Flightfax
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Transferring the Aircraft Controls

This article highlights three recent accidents resulting in fatalities following improper transfer of controls. This article is not designed to teach you about the four Army aircrew coordination objectives or the four essential Army aircrew coordination principles and the eight Army aircrew coordination qualities. Although parts obviously apply, the focus of this article is on the transfer of the flight controls and the importance of doing it correctly in a consistent manner. The following mishap demonstrates the hazards associated with an incomplete transfer of controls.

Basic transfer

A flight of two AH-64 aircraft, operating in a training area during a division FTX, were conducting simulated close combat attacks (CCAs) in support of an infantry battalion. The team used race track attack patterns (left turns) enabling each aircraft in the team to attack the targets while being covered by the other team member. Each circuit was flown at altitudes between 50-200 feet above highest obstacle (AHO) and airspeeds of 60-115 knots. As the accident crew was preparing to turn inbound, the other team aircraft asked if they wanted a target grid coordinate. The front seat PI, on the controls of the accident aircraft, instructed them to send the grid and internally announced, "You have the controls." The backseat PC almost simultaneously said, "I've got it." Eleven seconds later the aircraft impacted a hillside. The aircraft was destroyed and both crewmembers received fatal injuries. The PI, after initiating the transfer with the statement, "You have the controls," released the flight controls without the PC acknowledging the front-seat pilot's intent to transfer the flight controls. The PC never assumed control of the aircraft. Both pilots focused on receiving the target grid coordinate information.

Other than the initial introduction between a flight student and an instructor, one of the first training topics covered is the method used in transferring the flight controls. This was probably the first and the most basic introduction to what would eventually be termed aircrew coordination or cockpit resource management or several other variations of the same concept.

Typically, the crew brief centered on the "positive three-way" transfer of control. "I have the flight controls. You have the flight controls. I have the flight controls," was a common methodology. Slightly altered forms included, "You have the controls," omitting the reference to the flight descriptor. Because of the potential for confusion, as identified in the highlighted mishap, abbreviated terms such as "I've got it, you've got it" were and are discouraged. In crew coordination terms, effective communication occurs when the sender announces, the receiver acknowledges and the sender confirms. It becomes a bit more complicated when visual confirmation is not available to reinforce the aural communications – split cockpits, such as those found in the Apache or night conditions where visual signals are not available. Some workarounds emerged relating to physical confirmation such as "the shaker is the taker," which provided physical feedback when the other pilot came on the controls.

What isn't as apparent, but just as important in the transfer of the controls, is the "'why" of it. Why are we transferring the controls? Typically, a reason to transfer duties will be communicated between the pilots to provide situational aircraft control or awareness. "I'll write down the coordinates, you take the controls," could have been a simple lead-in to the above-mentioned mishap. It delineates crew duties and sets up for the positive transfer. Additional awareness is gained when aircraft flight parameters are included in the messaging.

Instrument flying demonstrates a sequence emphasizing situational awareness. When the controls are exchanged, the pilot assuming the controls will typically verbalize current aircraft conditions - heading, airspeed, altitude, orientation items for location (radials, vectors, intercepting a course or approach), current status (level, climbs, descents, turns) and special instructions. This transpires between crewmembers to ensure aircraft orientation

is maintained during the transfer. But it should not be limited to just instrument conditions. It can also be important during missions operating in degraded conditions and/or at night.

More complicated transfer

A flight of two Apaches departed the FARP at midnight en route to their home station. The aircraft were operating at approximately 600 feet AGL and 110 knots airspeed. Conditions were night, reduced visibility, low illumination and lack of contrast over the desert terrain. After approximately 20 minutes, the visibility deteriorated to two miles and the AMC, flying in Chalk 2, requested the lead element reverse course and return

to the FARP. Following acknowledgment, the PI in the front seat initiated the turn to reverse course. During the turn, the PC took control of the aircraft, lost situational awareness (spatial disorientation) and allowed the aircraft to establish an unrecoverable attitude. The aircraft crashed and the PC and PI received fatal injuries. Although a positive transfer of the flight controls was conducted, no discussion of the flight parameters or reasons for the transfer was conveyed in the verbal exchange. A methodical walkthrough of the flight instruments may have helped the PC increase his situational awareness of the aircraft conditions in which he was assuming. An example: "I'll take us back to the FARP. We're currently in a left-hand 25 degree angle of bank turn to heading 090, radar altimeter showing 880 feet AGL, airspeed 84 knots, 50 percent torque and 100 fpm rate of descent. I have the controls." Or, with no known urgent need for the control transfer, a more stable condition could have been selected to conduct the task. For example, "I have the controls." The PI responds with, "Based on flight conditions, recommend we wait until I complete this turn." It's simple, but greatly increasing the crew's situational awareness.

The mindset of transferring situational awareness with the flight controls can also be used when an event arises requiring immediate action.

Urgent transfer

Two UH-60s were conducting NVG formation flight as part of RL progression training. The aircraft were operating at altitude under low illumination and low contrast conditions with no visible horizon. The PI in the accident aircraft (Chalk 2) began to experience the effects of spatial disorientation and called for transfer of the flight controls. The PC immediately responded with, "I have the flight controls." Due to the flight conditions and lack of visual references, the PC became disoriented and lost control of the aircraft. The aircraft crashed, resulting in the loss of all crewmembers.

02:26: "Sir, You have the controls. "I have the flight controls."
Nose: 8 degrees down TAS: 123 ALT: 1160'
Bank: 6 degrees right bank HDG: 352 R/D: 750 fpm

02:30: FOUR SECONDS LATER
Nose: 32 degrees down TAS: 141 ALT: 880'
Bank: 22 degrees LEFT bank HDG: 352 R/D: 2000 fpm

Although the purpose of the control transfer from the inexperienced PI was not communicated, nor were the flight parameters of the aircraft, a methodical look at the instruments by the receiving PC as part of a standard transfer of controls may have helped the PC in his situational awareness and countering the effects of spatial disorientation due to lack of visual ques. Under the challenging flight conditions, parameters used during instrument flight would have been warranted.

As new mission parameters bring aircraft operations lower and into a more hazardous flight regime where reaction times are reduced and crew responses must be accurate and timely, the importance of transferring the flight parameters with the controls and communicating the "'why" factor also increases. *As an AH-64 was occupying a night battle position with low contrast, zero percent illumination, and limited visual cues outside the NVS, the PC, who was operating the flight controls, lost his outside visual reference when the pilot night vision sensor (PNVS) failed. With the aircraft at 100 feet AHO and airspeed less than 20 knots, the PC initiated a transfer of the flight controls to the CPG in the front seat and instructed the CPG to go to mode switch norm. The CPG, who was heads down inside the cockpit preparing to engage simulated targets, responded with, "I have the flight controls," followed by the PC's, "You have the flight controls." Immediately after the CPG took the controls, the aircraft was placed into an unrecoverable flight attitude and impacted the ground at a high rate of speed and descent, resulting in fatal injuries to the crew and destruction of the aircraft.* Following the PNVS failure, the PC did not tell the CPG why he was transferring the controls. More even, the CPG was heads down during a critical phase of the flight which was occupation of a battle position. It is important that both crewmembers understand the critical task prior to executing the mission.

Combined transfer

The transfer of the flight controls in its simplest form can be a very basic task following the protocols of the Announce, Acknowledge, and Confirm process. To gain the maximum benefit in the multitude of flight environments and critical phases of operations that Army aircrew members face in the conduct of their mission, don't just transfer the controls; utilize a combined transfer. The combined transfer includes, with the transfer of the controls, the transfer of situational awareness and reason for the transfer as part of the total communication/coordination package. ■

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Training to Meet the Near-Peer Threat

For the past 16 years, the conventional forces of Army aviation have trained for a specific mission set with a fairly narrow threat array. The predominant risk has been the environment and training focused on counterinsurgent (COIN) operations and mitigating environmental risk. With the re-emergence of the near-peer threat, Army aviation must adjust fire and retool its training programs to battle focus on the skills necessary to fight and survive in the high-risk–to-aviation-assets threat environment.

There are still senior aviators within our formations that remember the training focus from the 1990s and how we attempted to counter the threats of the former Soviet war machine. Our Army today is phenomenal at adapting to threats and environments as a necessity; but until we are forced to change our tactics and the employment of our weapons and survivability systems, we are slow to get ahead of the bow wave when reacting to emerging or future threats. We must not wait for the forcing function to be loss of life or equipment based on ineffective employment of tactics or aircraft systems. Army aviation must look ahead and improve its survivability on the modern battlefield by identifying the inherent risk factors associated with combat operations with peer or near-peer threats and implementing the appropriate training programs which provide the fundamentals of tactical terrain flight.

With the divestiture of our smaller armed reconnaissance aircraft, we now have a force which is largely untrained in the art of true nap-of-the-earth (NOE) terrain flight. Larger aircraft, with reduced visibility, are inherently more difficult and unforgiving when operating in close proximity of trees and terrain. Though we continue to require our aviators to conduct terrain flight tasks for evaluations, our warfighting focus has remained COIN centric, with little to no advanced air defense weapon system or integrated air defense threat defeat training. The massive amount of flight hours amassed by our formations during the global war on terrorism (GWOT), however, has not been wasted. Our formations possess aviator trainers with flight and operational experience not seen since the Vietnam War. This "air sense" and the flight experiences our warfighters have gained give them all the tools necessary to adapt and succeed in an alternate environment with different threat sets. It is incumbent on our aviation leaders to develop tough, realistic training scenarios that will challenge our aviators and develop their low-altitude skills while also expanding their knowledge of enemy threat systems and what countermeasures they possess to defeat a radio frequency (RF) missile/gun engagement.

An incremental, gated training strategy relying on the "crawl, walk, run" concept will enhance our formations survivability on the modern battlefield while reducing the probability of an accident or incident. Integrating aviation mission survivability officers (AMSO) into the program of instruction design will provide the necessary pre-mission threat risk mitigation strategies for operating in an advanced air defense artillery (ADA) threat environment.

The understanding of our aircraft vulnerabilities as well as our installed aircraft survivability equipment (ASE) capabilities and how to merge the two to effectively counter threats when our tactics have failed, requires access to classified information. Open-source study will only scratch the surface of what is required to fully integrate our survivability systems and maneuver to defeat the modern RF threat. We as an Army must improve accessibility to classified information for our aviators and the facilities to allow aviation personnel to interact and plan missions within a secure area. In this day of limited ASE resources and stay-behind equipment, units may only receive theater-specific ASE gear upon deployment, which creates an increased survivability risk. To mitigate the risk, reduction can be effected with the use of simulator scenarios and electronic warfare (EW) training ranges, which must be utilized effectively and often to prepare our aircrews for the future. Computer-based ASE training-operator (CBAT-O) and computer-based ASE training-classified (CBAT-C) will only serve as an introduction to our aircrews. Proficiency will only occur after diligent study and drills are performed to ingrain instinctive and appropriate actions and reactions to presented threat arrays.

The challenge our formations are going to be presented with are not unlike those we faced 16 years ago when we took aircraft into the challenging mountain environment of Afghanistan, where most were underpowered. We answered those challenges

with training plans that were aimed at reducing the risk of an incident or accident through mandated training programs like the High-Altitude Mountain Environment Training Strategy (HAMETS). With our return to a more near-peer threat array, we can expect the Army to produce and require training programs and strategies that highlight survival in these long-forgotten envelopes. Until a structured strategy is provided, unit commanders, AMSOs and standardization pilots must begin to focus on the flight techniques and aircraft employment methods at the grass-roots level. We must arm our aviators with the skills necessary to survive the flight and the knowledge required to defeat the threat in the modern, advanced battlefield. The time to train these skills and risk-mitigation techniques for operating and surviving in high ADA threat environments is now.

Our Army has always risen to the challenges of executing operations in a new environment. As the Army has transitioned to preparing for multi-domain operations in a high, ADA threat environment, Army aviation's ability to perform its mission sets relies on its ability to swing the pendulum back to the basics of training for a mix of RF and infrared threat systems and the techniques and tactics to minimize the risk and fight through the threat. To be successful, let's just make sure our adaptation is proactive rather than reactive to the new near-peer threat array. ■

CW5 L. Todd Saville
DES Standardization Officer

Continuous Refinement of the Plan:

A View of MDMP from the OPFOR at JMRC

Foreword

The ability to reduce operational risk to the combined arms team during combat operations requires the ability to apply adjustments to the operational plan which was produced during the military decision-making process (MDMP). In the lead up to and during combat operations there will always be unexpected consequences while carrying out the initial operations order plan. Our ability to adapt our operations plan to the reality on the ground is fundamental in achieving success against a threat force. The plan is the starting point. It provides the combatants with the base of knowledge and planned actions from which it can adjust as necessary due to changing conditions in the battle, while understanding the implications to the overall operation which these changes may produce. The following article provides a look at how an inability to refine the plan creates increased risk to our forces and the outcome of the battle during rotational training at the Joint Multinational Readiness Center (JMRC).
Jeff Warren, Major USA Retired

Force-on-force training at the Joint Multinational Readiness Center (JMRC) in Hohenfels, Germany, provides excellent opportunities for brigades to assess and improve their systems. One of the key processes that will make or break the rotational training unit (RTU) is the military decision-making process (MDMP). Executing the seven-step process is demanding for RTUs, particularly when they are simultaneously tackling other challenges. One of the most painful events of MDMP is found in an often overlooked sentence in Field Manual (FM) 6-0, Commander and Staff Organization Operations: "Commanders and staffs generally perform these steps sequentially; however, they may revisit several steps in an iterative fashion as they learn more about the situation."

During Allied Spirit V (held 26 September through 15 October 2016), changes in the situation forced JMRC's opposing force (OPFOR) — the 1st Battalion, 4th Infantry Regiment — to revisit steps three through seven after completion of the full MDMP process. Continually revising the plan and adjusting to the situation on the ground is necessary for success. It requires recognizing that the current plan is no longer valid. This continual revision occurs at the staff level during planning and also at the command level during execution. This article outlines a battle period at JMRC, starting with relative combat power analysis and ending with change of mission instructions.

Combat Power Analysis

For Allied Spirit V, the RTU was a composite brigade under a multinational headquarters. The ground combat forces consisted of one U.S. Stryker battalion and one U.S. airborne battalion with a Canadian company attached. Fire support came from a U.S. field artillery battalion with one Italian battery attached. The aviation was a multinational task force with U.S. attack aviation, Belgian scout aviation, and both Czech and U.S. lift assets. Brigade and higher collection assets included a Lithuanian reconnaissance company, a U.S. Navy SEAL platoon, UK pathfinders, and two U.S. Shadow unmanned aerial vehicles (UAVs). There was no dedicated brigade sustainment battalion or brigade engineer battalion (BEB) in the RTU. Company and smaller elements within the task force covered these support functions. It was not clear exactly how this would happen, and it was a challenge for the brigade to address. The RTU's task was to delay and then defend against advancing 1-4 IN armor to provide time for the RTU's decisive operation (DO) to move into position in the north and prepare for a counterattack.

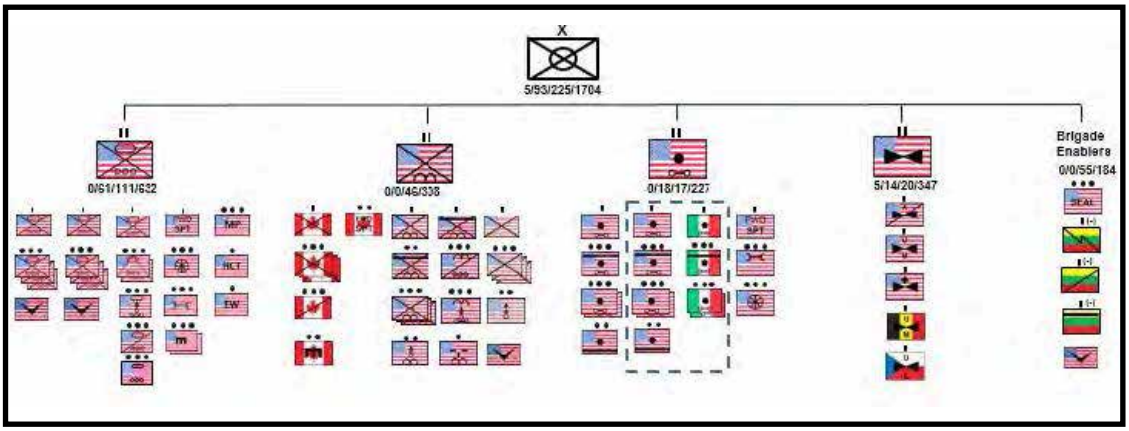


Figure 1 — Rotational Training Unit Task Organization for Allied Spirit V

The 1-4 IN fought with a total of four companies. Two mechanized infantry companies had three tanks and six infantry fighting vehicles (IFVs) per company. One engineer company had three sapper platoons and two D7 blade teams. One recon company consisted of one mortar platoon fighting as mounted infantry, one anti-tank platoon, and two platoons of special purpose forces (SPF — essentially OPFOR special operations forces). The 1-4 IN had significant artillery at its disposal including an artillery battalion (152mm howitzers), a 120mm mortar platoon, a multiple launch rocket system (MLRS) battery capable of firing chemical munitions, scatterable mines, conventional high explosive (HE), and dual-purpose improved conventional munitions (DPICM). The 1-4 IN also had a Mi-35 Hind air weapons team (AWT) at its disposal and direct support from brigade-level UAS and counterfire radar. The 1-4 IN's mission was attack to neutralize the RTU to enable the seizure of Nurnberg by the division DO.

The relative combat power analysis revealed several advantages for 1-4 IN to exploit in the attack: maneuver, mission command, and protection. The staff also assessed that RTU logistics would be susceptible to disruption given they did not have a dedicated brigade support battalion (BSB).

Maneuver advantage for 1-4 IN was inherent given the formations. The majority of 1-4 IN fights in tracked vehicles, which have significantly better off-road capabilities compared to the Stryker vehicle and obvious speed advantages over the RTU's dismounted infantry. From a movement/maneuver perspective, the only assets the RTU could rapidly reallocate against attacking forces were

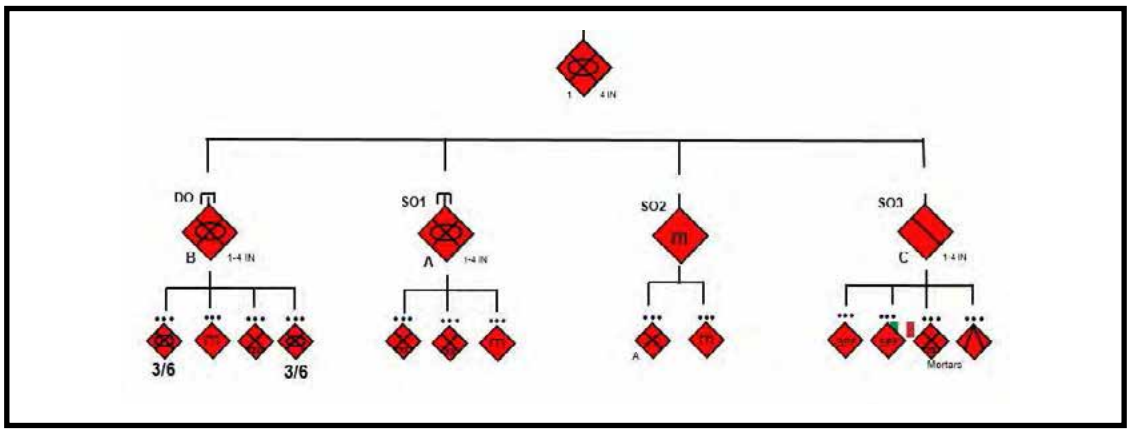


Figure 2 — OPFOR Task Organization

aviation assets and the Stryker battalion. The 1-4 IN had the ability to focus the majority of its combat power on a narrow front, and the RTU did not have the ability to rapidly respond to this challenge.

Mission command was a second advantage for 1-4 IN, particularly in the intelligence and fires warfighting functions. From an intelligence perspective, the RTU had a larger number of collection and analysis assets at its disposal. However, the force structure distributed the intelligence assets among multiple headquarters, and several did not even fall directly within the brigade (SEAL platoon and UK pathfinders reported to division through a separate chain of command). This created multiple steps between target acquisition, decision, and delivery which made the unit susceptible to deception. The 1-4 IN operates a much flatter collection plan with all assets reporting to one intel cell. The unit had a similar advantage in the fires warfighting function, with a single mission command post receiving, approving, and processing all fire missions. The RTU's larger size and multiple headquarters made clearing and approving fires a much more difficult and timely process.

The 1-4 IN's IFVs and tanks provided an additional advantage in protection. The RTU only had four weapons capable of defeating IFV and tank armor protection: attack aviation, Stryker Mobile Gun System (MGS), Stryker Anti-tank Guided Missile (ATGM), and Javelin. If 1-4 IN was capable of neutralizing these assets, it could destroy the remainder of the RTU brigade with impunity.

An OPFOR soldier fires a simulated rocket-propelled grenade during Allied Spirit V at the 7th Army Training Command's Hohenfels Training Area, Germany, on 12 October 2016. Photo by SPC Emily Houdershieldt

The Plan

The 1-4 IN staff built the initial course of action (COA) off of this analysis. The recon company would confirm the location of the RTU, identify seams, and disrupt its engagement area development. All three maneuver companies would advance on one avenue of approach and mass against the RTU's Stryker battalion. The companies would neutralize the Stryker battalion and then move on the light infantry battalion. A chemical strike from division MLRS and massed indirect fire from 2A36 howitzers supported the attack. By attacking on one axis, 1-4 IN would be able to achieve a 3:1 combat power advantage at the point of its attack, even though the overall ratio was in favor of the RTU.

Anti-tank (AT) assets were the largest threat to 1-4 IN's success. To control this risk, 1-4 IN tasked the recon company with targeting and destroying the easily identifiable ATGM and MGS Strykers. Unfortunately, Javelin missiles are harder to locate on the battlefield so a different method was required to neutralize them. The plan called for 1-4 IN SPF to disrupt the RTU support area, attacking logistics and mission command nodes. This would pull command focus to the rear (away from engagement area development) and reduce effective integration of AT systems into the RTU's defense.

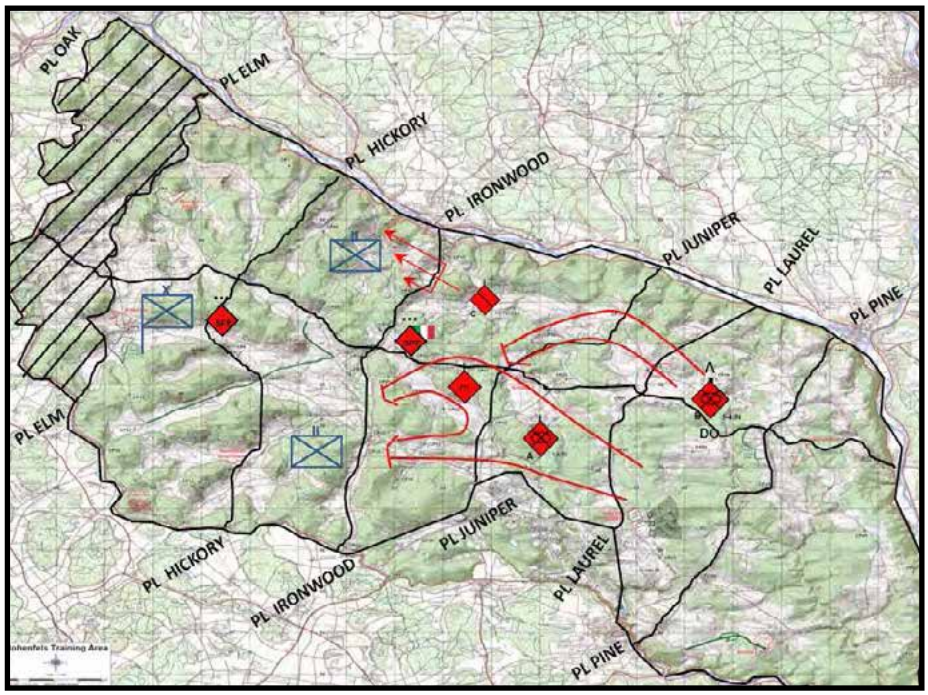


Figure 3 — OPFOR Scheme of Maneuver for the Attack

Reality on the battlefield quickly showed itself to be different from expectations. When 1-4 IN conducted a reconnaissance in force one day prior to the main attack, it identified two major changes in the enemy array that required a rethinking of the plan. First, the enemy task organization had changed. The RTU cross-attached companies between the Stryker and light infantry battalions. This meant that our initial plan of massing against only the Stryker battalion was no longer feasible as the infantry battalion also had Strykers. The RTU would be able to move forces from one task force to support the other if needed. Second, the enemy placed his defenses much further west than initially templated. With updated enemy information, the staff went back and developed a new COA, war gamed it, approved it, and published a fragmentary order (FRAGO) with the new scheme of maneuver. From the reconnaissance-in-force backbrief to FRAGO issue, the process took roughly six hours.

The FRAGO'd plan was a penetration targeting the southern task force. Supported by indirect fire and smoke, the recon company would fix the RTU in the north. The main body would initially move on a northern avenue of approach as deception. The intent was for the RTU to see recon forces and obscuration in the northern engagement area with tanks advancing in support. However, the sappers would advance to the southern engagement area with a chemical strike supporting. The main body would turn south, penetrate the engagement area, and destroy the enemy from behind. With the FRAGO issued, it was time for execution and more refinement.

The Battle

As 1-4 IN initiated the attack, they identified their first issue. The lead element was the attached reserve component sapper company. While it had a guide from the recon company and an attached platoon familiar with the terrain, the element had difficulty maintaining the rate of march necessary to stay synchronized with its enablers. The chemical strike from division MLRS required an hour of lead time. The MLRS fired according to the triggers planned, but with the lead company moving slower, the chemical agent dissipated on the target before the attack hit, which forced the tactical command post (TAC) to make a decision:

COA 1 — Conserve Combat Power: Halt the main body until the sappers reach the RTU engagement area. This would ensure awareness of the engagement area before the DO was committed. However, the MLRS would no longer support the DO's attack, and the main body would be vulnerable to indirect fire (IDF) and attack aviation.

COA 2 — Risk Combat Power: Allow the main body to close with or bypass the lead element. This would ensure the DO's attack was supported by all planned enablers but would also mean the main body would make initial contact with the enemy.

In considering the options, the TAC had to decide which risk was prudent. They decided halting the main body was a lesser risk because it preserved combat power. The RTU's defensive belts were unknown and bypasses were not yet identified. The halted DO would be vulnerable, but in order for the RTU to exploit and gain the initiative, they would have to identify the halted 1-4 IN main body, report it, decide on an action, and execute — all before the main body continued movement.

This decision to halt the main body was critical for the fight. Allowing the main body to bypass the engineers or decrease separation could have allowed the attack to hit in time with the chemical agent as originally planned; however, the main body would be making the initial contact with the

An AH-64D Apache Longbow helicopter crew with the 12th Combat Aviation Brigade takes part in Exercise Allied Spirit on 4 October 2016. Photo by Gertrud Zach

RTU, reducing flexibility. While halting movement provided an opportunity for the RTU, 1-4 IN was safe halting for a short time, based on an understanding of the RTU's ability to react. The flexibility provided by keeping the main body uncommitted showed its value when the sappers hit the RTU defense and identified the second issue — obstacles.

The RTU obstacle development was much more substantial than 1-4 IN expected. The terrain at Hohenfels is not conducive to developing a brigade-sized engagement area. The ridges and valleys split up the brigade area of operations (AO) into a series of company-size engagement areas. Normally 1-4 IN is able to find one of the company engagement areas that the engineers did not reach and penetrate. In this case, the RTU engineers had been working directly at the battalion level and below and had built up most of the engagement areas very well. This further slowed the sappers, and they were heavily attritted by RTU attack aviation.

The RTU used the attack aviation as a maneuver element and tasked them to screen. The advantage the RTU gained by this was that the aviation was not pulled to the north in reaction to 1-4 IN deception. The attack aviation stayed in a screen to the south, exactly where the sappers were entering engagement areas. The AH-64s did significant damage to the two lead 1-4 IN companies while they were attempting to penetrate obstacles. The aviation screen, however, also prevented the RTU from massing indirect fires because they were unable to clear air.

The fight at the breach lasted more than three hours but only consumed 1-4 IN's shaping efforts. If the TAC had maintained the initial plan, the DO would have been the element attritted by the aviation, not the sappers. In this case, the change of the plan ultimately resulted in a successful penetration by the DO with nearly all of its combat power.

Conclusion

Neither the RTU nor 1-4 IN had a perfect picture of what the fight would look like. The fight on the ground turned out very different from what was anticipated on either side. The RTU was successful in overcoming many weaknesses of its task organization, particularly the lack of a BEB. The 1-4 IN was successful in exploiting other weaknesses such as the sensor-shooter disconnect and the lack of RTU mobility. Some decisions, such as the employment of attack aviation, are difficult to judge as many of the advantages were offset by other problems they caused. This shows the necessity of continual refinement of the plan both during the MDMP process and during execution. During Allied Spirit V, as with most CTC rotations, the continually changing situation required the staff to constantly analyze and adjust. During execution, continuous supervision and refinement were necessary to ensure the units stayed synchronized when the pace did not match the planned tempo. Continual refinement is key to success. ■

Soldiers with Charlie Company, 1st Battalion, 503rd Infantry Regiment, 173rd Airborne Brigade, conduct a foot patrol during Allied Spirit V on 8 October 2016. Photo by Markus Rauchenberger

CPT Erik J. Prins is currently serving as commander of Cherokee Company, 1st Battalion, 4th Infantry Regiment, in Hohenfels, Germany. His previous assignments include serving as a platoon leader and company executive officer in the 1st Battalion, 87th Infantry Regiment, 10th Mountain Division, at Fort Drum, NY; and assistant operations officer (plans) with the Joint Multinational Readiness Center in Hohenfels for 12 decisive action training environment rotations. CPT Prins earned a bachelor's degree in criminal justice from Grand Valley State University.

Infantry Professional Bulletin July-September 2017
PB 7-17-3
BG Christopher T. Donahue
Commandant,
U.S. Army Infantry School

Mishap Review - UH-60 Loss of Tail Rotor Thrust

While in flight during mission execution, tail rotor disbonding occurred, resulting in severe vibrations. The aircraft tail rotor gearbox separated from its mount points on the tail pylon. The aircraft entered autorotation, spun and contacted a tree, followed by ground impact. One fatality and the aircraft was a total loss.

History of Flight

While executing a daytime, cross-country, formation flight under visual meteorological conditions, Chalk 3 in a flight of three UH-60 aircraft experienced vibrations shortly after takeoff. The aircraft lost three of four tail rotor blades, and eventually the tail rotor gearbox separated from its mount point. The aircraft was traveling at 140 knots and approximately 1,500 feet when the separation occurred. When the vibrations started, the aircraft entered an autorotational descent. At approximately 250 feet above ground level (AGL) the aircraft began to spin on the vertical axis as it continued its descent. The main rotors contacted a large tree and the aircraft fell vertically to the ground, landing on its belly. One fatality occurred.

Crewmember Experience

The pilot in command (PC) had 429 hours in series and 560 hours total time. The PI had 375 hours in series and 826 total time.

Commentary

As Army aviation aircraft operate in extremely harsh environments and have high-stress workloads placed on them during training and combat missions, it is imperative aviators are prepared to execute emergency procedures during each flight. System and component failures can and do occur, so the ability to quickly identify, analyze and respond to a systems failure or component failure correctly can mean the difference between a safe landing and a catastrophic one. Aviators must ensure emergency procedures are followed as directed in their aircraft operator's manual. When failures are those which require immediate-action underlined steps to be executed, aviators must be thoroughly trained and have those procedures engrained in them. Commanders should ensure their unit personnel are making maximum utilization of simulator training and spend adequate time focusing on immediate-action emergency procedure training. Whether in combat or training, aviators must be prepared to respond correctly to emergency procedures. Training these procedures on a regular basis provides the best opportunity for crews to execute the proper emergency procedure responses when necessary which maximize positive outcomes following an emergency. ■

Class A - C Mishap Tables

	Manned Aircraft Class A – C Mishap Table									as of 26 Apr 18
	Month	FY 17					FY 18			
		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities		Class A Mishaps	Class B Mishaps	Class C Mishaps	Fatalities
1st Qtr	October	0	0	7	0		1	2	6	0
	November	1	0	4	0		0	1	3	0
	December	1	0	4	2		1	0	7	0
2nd Qtr	January	1	0	3	0		1	1	3	2
	February	0	1	4	0		0	0	1	0
	March	0	1	5	0		0	1	10	0
3rd Qtr	April	1	0	6	1		1	1	3	2
	May	1	0	7	0					
	June	0	3	4	0					
4th Qtr	July	0	1	7	0					
	August	3	3	4	6					
	September	1	1	6	1					
	Total for Year	9	10	61	10	Year to Date	4	6	33	4
	Class A Flight Accident rate per 100,000 Flight Hours									
	5 Yr Avg: 1.14		3 Yr Avg: 1.09			FY 17: 0.99			Current FY: 0.96	

	UAS Class A – C Mishap Table								as of 26 Apr 18
	FY 17					FY 18			
	Class A Mishaps	Class B Mishaps	Class C Mishaps	Total		Class A Mishaps	Class B Mishaps	Class C Mishaps	Total
MQ-1	10	2	4	16	W/GE	3	0	2	5
MQ-5	5	0	1	6	Hunter	0	0	0	0
RQ-7	0	16	38	54	Shadow	0	4	11	15
RQ-11	0	0	1	1	Raven	0	0	0	0
RQ-20	0	0	0	0	Puma	0	0	0	0
SUAV	0	0	0	0	SUAV	0	0	0	0
UAS	15	18	44	77	UAS	3	4	13	20
Aerostat	6	0	1	7	Aerostat	2	1	0	3
Total for Year	21	18	45	84	Year to Date	5	5	13	23

Flightfax Forum

Tracking Army Aviation Maintainer Proficiency: The Case for Automation

Current Operations

Army aviation maintenance is a very high-tempo operation. The results of our maintainers are seen every day in aviation flight training and combat operations. Following a decade of reliance on contract maintenance to fill the green suiter void, and due to manpower restrictions in theaters of operation, Army aviation maintainers have taken the brunt of limited maintenance opportunities to increase their skills and experience. The Army aviation leadership recognized that aviation maintainers require a codified training program and implemented the production of the Aviation Maintenance Training Program technical circular. This program will provide the field with guidance concerning aviation maintainer training and responsibilities from the aviation brigade to the platoon level.

This training program guidance requires a method of tracking maintainer proficiency and certifications. Currently, the Army requirement is for units to utilize the Digital Training Management System (DTMS), which is a web-based commercial-off-the-shelf software application customized to implement Field Manual 7-1 Battle Focused Training. Optimized for use at brigade level and below, the DTMS provides the ability to plan, resource and manage unit and individual training at all levels. It compiles and displays a unit roll-up of training conducted through a series of customizable tabs to track weapons qualification, Army physical fitness tests, Army Regulation 350-1 mandatory training and deployment tasks from enlistment to retirement.

Efficacy

Within the scope of tracking training and proficiency for aviation maintainers, there is derived information which typically is found in the Army standardized training and counseling system. While DTMS provides the mechanism to track personnel training in a job book format, it still requires manual input of data. Requisite in this input is a heavy workload upon supervisors to search out records of training, requirements and validation of what the Soldier accomplished and their proficiency level. This becomes a very intensive process and leaves the actual completion and efficiency of the records to chance, at times based on the commander's priorities and the mission workload.

Some examples of why the job book may not be used purposefully are:

1. It is an enormous task, one with large amounts of paperwork to track and keep on file for each Soldier.
2. Leaders can quickly become task saturated with the myriad of tasks they must accomplish daily in aviation maintenance.
3. When the leader has to draw the line on whether they are supervising, mentoring and training Soldiers, or in the office filling out the paperwork and inputting into DTMS, leaders know what will be "adjusted to the right" to make the mission happen.

Army leaders and Soldiers work extremely hard to execute the mission, yet are left with no real good option when it comes to managing and tracking aviation maintainer training and proficiency within the given systems available.

If the Army were to conduct an analysis of the tracking and managing of aviation maintainers within DTMS, it probably stands a high chance that the results would show a lack of accuracy in the records. This just sheds more light on the issue that maybe for aviation maintainer training and proficiency tracking there needs to be an alternate system which automates maintainer tracking and proficiency management. While we currently have regulations and guidance to use DTMS for tracking, that doesn't mean it is the right system for all organizations. Rarely does an out-of-the-box SAP solution for a very large functionally distributed organization have the capability to cover every section and make it user-friendly and light workload.

Misguided Value

So how do Army aviation maintenance leaders provide the required tracking and management and execute the mission of training, supervising and mentoring young aviation maintenance Soldiers? If the current system requires an extensive amount of time to manually gather records information, consolidate work by each Soldier, verify proficiency or lack of, query quality control inspectors, review counseling, and then input all this information into the job book, is it really producing the value stated in battle focusing? If leaders at the platoon level are able to do this and provide the

necessary oversight of their Soldiers, while training, supervising and mentoring on the line, then they are probably the exception. As we look at battle focusing, we understand that our organizations can't do it all. The Army states it knows that, yet we give guidance to maintenance organizations which causes them to operate contrary to battle focusing.

To overcome the task saturation, it becomes easy for noncommissioned officers to determine what the most important task to complete is — battle focusing on aircraft being combat capable and mission ready. Within this scope they are providing the proper supervision, training and visibility on the floor to ensure maintenance tasks are completed safely and correctly.

An Alternate COA

What if there were a system similar to the Centralized Aviation Flight Records System (CAFRS) and what if it provided automated management of aviation maintainer training, proficiency, task accomplishment and certifications? As an alternate course of action, this certainly would provide an added value to the Army. Within the automated process, commanders from the lowest level to senior Army leaders could know the status of unit maintenance personnel. This same information could also be utilized to assist in resource, readiness and personnel management. Within the scope of the added value is the reduction in man hours spent by NCOs and leaders manually inputting information into a system while instead being able to apply more man hours in training, supervising and evaluating their subordinates so they can manage their personnel more effectively to accomplish the mission.

Below is an example of how CAFRS integrates seamlessly with the Army enterprise systems and automates what was once a very labor-intensive manual-entry process.

So if the Army were to develop a system which automates tasks for maintenance personnel such as task completed, proficiency level, training records and certifications in aviation and have it compatible with integrating into the Army enterprise systems, as does CAFRS, wouldn't this be the best option? This would provide commanders with the opportunity to apply more NCO force to hands-on leadership and supervision, while gaining all the appropriate training and proficiency information necessary for them to make risk assessment decisions on who is assigned specific tasks and for deployment decisions — all while decreasing the laborious manual entry which is currently the process.

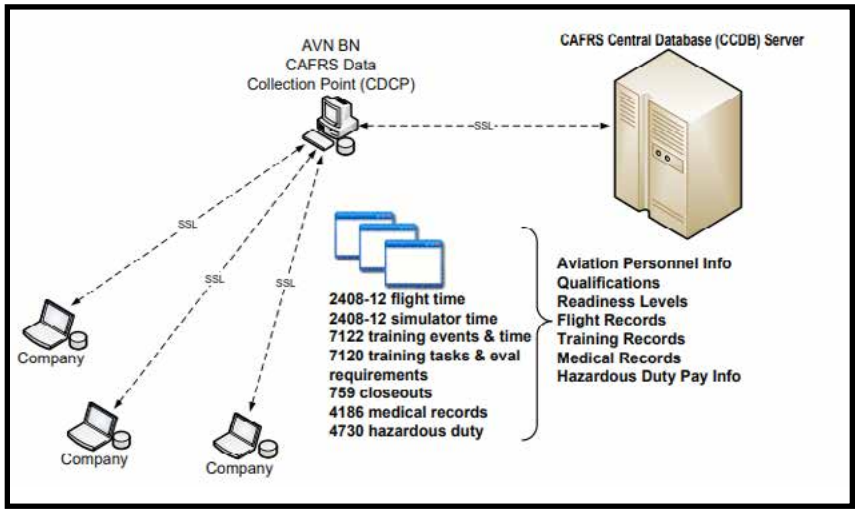
Possibilities

There are existing solutions with commercial companies providing for Army aviation needs. An example of a system which is a government-funded solution software was produced to support an Army organization's needs to put more hands on the aircraft and less on keyboards manually entering data. The system is fully integrated into the Army enterprise, pulls information from Unit Level Logistics System-Aviation (ULLS-A) and has the capability to tie to Global Combat Support System-Army (GCSS-A). The application provides leaders with real-time maintenance information on each maintainer in addition to real-time readiness and sustainment information. All the information is provided to the commander in an intuitive dashboard format.

The system provides maintainer readiness information to the commander such as:

- Immediate graphic depiction of current aircraft maintainer readiness.
- Automated management of training requirements and associated tasks.
- Associates open faults on aircraft with a Soldier who needs experience to gain the credentials for certification or progression.
- Automatically updates reports necessary to build the individual's training folder.

With the next update of this software, the goal is to have the system connect with DTMS and populate it with data directly.



The Way Ahead

As Army aviation continues preparing to support ground commanders worldwide, we must be able to execute cross-domain maneuver operations, which will rely on every Soldier within the organization to be fully trained and proficient.

To accomplish this and maintain low-risk and high operational capability, aviation as an enterprise should maximize utilization of its NCOs on the floor, personally training, supervising and evaluating maintainers while utilizing available software applications to automate population of training and proficiency tracking information to the individual critical task list (ICTL).

Commanders can use this real-time information to thoroughly assess their unit maintenance readiness and reduce risk through information management. This produces the greatest economy of force for aviation organization maintenance operations, ensuring the right personnel receive the right training with the proper supervision to produce skilled aviation maintenance Soldiers who can deploy anywhere and provide a fully mission capable (FMC) aircraft. ■

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Hot Topics

Airspace Control Proponent Office (ACPO) Reorganization.
ACPO coordinating with the Army Joint Support Team (AJST) to implement the move of AJST from Combined Arms Center-Training to Mission Command Center of Excellence and ACPO under ASJT. The organizational shift is planned for May 18.

Joint Air Ground Integration Center (JAGIC) Update:

JAGIC ATP Revision. The ATP 3-91.1 was sent out for worldwide staffing on 27 March with a suspense of 25 Jun 18. Major ACPO estimates completion of the ATP Revision will be 4th QTR, FY 18.

JAGIC Training Circular. The draft, staffing memo, and comment matrix for Service wide staffing were submitted to CADD for the TC 3-91.1, Training the JAGIC. ACPO estimates completion of the TC will be 4th QTR, FY 18.

Div FDU. ACPO has provided the organizational design for the Airspace Control Element in the division, Organization of the JAGIC using PLS containers and airspace and JAGIC input to the Division O&O to TCM EAB and CADD. The Design and the O&O are at FORSCOM for staffing.

Airspace Control Portfolio Review GOSC.
The Airspace Control Portfolio Review GOSC was held on 20 April 18.

Army Air Force Integration Forum Council of Colonels - TCM EAB Tactical Corps Working Group.
The AAFIF scheduled for 11 Apr was postponed until May. The proposal for an enhanced Corps TAC is complete. The CSA/CSAF Army Air Force Warfighter talks will be held on 16 May 18.

Joint Fires Symposium.
ACPO has been invited to present at the Joint Fires Symposium 8/9 May in Virginia Beach, VA. ACPO's presentation will cover the use of the Airspace Information Services interface used by the Army airspace personnel in the JAGIC to dynamically collaborate with the USAF airspace managers in the JAGIC and in the Combined Air Operations Center. ACPO's white paper "Future Close Air Support: Improve Airspace Control" 9 Dec 15 will be the basis for the presentation.

JAGIC Systems Handbook.
ACPO is revising the JAGIC Systems Handbook. ACPO is addressing a number of systems interoperability gaps in the current systems handbook. ACPO is developing system interoperability cutsheets based on research with SMEs and documents. Validation of all system interoperability tasks will occur over 3rd/4th QTR, FY 18.

CGSC A305 Air Ground Operations Elective.
ACPO is assisting CGSC DTAC in the assessment of the new Air Ground Operations (AGO) elective. ACPO is attending all of the blocks of instruction except CEMA and providing comments to the lead instructor.

For questions, comments or concerns contact ACPO via the Airspace Control page on milBook (https://www.milsuite.mil/book/community/spaces/airspace-control). Be sure to follow the page and stay informed on products, discussions and updates to all things concerning airspace control and airspace management.

FY 18 ALERT SERVICE BULLETINS (ASBs), Airworthiness Directives (ADs) & SERVICE BULLETINS (SBs), Safety Information Notices (SIN), ASAMS, SOFs

ASB BK117 C-2-65A-008 Tail Rotor Gearbox, 2 Feb 18
ASB BK117 C-2-29A-003R3 Hydraulic Power System-Plate Assembly, 3 Jan 18
ASB BK117 C-2-85A-042R1 Outboard Load System, 3 Jan 18
SIN 3157-S-63 Main Rotor Drive, 6 Dec 17
ASB BK117 C-2-31-068 Indicating and Recording System-CVFDR, 28 Nov 17
SIN 3190-S-00 GPUs with Lithium ION Batteries, 20 Nov 17
SAIB SW-18-04 Engine Oil Drainage System, 20 Nov 17
ASB BK117 C-2-71-019 Inlet Barrier Filter, 17 Oct 17
ASB BK117 C-2-71-020 Inlet Barrier Filter, 17 Oct 17
SAIB SW-17-30 Inlet Barrier Filter System, 17 Oct 17
AD 2017-09-02 Main Rotor Blade – Vibration Absorbers, 2 Oct 17
SIN 3170-S-00 External Load Operations, 5 Oct 17
AD 2017-09-02 Air Inlet Cover Rings, 2 Oct 17

Flightfax

When conducting aviation planning and risk assessments, many factors are
ensure the mitigation of potential risks, prior to the aircrew lifting off the
The primary base for this premise is the established three-step mission
process. When a crew heads out to their aircraft, a systematic review of the

Blast From The Past: *Articles from the archives of past **Flightfax** issues*

VOL 3, NO. 49, 1 October 1975

COMMAND INFLUENCE?

The aviation detachment was situated outside a large city. The location was ideal and so was the mission, strictly VIP flights in plush U-8Fs and UH-1s. The unit, headed by a lieutenant colonel, was made up of some of the most experienced officers and warrant officers in the command.

The "old man" had been commended personally for a job well done early in the week and he had declared a training holiday on Friday and Saturday, with minimum crew on standby. Friday afternoon we got word that the commanding general would be making an inspection of the local area by sedan and would like a helicopter on standby Saturday in case his schedule was tight.

On Saturday, MAJ Maxwell, our exec and a senior aviator, and CW4 Warren checked weather, and the picture was not so good — 500 feet overcast with 1½ miles visibility dropping in the afternoon. They proceeded to preflight and review the general's inspection route.

After 1530 we learned that the general was to be picked up at a place about 15 minutes from the airfield and transported back to his headquarters 30 miles away.

CW4 Warren was concerned about the weather. His years of experience told him this was no time to be flying. The weather was intermittently 100 feet overcast, with ¾-mile visibility. Warren told MAJ Maxwell how he felt but Maxwell said they should try it anyway.

They strapped in and began the run-up checklist. Halfway through the checklist, Maxwell agreed with Warren that the flight should not be made. He left the helicopter and called the unit commander and told him the situation.

The commander arrived at the airfield about 15 minutes later and after a quick discussion told them the detachment was to support headquarters on all missions and that he would replace Warren on the flight.

Although there were IFR facilities in the area, and the aircraft was instrument equipped, the mission required VFR weather and landings at small helipads.

The commander, a master Army aviator, and Maxwell departed low level to the pickup site. The weather forced them to fly low over the route and the commander was heard to comment over FM at operations, "I hope we can get over that damn pass into the valley; then we're home free."

At approximately 1715, 45 minutes after the flight departed, operations was notified that the general was proceeding by sedan back to headquarters because the helicopter had not arrived.

About 1815 a ground search was initiated. The wreckage was found and all crewmembers were dead. The commander was still on the controls.

Cause? You guessed it. Trying to maintain VFR in IMC. The reason? Command influence or just damn fools? As I looked down into the crushed cockpit and saw two pairs of aviator wings, one master and one senior, I wondered how many other crews take unnecessary risks when the mission could be accomplished in other ways.

Mishap Briefs for Month of April 2018

Attack Helicopters

AH-64

E Model –Aircraft crashed while conducting aerial gunnery training under night vision system. Post-crash fire ensued and both crewmembers suffered fatal injuries. (Class A)

D Model- #2 Engine nacelle door opened while crew was conducting a low level flight, resulting in damage to the support structure of the engine nacelle. (Class C)

Utility Helicopters

UH-60

L Model- Aircraft experienced #2 engine exceedance (105%/12 sec) during run-up for flight. (Class C)

M Model- Aircraft was being ground-taxied for refuel-parking when its main rotor system made contact with the vertical fin of a parked AH-64D. (Class B)

M Model- Crew was conducting AQT when a bird struck the main rotor system of aircraft. The aircraft was flown to the nearest stage field where crew performed normal shutdown. Post flight inspection revealed damage to one blade. (Class C)

Unmanned Aircraft Systems

MQ-1

C Model- Aircraft sustained damage to left landing gear and left stabilator after striking a runway light while landing during high wind conditions. (Class C)

RQ-7

B Model- During the mission, the AV experienced a propulsion failure. The FTS was deployed and AV recovery is in progress. (Class C)

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If you have comments, input, or contributions to Flightfax, feel free to contact the Aviation Division, U.S. Army Combat Readiness Center at com (334) 255-3530, DSN 558-3530.

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Degraded Visual Environment

There's an aviation killer out there and it's called DVE.

It lurks in conditions conducive to spatial disorientation, low illumination, poor contrast, limited visibility and dusty environments.

It will steal an aircrew's situational awareness.

Maintain Your Guard!

- **Plan for it**
- **Train for it**
- **Manage the Risk**

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