated on 2 March 1968 in Vietnam. Prior to its activation, air traffic services were loosely organized by the 125th Aviation Company (ATC) and numerous other aviation detachments organic to aviation companies and battalions throughout Vietnam. As the intensity of the war in Vietnam increased, air traffic control requirements quickly grew and the capabilities of division-sized units to provide air traffic services became overwhelmed. All entities providing air traffic control services were assigned to the 58th Aviation Battalion upon its activation for centralized command and control.

The 58th Aviation Battalion was deactivated one year later on 17 February 1969. The 165th Combat Aviation Group was activated and assumed all 58th Aviation Battalion assets in Vietnam on the same day.

On 1 September 1979, the 58th Air Traffic Control Battalion was reactivated at Fort Bragg, NC with the mission to provide air traffic services to the 18th Airborne Corps Divisions: 10th Mountain Division, 24th Infantry Division, 82nd Airborne Division, and the 101st Airborne Division.

Effective 16 July 1987, the 58th Aviation Battalion was redesignated and activated under the U.S. Army's Regimental System as the 58th Aviation Regiment. Concurrently, units of the 58th Aviation Regiment were redesignated and activated as the 1st, 2nd, 3rd, and 4th Battalions to support III Corps and the 18th Airborne Corps (1st and 2nd Battalions), Army Aviation units in the Federal Republic of Germany (3rd Battalion), and Army Aviation units in the Republic of Korea and Hawaii (4th Battalion).

The 58th Aviation Regiment was awarded the lineage and honors of the 58th Air Traffic Control Battalion.

Campaign Participation Credit

Vietnam
Tet Counteroffensive
Counteroffensive, Phase IV
Counteroffensive, Phase V
Counteroffensive, Phase VI

Decorations

Republic of Vietnam Cross of Gallantry w/Palm, 22 Feb 67 – 17 May 68

Aviation Digest
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Look For The October - December, 2015 Issue:

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